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TPO-16

## **Trade and the Ancient Middle East**

Trade was the mainstay of the urban economy in the Middle East, as caravans negotiated the surrounding desert, restricted only by access to water and by mountain ranges. This has been so since ancient times, partly due to the geology of the area, which is mostly limestone and sandstone, with few deposits of metallic ore and other useful materials Ancient demands for obsidian (a black volcanic rock useful for making mirrors and tools) led to trade with Armenia to the north, while jade for cutting tools was brought from Turkistan, and the precious stone lapis lazuli was imported from Afghanistan. One can trace such expeditions back to ancient Sumeria, the earliest known Middle Eastern civilization. Records show merchant caravans and trading posts set up by the Sumerians in the surrounding mountains and deserts of Persia and Arabia, where they traded grain for raw materials, such as timber and stones, as well as for metals and gems.

Reliance on trade had several important consequences. Production was generally in the hands of skilled individual artisans doing piecework under the tutelage of a master who was also the shop owner. In these shops differences of rank were blurred as artisans and masters labored side by side in the same modest establishment, were usually members of the same guild and religious sect, lived in the same neighborhoods, and often had assumed (or real) kinship relationships. The worker was bound to the master by a mutual contract that either one could repudiate, and the relationship was conceptualized as one of partnership.

This mode of craft production favored the growth of self-governing and ideologically egalitarian craft guilds everywhere in the Middle Eastern city. These were essentially professional associations that provided for the mutual aid and protection of their members, and allowed for the maintenance of professional standards. The growth of independent guilds was furthered by the fact that surplus was not a result of domestic craft production but resulted primarily from international trading; the government left working people to govern themselves, much as shepherds of tribal confederacies were left alone by their leaders. In the multiplicity of small-scale local egalitarian or quasi-egalitarian organizations for fellowship, worship, and production that flourished in this laissez-faire environment, individuals could interact with one another within a community of harmony and ideological equality, following their own popularly elected leaders and governing themselves by shared consensus while minimizing distinctions of wealth and power.

The mercantile economy was also characterized by a peculiar moral stance that is typical of people who live by trade—an attitude that is individualistic, calculating, risk taking, and adaptive to circumstances. As among tribespeople, personal relationships and a careful weighing of character have always been crucial in a mercantile economy with little regulation, where one's word is one's bond and where informal ties of trust cement together an international trade network. Nor have merchants and artisans ever had much tolerance for aristocratic professions of moral superiority, favoring instead an egalitarian ethic of the open market, where steady hard work, the loyalty of one's fellows, and ntrepreneurial skill make all the difference. And, like the pastoralists, Middle Eastern merchants and artisans unhappy with their environment could simply pack up and leave for greener pastures—an act of self-assertion wholly impossible in most other civilizations throughout history.

Dependence on long-distance trade also meant that the great empires of the Middle East were built both literally and figuratively on shifting sand. The central state, though often very rich and very populous, was intrinsically fragile, since the development of new international trade routes could undermine the monetary base and erode state power, as occurred when European seafarers circumvented Middle Eastern merchants after Vasco da Gama's voyage around Africa in the late fifteenth century opened up a southern route. The ecology of the region also permitted armed predators to prowl the surrounding barrens, which were almost impossible for a state to control. Peripheral peoples therefore had a great advantage in their dealings with the center, making government authority insecure and anxious.

【Paragraph 1】Trade was the mainstay of the urban economy in the Middle East, as caravans negotiated the surrounding desert, restricted only by access to water and by mountain ranges. This has been so since ancient times, partly due to the geology of the area, which is mostly limestone and sandstone, with few deposits of metallic ore and other useful materials Ancient demands for obsidian (a black volcanic rock useful for making mirrors and tools) led to trade with Armenia to the north, while jade for cutting tools was brought from Turkistan, and the precious stone lapis lazuli was imported from Afghanistan. One can trace such expeditions back to ancient Sumeria, the earliest known Middle Eastern civilization. Records show merchant caravans and trading posts set up by the Sumerians in the surrounding mountains and deserts of Persia and Arabia, where they traded grain for raw materials, such as timber and stones, as well as for metals and gems.

1. According to paragraph 1, why has trade been so important throughout the history of the Middle East

○The rare and valuable metals and stones found in Middle Eastern deserts have always been in high demand in surrounding areas.

○Growing conditions throughout the Middle East are generally poor, forcing Middle Eastern people to depend on imported grain.

○Many useful and decorative raw materials cannot be found naturally in the Middle East but are available from neighboring regions.

○Frequent travel, due to limited water supplies in the Middle East, created many opportunities for trade with neighboring societies.

【Paragraph 2】Reliance on trade had several important consequences. Production was generally in the hands of skilled individual artisans doing piecework under the tutelage of a master who was also the shop owner. In these shops differences of rank were blurred as artisans and masters labored side by side in the same modest establishment, were usually members of the same guild and religious sect, lived in the same neighborhoods, and often had assumed (or real) kinship relationships. The worker was bound to the master by a mutual contract that either one could repudiate, and the relationship was conceptualized as one of partnership.

2. The word “repudiate”in the passage is closest in meaning to

○respect

○reject

○review

○revise

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3. According to paragraph 2, how did Middle Eastern shop owners treat their workers?

○Workers were ranked according to their skill level, with the most-experienced artisans becoming partial owners of the shop.

○Shop owners treated different workers differently depending on how much the workers had in common with their masters.

○Workers were bound to their masters by unbreakable contracts that strictly defined the terms of their partnership.

○The shop owner worked alongside the workers and often considered them partner and members of the family.

【Paragraph 3】This mode of craft production favored the growth of self-governing and ideologically egalitarian craft guilds everywhere in the Middle Eastern city. These were essentially professional associations that provided for the mutual aid and protection of their members, and allowed for the maintenance of professional standards. The growth of independent guilds was furthered by the fact that surplus was not a result of domestic craft production but resulted primarily from international trading; the government left working people to govern themselves, much as shepherds of tribal confederacies were left alone by their leaders. In the multiplicity of small-scale local egalitarian or quasi-egalitarian organizations for fellowship, worship, and production that flourished in this laissez-faire environment, individuals could interact with one another within a community of harmony and ideological equality, following their own popularly elected leaders and governing themselves by shared consensus while minimizing distinctions of wealth and power.

4. The author includes the information that surplus was not a result of domestic craft production but resulted primarily from international trading in order to

○support the claim that the mode of production made possible by the craft guilds w very good for trade

○contrast the economic base of the city government with that of the tribal confederacies

○provide a reason why the government allowed the guilds to be self-controlled

○suggest that the government was missing out on a valuable opportunity to tax the guilds

5. According to paragraph 3, all of the following are true of the Middle Eastern craft guilds EXCEPT:

○The guilds were created to support workers and to uphold principles of high-quality craft production.

○Each guild was very large and included members from a broad geographic area.

○The leaders of the guilds were chosen by popular vote.

○All guild members were treated as equals.

6. The word “consensus”in the passage is closest in meaning to

○authority

○responsibility

○custom

○agreement

【Paragraph 4】The mercantile economy was also characterized by a peculiar moral stance that is typical of people who live by trade—an attitude that is individualistic, calculating, risk taking, and adaptive to circumstances. As among tribes people, personal relationships and a careful weighing of character have always been crucial in a mercantile economy with little regulation, where one's word is one's bond and where informal ties of trust cement together an international trade network. Nor have merchants and artisans ever had much tolerance for aristocratic professions of moral superiority, favoring instead an egalitarian ethic of the open market, where steady hard work, the loyalty of one's fellows, and entrepreneurial skill make all the difference. And, like the pastoralists, Middle Eastern merchants and artisans unhappy with their environment could simply pack up and leave for greener pastures—an act of self-assertion wholly impossible in most other civilizations throughout history.

7. According to paragraph 4, which of the following was NOT necessary for success in the mercantile economy?

○Good business sense

○Reliable associates

○Family wealth

○Constant effort

8. Which of the sentences below best expresses the essential information in the highlighted sentence the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Tribes people were comfortable forming personal relationships with merchants, who, like them, were bound by their promises to one another.

○Because trade was not formally regulated, merchants were careful about whom they trusted and often conducted business with people they knew personally.

○While trade among merchants relied somewhat on regulation, among tribes people trade was based on personal relationships and careful character evaluation.

○Because tribes people were bound only by their promises to one another, personal relationships were formed only after careful weighing of character.

9. The word “ethic”in the passage is closest in meaning to

○set of moral principles

○division of labor

○economic system

○test of character

10. According to paragraph 4, what choice did Middle Eastern merchants and artisans have that many other people have not had?

○If they were unhappy in the mercantile environment, they could draw on personal connections to find a different kind of work.

○They were allowed to assert their opinions without having to listen to aristocratic professions of moral superiority.

○Following the example of the pastoralists, they could demand, and receive, better working conditions.

○If they didn't like their environment, they could move somewhere else.

【Paragraph 5】Dependence on long-distance trade also meant that the great empires of the Middle East were built both literally and figuratively on shifting sand. The central state, though often very rich and very populous, wasintrinsically fragile, since the development of new international trade routes could undermine the monetary base and erode state power, as occurred when European seafarers circumvented Middle Eastern merchants after Vasco da Gama's voyage around Africa in the late fifteenth century opened up a southern route. The ecology of the region also permitted armed predators to prowl the surrounding barrens, which were almost impossible for a state to control. Peripheral peoples therefore had a great advantage in their dealings with the center, making government authority insecure and anxious.

11. The word “intrinsically”in the passage is closest in meaning to

○fundamentally

○surprisingly

○consequently

○particularly

12.In paragraph 5, why does the author mention the new trade route opened up by Vasco da Gama's fifteenth century voyage around Africa?

○To provide evidence that European seafarers took every opportunity to bypass Middle Eastern merchants

○To present an instance in which Middle Eastern states lost money and power because of their reliance on long-distance trade

○To argue this new route became necessary when European seafarers wanted to avoid Middle Eastern states whose central power had begun to erode

○To explain how da Gama helped European traders avoid the dangerous predators prowling the areas surrounding Middle Eastern cities

【Paragraph2】Reliance on trade had several important consequences. ■Production was generally in the hands of skilled individual artisans doing piecework under the tutelage of a master who was also the shop owner. ■In these shops differences of rank were blurred as artisans and masters labored side by side in the same modest establishment, were usually members of the same guild and religious sect, lived in the same neighborhoods, and often had assumed (or real) kinship relationships. ■The worker was bound to the master by a mutual contract that either one could repudiate, and the relationship was conceptualized as one of partnership.■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**For one thing, it created a demand for finished goods to be sold both locally and abroad.**

Where would the sentence best fit?

14. 【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

Since ancient times. reliance on trade has shaped the culture and organizational structure of Middle Eastern societies.

●

●

●

Answer Choices

○ Persian and Arabian merchants traveled great distances to sell their finished goods at the marketplaces of ancient Sumeria.

○ Revenue from trade was unevenly distributed, causing Middle Eastern societies to be characterized by growing distinctions in wealth and power.

○ Qualities that were valued in the mercantile economy included individualism, hard work, loyalty, and the willingness to take risks.

○ As production increased, centralized control over production also increased, leading in turn to more-centralized control over fellowship and worship.

○ Crafts were produced by skilled artisans working in close, egalitarian relationships with their masters and other fellow guild members.

○The stability of Middle Eastern governments was threatened by their lack of control over international trade patterns and over their own peripheral territories.

**参考答案：**

1. ○3

2. ○2

3. ○4

4. ○3

5. ○2

6. ○4

7. ○3

8.○2

9. ○1

10. ○4

11. ○1

12. ○2

13. ○1

14. Qualities that were

Crafts were produced

The stability of Middle

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## **参考译文：古代中东与贸易**

自从中东地区的商旅们成功跨越周围的戈壁，只有水路和山峦还是障碍时，贸易就成为了中东地区城市经济的主要支柱。这种情况（贸易是主要支柱）从古至今都是如此，一部分原因是中东地区的地质环境——多为沙石和石灰岩，金属矿藏和其它有用材料很少。古代对黑曜石（一种火山岩，可以用来制作镜子和工具）的需求引发了（中东地区）与北方的亚美尼亚之间的贸易；用作切削工具的玉石从土耳其斯坦购买；而稀有贵重的琉璃青金石是从阿富汗地区进口。探险活动最早可以追溯至古苏美尔——已知最早的中东文明。记录显示商队和贸易站由古苏美尔人在周围山区及古波斯和阿拉伯的沙漠地区建立。

过于依赖贸易造成了一些重大影响。生产工作一般在师傅也是店主的监视下，由熟练的工匠计件完成。在这些店铺中，阶级差异并不明显，因为工匠和店主同在一个相对舒适的环境中共事，通常有着相同的宗教信仰，而且又是街坊邻里，彼此之间还很有可能（没准真的）是亲戚关系。工人和店主双方具有劳务关系，任一方都有权终止，这是合作关系中的一种。

这种生产模式有助于自主管理制度的发展，在中东城市里意识形态上秉持人人平等的手工行会比比皆是。他们实质上是专门提供互助且保护组织成员的协会组织，同时注重维持行业标准。独立行会不断增加，是因为剩余价值的产生并非由于国内生产，而是主要来自于国际间的贸易活动。政府允许劳动人民自主管理，这和部落首领让牧羊者们离群索居一样。在当地，团体、信仰以及生产方面的小型平等主义团体或类似平等主义的组织在这种自由放任的环境里遍地开花，和谐平等的团体中，成员之间相互影响，追随着他们自己选举的领导人，在缩小财富和权力差距的同时通过分享意见进行自我管理。

商品经济也通过靠贸易为生的商人所秉持的特定道德立场表现出来。他们具有独立自主、精于计算、敢于冒险和随遇而安的优秀品质。在部落成员之间，人际关系和谨言慎行的品质在监管不严的商品经济中至关重要,商品经济里人们出口成契，诚信基础上的非正式联系形成了一个国际贸易网络。从没有商人和工匠对贵族职业的道德优越感如此宽容，这很好地促进了开放市场中的平等主义，人们辛勤工作，忠诚跟随，具备企业家精神非常重要。而且，这和畜牧文明类似，中东的商人和工匠们若对自己所处的环境不满意，简单收拾一下就可迁移到一个更加丰茂的牧场——纵观历史，如此随性而为的行为在其他多数文明中是无法想象的。

对远距离贸易的依赖也意味着伟大的中东帝国得以建立在这片飘忽不定却又无比真实的沙土之中。帝国中部尽管非常富足繁盛，但本质上脆弱不堪，因为新的国际贸易线路的出现会动摇经济基础并腐蚀国家权力。就在15世纪晚期达伽马绕过非洲开辟南部航线以后，欧洲的水手们便绕过中东商人改走南部航线了。该地区的生态环境也允许武装“捕食者”在周围的荒漠潜行，几乎很难被帝国控制。外围的人借此得到一个应对中央帝国的绝好机会，这让政府惴惴不安。

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苏美尔人（也译作苏默），是历史上两河流域（底格里斯河和幼发拉底河中下游）早期的定居民族，他们所建立的苏美尔文明是整个美索不达米亚文明中最早，同时也是全世界最早产生的文明。

## **Development of the Periodic Table**

The periodic table is a chart that reflects the periodic recurrence of chemical and physical properties of the elements when the elements are arranged in order of increasing atomic number (the number of protons in the nucleus). It is a monumental scientific achievement, and its development illustrates the essential interplay between observation, prediction, and testing required for scientific progress. In the 1800's scientists were searching for new elements. By the late 1860's more than 60 chemical elements had been identified, and much was known about their descriptive chemistry. Various proposals were put forth to arrange the elements into groups based on similarities in chemical and physical properties. The next step was to recognize a connection between group properties (physical or chemical similarities) and atomic mass (the measured mass of an individual atom of an element). When the elements known at the time were ordered by increasing atomic mass, it was found that successive elements belonged to different chemical groups and that the order of the groups in this sequence was fixed and repeated itself at regular intervals. Thus when the series of elements was written so as to begin a new horizontal row with each alkali metal, elements of the same groups were automatically assembled in vertical columns in a periodic table of the elements. This table was the forerunner of the modern table.

When the German chemist Lothar Meyer and (independently) the Russian Dmitry Mendeleyev first introduced the periodic table in 1869-70, one-third of the naturally occurring chemical elements had not yet been discovered. Yet both chemists were sufficiently farsighted to leave gaps where their analyses of periodic physical and chemical properties indicated that new elements should be located. Mendeleyev was bolder than Meyer and even assumed that if a measured atomic mass put an element in the wrong place in the table, the atomic mass was wrong. In some cases this was true. Indium, for example, had previously been assigned an atomic mass between those of arsenic and selenium. Because there is no space in the periodic table between these two elements, Mendeleyev suggested that the atomic mass of indium be changed to a completely different value, where it would fill an empty space between cadmium and tin. In fact, subsequent work has shown that in a periodic table, elements should not be ordered strictly by atomic mass. For example, tellurium comes before iodine in the periodic table, even though its atomic mass is slightly greater. Such anomalies are due to the relative abundance of the "isotopes" or varieties of each element. All the isotopes of a given element have the same number of protons, but differ in their number of neutrons, and hence in their atomic mass. The isotopes of a given element have the same chemical properties but slightly different physical properties. We now know that atomic number (the number of protons in the nucleus), not atomic mass number (the number of protons and neutrons), determines chemical behavior.

Mendeleyev went further than Meyer in another respect: he predicted the properties of six elements yet to be discovered. For example, a gap just below aluminum suggested a new element would be found with properties analogous to those of aluminum. Mendeleyev designated this element "eka-aluminum" (eka is the Sanskrit word for "next") and predicted its properties. Just five years later an element with the proper atomic mass was isolated and named gallium by its discoverer. The close correspondence between the observed properties of gallium and Mendeleyev’s predictions for eka-aluminum lent strong support to the periodic law. Additional support came in 1885 when eka-silicon, which had also been described in advance by Mendeleyev, was discovered and named germanium.

The structure of the periodic table appeared to limit the number of possible elements. It was therefore quite surprising when John William Strut (Lord Rayleigh, discovered a gaseous element in 1894 that did not fit into the previous classification scheme. A century earlier, Henry Cavendish had noted the existence of a residual gas when oxygen and nitrogen are removed from air, but its importance had not been realized. Together with William Ramsay, Rayleigh isolated the gas (separating it from other substances into its pure state) and named it argon. Ramsay then studied a gas that was present in natural gas deposits and discovered that it was helium, an element whose presence in the Sun had been noted earlier in the spectrum of sunlight but that had not previously been known on Earth. Rayleigh and Ramsay postulated the existence of a new group of elements, and in 1898 other members of the series (neon, krypton, and xenon) were isolated.

【Paragraph 1】The periodic table is a chart that reflects the periodic recurrence of chemical and physical properties of the elements when the elements are arranged in order of increasing atomic number (the number of protons in the nucleus). It is a monumental scientific achievement, and its development illustrates the essential interplay between observation, prediction, and testing required for scientific progress. In the 1800's scientists were searching for new elements. By the late 1860's more than 60 chemical elements had been identified, and much was known about their descriptive chemistry. Various proposals were put forth to arrange the elements into groups based on similarities in chemical and physical properties. The next step was to recognize a connection between group properties (physical or chemical similarities) and atomic mass (the measured mass of an individual atom of an element). When the elements known at the time were ordered by increasing atomic mass, it was found that successive elements belonged to different chemical groups and that the order of the groups in this sequence was fixed and repeated itself at regular intervals. Thus when the series of elements was written so as to begin a new horizontal row with each alkali metal, elements of the same groups were automatically assembled in vertical columns in a periodic table of the elements. This table was the forerunner of the modern table.

1. The phrase interplay in the passage is closest in meaning to

○sequence

○interpretation

○requirement

○interaction

2. According to paragraph 1, what pattern did scientists notice when the known elements were written in order of increasing atomic mass?

○The elements of the group of alkali metals were the first elements in the order of increasing atomic mass.

○Repetition of the same atomic masses for elements in different groups appeared.

○Elements with similar chemical properties appeared in the listing at regular intervals.

○Elements were chemically most similar to those just before and after them in the order.

【Paragraph 2】When the German chemist Lothar Meyer and (independently) the Russian Dmitry Mendeleyev first introduced the periodic table in 1869-70, one-third of the naturally occurring chemical elements had not yet been discovered. Yet both chemists were sufficiently farsighted to leave gaps where their analyses of periodic physical and chemical properties indicated that new elements should be located. Mendeleyev was bolder than Meyer and even assumed that if a measured atomic mass put an element in the wrong place in the table, the atomic mass was wrong. In some cases this was true. Indium, for example, had previously been assigned an atomic mass between those of arsenic and selenium. Because there is no space in the periodic table between these two elements, Mendeleyev suggested that the atomic mass of indium be changed to a completely different value, where it would fill an empty space between cadmium and tin. In fact, subsequent work has shown that in a periodic table, elements should not be ordered strictly by atomic mass. For example, tellurium comes before iodine in the periodic table, even though its atomic mass is slightly greater. Such anomalies are due to the relativeabundance of the "isotopes" or varieties of each element. All the isotopes of a given element have the same number of protons, but differ in their number of neutrons, and hence in their atomic mass. The isotopes of a given element have the same chemical properties but slightly different physical properties. We now know that atomic number (the number of protons in the nucleus), not atomic mass number (the number of protons and neutrons), determines chemical behavior.

3. In paragraph 2, what is the author's purpose in presenting the information about the decision by Meyer and Mendeleyev to leave gaps in the periodic table?

○To illustrate their confidence that the organizing principles of the periodic table would govern the occurrence of all chemical elements

○To indicate that some of their analyses of periodic physical and chemical properties were later found to be wrong

○To support the idea that they were unwilling to place new elements in the periodic table

○To indicate how they handled their disagreement about where to place new elements

4. What reason does the author provide for the claim that Mendeleyev was bolder than Meyer?

○Mendeleyev corrected incorrect information Meyer had proposed.

○Mendeleyev assumed that some information believed to be true about the elements was incorrect.

○Mendeleyev argued that Meyer had not left enough gaps in the periodic table.

○Mendeleyev realized that elements were not ordered by atomic mass in the periodic table.

5. According to paragraph 2, why did Mendeleyev suggest changing the atomic mass of indium?

○Because indium did not fit into the periodic table in the place predicted by its atomic mass.

○Because there was experimental evidence that the atomic mass that had been assigned to indium was incorrect.

○Because there was an empty space between cadmium and tin in the periodic table.

○Because the chemical properties of indium were similar to those of arsenic and selenium.

6. It can be inferred from paragraph 2 that tellurium comes before iodine in the periodic table even though tellurium's atomic mass is slightly greater because

○iodine is less common than tellurium

○both iodine and tellurium have no isotopes

○the chemical behavior of tellurium is highly variable

○the atomic number of tellurium is smaller than that of iodine

7. The phrase “abundance”in the passage is closest in meaning to

○weight

○requirement

○plenty

○sequence

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【Paragraph 3】Mendeleyev went further than Meyer in another respect: he predicted the properties of six elements yet to be discovered. For example, a gap just below aluminum suggested a new element would be found with properties analogous to those of aluminum. Mendeleyev designated this element "eka-aluminum" (eka is the Sanskrit word for "next") and predicted its properties. Just five years later an element with the proper atomic mass was isolated and named gallium by its discoverer. The close correspondence between the observed properties of gallium and Mendeleye Vs predictions for eka-aluminum lent strong support to the periodic law. Additional support came in 1885 when eka-silicon, which had also been described in advance by Mendeleyev, was discovered and named germanium.

8. The phrase “analogous to”in the passage is closest in meaning to

○predicted by

○expected of

○similar to

○superior to

9. Paragraph 3 suggests that Mendeleyev predicted the properties of eka-aluminum on the basis of

○the atomic mass of aluminum

○the position of the gap in the periodic table that eka-aluminum was predicted to fill

○the similarity of eka-aluminum to the other five missing elements

○observation of the properties of gallium

10. It can be inferred from paragraph 3 that the significance of the discovery of gallium was that it supported which of the following?

○The idea that aluminum was correctly placed in the periodic table.

○Mendeleyev's prediction that eka-silicon would be discovered next.

○The organizing principle of the periodic table.

○The idea that unknown elements existed.

【Paragraph 4】The structure of the periodic table appeared to limit the number of possible elements. It was therefore quite surprising when John William Strut (Lord Rayleigh, discovered a gaseous element in 1894 that did not fit into the previous classification scheme. A century earlier, Henry Cavendish had noted the existence of a residual gas when oxygen and nitrogen are removed from air, but its importance had not been realized. Together with William Ramsay, Rayleigh isolated the gas (separating it from other substances into its pure state) and named it argon. Ramsay then studied a gas that was present in natural gas deposits and discovered that it was helium, an element whose presence in the Sun had been noted earlier in the spectrum of sunlight but that had not previously been known on Earth. Rayleigh and Ramsay postulated the existence of a new group of elements, and in 1898 other members of the series (neon, krypton, and xenon) were isolated.

11. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Ramsay found evidence of helium in the spectrum of sunlight before he discovered that the element was also contained in natural gas deposits on Earth.

○Ramsay thought he had discovered a new element present in natural gas deposits, but he was wrong since that element had been previously observed elsewhere on Earth.

○After Ramsay had discovered a new element, called helium, in natural gas deposits on Earth, he also found evidence of its presence in the Sun.

○Ramsay later discovered that helium, an element that was already known to be present in the Sun, was also present in natural gas deposits on Earth.

【Paragraph 4】The structure of the periodic table appeared to limit the number of possible elements. It was therefore quite surprising when John William Strut( Lord Rayleigh, discovered a gaseous element in 1894 that did not fit into the previous classification scheme. A century earlier, Henry Cavendish had noted the existence of a residual gas when oxygen and nitrogen are removed from air, but its importance had not been realized. Together with William Ramsay, Rayleigh isolated the gas (separating it from other substances into its pure state) and named it argon. Ramsay then studied a gas that was present in natural gas deposits and discovered that it was helium, an element whose presence in the Sun had been noted earlier in the spectrum of sunlight but that had not previously been known on Earth. Rayleigh and Ramsay postulated the existence of a new group of elements, and in 1898 other members of the series (neon, krypton, and xenon) were isolated.

12. The word “postulated”in the passage is closest in meaning to

○hypothesized

○discovered

○reported

○generated

【Paragraph1】The periodic table is a chart that reflects the periodic recurrence of chemical and physical properties of the elements when the elements are arranged in order of increasing atomic number (the number of protons in the nucleus). It is a monumental scientific achievement, and its development illustrates the essential interplay between observation, prediction, and testing required for scientific progress. In the 1800's scientists were searching for new elements. By the late 1860's more than 60 chemical elements had been identified, and much was known about their descriptive chemistry. Various proposals were put forth to arrange the elements into groups based on similarities in chemical and physical properties. ■The next step was to recognize a connection between group properties (physical or chemical similarities) and atomic mass (the measured mass of an individual atom of an element). ■When the elements known at the time were ordered by increasing atomic mass, it was found that successive elements belonged to different chemical groups and that the order of the groups in this sequence was fixed and repeated itself at regular intervals. ■Thus when the series of elements was written so as to begin a new horizontal row with each alkali metal, elements of the same groups were automatically assembled in vertical columns in a periodic table of the elements. ■This table was the forerunner of the modern table.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**It was a natural Idea to break up the series of elements at the points where the sequence of chemical groups to which the elements belonged began to repeat itself.**

Where would the sentence best fit?

14.【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

The periodic table introduced by Meyer and Mendeleyev was the forerunner of the modern table of elements.

●

●

●

Answer Choices

○Lord Rayleigh provided evidence that the structure of the I—Ramsay and Lord Rayleigh challenged the importance of the periodic table limited the potential number of elements.

○Chemical research that Henry Cavendish had done a centuryearlier.

○Isotopes of a given element have exactly the same physical properties, but their chemical properties are slightly different.

○Mendeleyev and Meyer organized the known elements into a F chart that revealed periodic recurrences of chemical and physical properties.

○Mendeleyev's successful prediction of the properties of then- r unknown elements lent support to the acceptance of the periodic law.

○In the 1890's, Ramsay and Lord Rayleigh isolated argon and proposed the existence of a new series of elements.

**参考答案：**

1. ○4

2. ○3

3. ○1

4. ○2

5. ○1

6. ○4

7. ○3

8.○3

9. ○2

10. ○3

11. ○4

12. ○1

13. ○3

14. ○4, 5,6

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## **参考译文：元素周期表的演进**

元素周期表是按原子序数（元素原子核中质子的数量）由小到大依次排列，反映化学周期性和元素的物理特征的图表。这一科学发现具有里程碑的意义，它进一步证明了科学探索过程中观察、预测和实证之间的根本联系。19世纪一开始，科学家们不断探索新的元素。到19世纪60年代后期，已经发现了60种以上的化学元素，而许多描述性化学被认知。人们提出各种建议，认为该基于化学和物理特征的相似性将化学元素排列成组。他们接下来又证实了元素的族群特性（物理或是化学相似性）和原子质量（一种元素的单个原子的测量质量）之间存在联系。当时元素还是按照原子质量从小到大排列，人们发现，一些具备连续性的元素却分属不同的化学组，并且发现在这种排列方式下，元素群组的顺序是固定的且定期重复。因此，当每一新行都以碱性金属元素开始并逐步将这一系列的元素排列出来时，元素周期表中同一组中的元素就会自动归入一个垂直纵列中。这个表格就是现代元素周期表的雏形。

当德国化学家迈耶（Lother Meyer）和（彼此独立的）俄国化学家门捷列夫在1869年到1870年间首次发布元素周期表时，有三分之一的天然化学元素还没被发现。然而这两位化学家都极富远见，他们在周期表上留白，对元素物理性和化学性的分析空白处还有新的元素有待发现。门捷列夫比迈耶更为大胆，他甚至做出假设，如果周期表按原子质量排列，但元素位置不对的话，那么原子质量也是错的。在某些情况下，这个设想是正确的。以铟为例，先前测量出铟的原子质量在砷和硒之间。但是因为在周期表中这两个元素之间没有缝隙，由此门捷列夫提出铟的原子质量变为截然不同的一个值，这样就可以将其置于镉和锡之间的空位。事实上，接下来的研究表明，元素周期表中元素不能严格按照原子质量排列。例如，尽管碲的原子质量比碘略大，但在元素周期表中，它却排在碘前面。出现这种反常现象，主要是因为相对丰富的“同位素”或者各种元素的多样性。同一元素的所有同位素具有相同的质子数，但中子数不同，因此它们的原子质量也不一样。一个特定元素的同位素具有相同的化学特征，但在物理性质上有一些细微差异。现在我们知道，是原子数目（原子核中质子的数量）而非原子质量（质子和中子的数量）决定着元素的化学性质。

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门捷列夫在另一个研究上也比迈耶更为深入：他预测还有六种元素的性质待被发现。例如，就在铝下面有一个空位，这表明还有一个性质和铝类似的新元素存在。门捷列夫将该元素定义为“铝下元素”（eka是梵语词，意思是“下一个”）并且还预测了其性质。仅仅5年之后，原子质量相吻合的元素就被分离出来，发现者将其命名为“镓”。镓所表现出的特性和门捷列夫对“铝下元素”的预测一一对应，这为元素法则提供了一个强有力的依据。还有一个例证，1885年发现“硅下元素”，同样为门捷列夫所预测，后来命名为锗。

元素周期表的框架似乎限制了可能存在的元素数量。因此，当约翰•威廉姆•斯特拉特（瑞利男爵），在1894年发现一种气态元素不能适应之前的元素表时会非常惊讶。一个世纪以前，亨利•卡文迪许就注意到，当氧气和氮气从空气中被移除后仍然有残余气体存在，但当时没人意识到其中的重要性。瑞利和威廉•拉姆齐一道，共同分离出一种气体（将之与其他物质隔离并存于一个真空环境）并将其命名为氩。拉姆齐经过研究又发现了另一种存在于自然界中的气体元素——氦，该元素在太阳中存在，并且很早就被发现存在于太阳光谱中，但是之前并没有在地球上找到过。瑞利和拉姆齐做出假设，认为存在一组新元素，1898年，这一系列元素中的其他元素（氖，氪，氙）也被成功分离出来。

具有相同质子数，不同中子数（或不同质量数）同一元素的不同核素互为同位素(Isotopes)。

Eka是一个用来为在元素周期表中位于某个元素下面的位置的化学元素命名的前缀。前缀eka-尤其用于命名尚未发现的元素。例如，在发现锗以前它被称为硅下元素（eka-硅，ekasilicon）。

## **Planets in Our Solar System**

The Sun is the hub of a huge rotating system consisting of nine planets, their satellites, and numerous small bodies, including asteroids, comets, and meteoroids. An estimated 99.85 percent of the mass of our solar system is contained within the Sun, while the planets collectively make up most of the remaining 0.15 percent. The planets, in order of their distance from the Sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. Under the control of the Sun's gravitational force, each planet maintains an elliptical orbit and all of them travel in the same direction.

The planets in our solar system fall into two groups: the terrestrial (Earth-like) planets (Mercury, Venus, Earth, and Mars) and the Jovian (Jupiter-like) planets (Jupiter, Saturn, Uranus, and Neptune). Pluto is not included in either category, because its great distance from Earth and its small size make this planet's true nature a mystery.

The most obvious difference between the terrestrial and the Jovian planets is their size. The largest terrestrial planet, Earth has a diameter only one quarter as great as the diameter of the smallest Jovian planet, Neptune, and its mass is only one seventeenth as great. Hence, the Jovian planets are often called giants. Also, because of their relative locations, the four Jovian planets are known as the outer planets, while the terrestrial planets are known as the inner planets. There appears to be a correlation between the positions of these planets and their sizes.

Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.

The Jovian planets have very thick atmospheres consisting of varying amounts of hydrogen, helium, methane, and ammonia. By comparison, the terrestrial planets have meager atmospheres at best. A planet's ability to retain an atmosphere depends on its temperature and mass. Simply stated, a gas molecule can "evaporate" from a planet if it reaches a speed known as the escape velocity. For Earth, this velocity is 11 kilometers per second. Any material, including a rocket, must reach this speed before it can leave Earth and go into space. The Jovian planets, because of their greater masses and thus higher surface gravities, have higher escape velocities (21-60 kilometers per second) than the terrestrial planets. Consequently, it is more difficult for gases to "evaporate" from them. Also, because the molecular motion of a gas depends on temperature, at the low temperatures of the Jovian planets even the lightest gases are unlikely to acquire the speed needed to escape. On the other hand, a comparatively warm body with a small surface gravity, like Earth's moon, is unable to hold even the heaviest gas and thus lacks an atmosphere. The slightly larger terrestrial planets Earth, Venus, and Mars retain some heavy gases like carbon dioxide, but even their atmospheres make up only an infinitesimally small portion of their total mass.

The orderly nature of our solar system leads most astronomers to conclude that the planets formed at essentially the same time and from the same material as the Sun. It is hypothesized that the primordial cloud of dust and gas from which all the planets are thought to have condensed had a composition somewhat similar to that of Jupiter. However, unlike Jupiter, the terrestrial planets today are nearly void of light gases and ices. The explanation may be that the terrestrial planets were once much larger and richer in these materials but eventually lost them because of these bodies' relative closeness to the Sun, which meant that their temperatures were relatively high.

1. According to the passage, each of the following statements comparing terrestrial planets with Jovian planets is true EXCEPT:

○Terrestrial planets are closer to the Sun than Jovian planets.

○Terrestrial planets have smaller diameters than Jovian planets.

○Terrestrial planets have smaller masses than Jovian planets.

○Terrestrial planets travel in a different direction than Jovian planets do.

【Paragraph 4】Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.

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2. The word markedly in the passage is closest in meaning to

○Essentially

○Typically

○Consistently

○noticeably

3. Paragraph 4 mentions which of the following as a reason why terrestrial planets are dense?

○They are made up of three groups of substances.

○They are composed mainly of rocky and metallic materials.

○They contain more ice than Jovian planets.

○They contain relatively small amounts of water.

4. Paragraph 4 supports each of the following statements about Saturn EXCEPT:

○It is less dense than any of the terrestrial planets.

○It contains no rocky material.

○It contains ices.

○It contains a large percentage of gases.

【Paragraph 5】The Jovian planets have very thick atmospheres consisting of varying amounts of hydrogen, helium, methane, and ammonia. By comparison, the terrestrial planets have meager atmospheres at best. A planet's ability to retain an atmosphere depends on its temperature and mass. Simply stated, a gas molecule can "evaporate" from a planet if it reaches a speed known as the escape velocity. For Earth, this velocity is 11 kilometers per second. Any material, including a rocket, must reach this speed before it can leave Earth and go into space. The Jovian planets, because of their greater masses and thus higher surface gravities, have higher escape velocities (21-60 kilometers per second) than the terrestrial planets. Consequently, it is more difficult for gases to "evaporate" from them. Also, because the molecular motion of a gas depends on temperature, at the low temperatures of the Jovian planets even the lightest gases are unlikely to acquire the speed needed to escape. On the other hand, a comparatively warm body with a small surface gravity, like Earth's moon, is unable to hold even the heaviest gas and thus lacks an atmosphere. The slightly larger terrestrial planets Earth, Venus, and Mars retain some heavy gases like carbon dioxide, but even their atmospheres make up only an infinitesimally small portion of their total mass.

5. The word meager in the passage is closest in meaning to

○rich

○thin

○unique

○complex

6. According to paragraph 5, which of the following statements is true of both Jovian and terrestrial planets?

○ The thicker the atmosphere, the smaller the planet’s mass

○ The more varied the gases in the atmosphere, the higher the temperature

○ The higher the surface gravity, the higher the escape velocity

○ The less the atmosphere contributes to the total mass, the lower the temperature

7. According to paragraph 5, what is a major reason that Jovian planets have much thicker atmospheres than terrestrial planets do?

○ Jovian planets have lower surface gravities

○Jovian planets have lower temperatures

○Jovian planets have lower escape velocities

○Jovian planets’gas molecules have higher average speeds

8. Paragraph 5 supports which of the following statements about the ability of planets to retain gases?

○More-massive planets are less able to retain gases than less-massive ones.

○Planets are more likely to retain heavy gases than light gases.

○Jovian planets are unlikely to retain the lightest gases.

○Only terrestrial planets have been able to retain carbon dioxide.

【Paragraph 6】The orderly nature of our solar system leads most astronomers to conclude that the planets formed at essentially the same time and from the same material as the Sun. It is hypothesized that the primordial cloud of dust and gas from which all the planets are thought to have condensed had a composition somewhat similar to that of Jupiter. However, unlike Jupiter, the terrestrial planets today are nearly void of light gases and ices. The explanation may be that the terrestrial planets were once much larger and richer in these materials but eventually lost them because of these bodies' relative closeness to the Sun, which meant that their temperatures were relatively high.

9. In calling the cloud of gas and dust from which the Sun and all the planets are thought to have condensed "primordial,' the author means that the cloud was

○immense in size

○composed of similar particles

○present at the very beginning of our solar system's formation

○created from a great variety of different materials

10. The word eventually in the passage is closest in meaning to

○over time

○long ago

○simply

○certainly

11. According to paragraph 6, what is a possible explanation for the lack of light gases and ices on terrestrial planets?

○The location of terrestrial planets caused them to lose some of the materials they once contained.

○Terrestrial planets were formed much later than Jovian planets.

○The composition of terrestrial planets was different from that of Jupiter.

○Terrestrial planets were formed out of different material than the Sun was.

【Paragraph 4】Other dimensions along which the two groups differ markedly are density and composition. The densities of the terrestrial planets average about 5 times the density of water, whereas the Jovian planets have densities that average only 1.5 times the density of water. One of the outer planets, Saturn, has a density of only 0.7 that of water, which means that Saturn would float in water. Variations in the composition of the planets are largely responsible for the density differences. ■The substances that make up both groups of planets are divided into three groups—gases, rocks, and ices—based on their melting points. ■The terrestrial planets are mostly rocks: dense rocky and metallic material, with minor amounts of gases. ■The Jovian planets, on the other hand, contain a large percentage of the gases hydrogen and helium, with varying amounts of ices: mostly water, ammonia, and methane ices.■

12. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This explains their relatively low densities.**

Where would the sentence best fit?

13. 【Directions】From the seven answer choices below, select the two phrases that correctly characterize the terrestrial planets and the three phrases that correctly characterize the Jovian planets. Drag each phrase you select into the appropriate column of the table. Two of the phrases will NOT be used. This question is worth 3 points.

|  |  |
| --- | --- |
| terrestrial planets | Jovian planets |
| ●  ● | ●  ●  ● |

Answer Choices

○Have relatively small sizes

○Are grouped in the same category as Pluto

○Contain relatively high proportions of ices

○Have relatively high temperatures

○Have densities that are generally lower than the density of water

○Have relatively high escape velocities

○Have a composition closer to that of the cloud from which they condensed terrestrial

**参考答案：**

1. ○4

2. ○4

3. ○2

4. ○2

5. ○2

6. ○3

7. ○2

8.○2

9. ○3

10. ○1

11. ○1

12. ○4

13. ○1,4 ○3, 6,7

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：太阳系中的行星**

九大行星、它们的卫星以及数以亿计的小天体，包括小行星、彗星和陨星，共同构成了一个巨大的公转系统而太阳是这个公转系统的核心。太阳系中，太阳的质量占大约99.85%，而所有行星的质量加起来占剩下的0.15%。九大行星按照距离太阳的远近依次为：水星、金星、地球、火星、木星、土星、天王星、海王星和冥王星。在太阳引力的作用下，每个行星都沿着椭圆形的轨道，按照相同的方向公转。

太阳系中九大行星分为两类：类地行星（和地球类似，包括水星、金星、地球和火星）和类木行星（与木星类似，包括木星、土星、天王星和海王星）。冥王星不属于这两类中的任何一个，因为它距地球很远且体积较小，所以目前冥王星的真实形态仍然是个谜。

类地行星和类木行星最为明显的差别就在于它们的体积。比如最大的类地行星地球的直径仅仅是最小的类木行星海王星的四分之一，而质量更是只有海王星的1/17。因此，类木行星通常又被称为巨行星。又因这四颗类木行星与地球的相对位置，它们也被称为外行星，而类地行星则相应被称作内行星。这表示行星的位置与体积之间是有关联的。

两类行星其它方面的区别中，比较显著的是密度和构成成分。类地行星的平均密度大约为水的5倍，而类木行星的平均密度大概只有水的1.5倍。外行星中土星的密度只有水的0.7倍，也就是说土星可以浮在水上。行星的构成成分不同很大程度上是因为密度差异。两类行星的构成物质根据熔点可以划分为三类——气体、岩石和冰。类地行星多数由岩石（致密岩石和金属材料）以及少量气体构成。而类木行星恰恰相反，包含较大比例的气态氢和氦，以及各种形态的冰（大部分是水、氨和甲烷冰）。

类木行星有非常致密的大气层，主要由变化量的氢、氦、甲烷和氨组成。相比之下，类地行星的大气层则要稀薄得多。一个行星保持大气的能力取决于其温度和质量。简单来说，如果气体达到逃逸速度，那么气体分子可以从行星上“蒸发”。地球的逃逸速度大约为11千米/秒。任何物质，包括火箭，要离开地球进入太空就必须达到这个速度。由于类木行星的质量较大并因此产生更高的表面引力，因此，类木行星的逃逸速度（21～60千米/秒）要比类地行星高得多。所以，气体从类木行星的表面“蒸发”就更为困难。同时又因为气体分子运动取决于温度，所以在类木行星这样的低温环境下，即使是最轻的气体也无法达到所需要的逃逸速度。而从另一个角度讲，一个相对温暖表面引力很小的天体，比如月球，甚至无法留住最重的气体，因此没有大气层。体积稍大的类地行星，比如地球、金星和火星，保持了二氧化碳等一部分较重的气体，但即便如此，大气构成也只占它们总质量的很小一部分。

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太阳系有序的性质使得大部分天文学家得出结论：行星基本形成于同一时间并且构成物质与太阳相同。天文学家们推测，所有行星原始状态的尘埃和气体形成的云状物凝聚，合成物与木星的有些类似。然而，和木星不同的是，如今类地行星上的轻质气体和冰极度缺乏。有一种解释认为，类地行星曾经体积更大并且物质构成上更为丰富多样，但因为它们距太阳较近致使温度相对较高而最终失去这些物质。

冥王星于2006年被降级为矮行星，九大行星修订为八大行星，海王星仍属太阳系。

TPO-17

## **Europe's Early Sea Trade with Asia**

In the fourteenth century, a number of political developments cut Europe's overland trade routes to southern and eastern Asia, with which Europe had had important and highly profitable commercial ties since the twelfth century. This development, coming as it did when the bottom had fallen out of the European economy, provided an impetus to a long-held desire to secure direct relations with the East by establishing a sea trade. Widely reported, if somewhat distrusted, accounts by figures like the famous traveler from Venice, Marco Polo, of the willingness of people in China to trade with Europeans and of the immensity of the wealth to be gained by such contact made the idea irresistible. Possibilities for trade seemed promising, but no hope existed for maintaining the traditional routes over land A new way had to be found.

The chief problem was technological: How were the Europeans to reach the East? Europe's maritime tradition had developed in the context of easily navigable seas—the Mediterranean, the Baltic, and, to a lesser extent, the North Sea between England and the Continent—not of vast oceans. New types of ships were needed, new methods of finding one's way, new techniques for financing so vast a scheme. The sheer scale of the investment it took to begin commercial expansion at sea reflects the immensity of the profits that such East-West trade could create Spices were the most sought-after commodities. Spices not only dramatically improved the taste of the European diet but also were used to manufacture perfumes and certain medicines. But even high-priced commodities like spices had to be transported in large bulk in order to justify the expense and trouble of sailing around the African continent all the way to India and China.

The principal seagoing ship used throughout the Middle Ages was the galley, a long, low ship fitted with sails but driven primarily by oars. The largest galleys had as many as 50 oarsmen Since they had relatively shallow hulls, they were unstable when driven by sail or when on rough water: hence they were unsuitable for the voyage to the East. Even if they hugged the African coastline, they had little chance of surviving a crossing of the Indian Ocean. Shortly after 1400, shipbuilders began developing a new type of vessel properly designed to operate in rough, open water: the caravel. It had a wider and deeper hull than the galley and hence could carry more cargo: increased stability made it possible to add multiple masts and sails. In the largest caravels, two main masts held large square sails that provided the bulk of the thrust driving the ship forward, while a smaller forward mast held a triangular-shaped sail, called a lateen sail, which could be moved into a variety of positions to maneuver the ship.

The astrolabe had long been the primary instrument for navigation, having been introduced in the eleventh century. It operated by measuring the height of the Sun and the fixed stars: by calculating the angles created by these points, it determined the degree of latitude at which one stood (The problem of determining longitude, though, was not solved until the eighteenth century.) By the early thirteenth century. Western Europeans had also developed and put into use the magnetic compass, which helped when clouds obliterated both the Sun and the stars. Also beginning in the thirteenth century, there were new maps refined by precise calculations and the reports of sailors that made it possible to trace one's path with reasonable accuracy. Certain institutional and practical norms had become established as well.

A maritime code known as the Consulate of the Sea, which originated in the western Mediterranean region in the fourteenth century, won acceptance by a majority of sea goers as the normative code for maritime conduct; it defined such matters as the authority of a ship's officers, protocols of command, pay structures, the rights of sailors, and the rules of engagement when ships met one another on the sea-lanes. Thus by about 1400 the key elements were in place to enable Europe to begin its seaward adventure.

【Paragraph 1】In the fourteenth century, a number of political developments cut Europe's overland trade routes to southern and eastern Asia, with which Europe had had important and highly profitable commercial ties since the twelfth century. This development, coming as it did when the bottom had fallen out of the European economy, provided an impetus to a long-held desire to secure direct relations with the East by establishing a sea trade. Widely reported, if somewhat distrusted, accounts by figures like the famous traveler from Venice, Marco Polo, of the willingness of people in China to trade with Europeans and of the immensity of the wealth to be gained by such contact made the idea irresistible. Possibilities for trade seemed promising, but no hope existed for maintaining the traditional routes over land A new way had to be found.

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1. The word impetus in the passage is closest in meaning to

○Return

○Opportunity

○Stimulus

○Obstacle

2. According to paragraph 1 why was it necessary to find a new way for European merchants to reach the East?

○People in China were finally ready to trade with Europeans

○The European economy was failing because there was no trade with the East

○Traditional ways of trading with the East had becomevery costly

○Commercial routes over land had become blocked because of political events

【Paragraph 2】The chief problem was technological: How were the Europeans to reach the East? Europe's maritime tradition had developed in the context of easily navigable seas—the Mediterranean, the Baltic, and, to a lesser extent, the North Sea between England and the Continent—not of vast oceans. New types of ships were needed, new methods of finding one's way, new techniques for financing so vast a scheme. The sheer scale of the investment it took to begin commercial expansion at sea reflects the immensity of the profits that such East-West trade could create Spices were the most sought-after commodities. Spices not only dramatically improved the taste of the European diet but also were used to manufacture perfumes and certain medicines. But even high-priced commodities like spices had to be transported in large bulk in order to justify the expense and trouble of sailing around the African continent all the way to India and China.

3. According to paragraph 2. what was the main difficulty Europeans had to overcome in order to develop a new way of trading with the East?

○Europeans were unwilling to invest in large-scale commercial ventures.

○Europeans lacked the means for navigating long distances across oceans.

○Europeans were unwilling to experiment with new business techniques.

○Europeans lacked knowledge about the commercial methods of other peoples.

4. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The high cost to investors of developing trade by sea between East and West indicates the great size of the profits that such trade could produce.

○The profits that could be created by sea trade between East and West were immense compared with the investment required to develop such trade.

○The increase in commercial activity by using sea routes reflects the importance trade between East and West had for investors seeking great profits.

○Because people made large investments in sea commerce between East and West. They expected to make immense profits.

5. The word dramatically in the passage is closest in meaning to

○Artificially

○Greatly

○Immediately

○Regularly

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6. It can be inferred from paragraph 2 that spices from Asia were desirable in Europe in the Middle Ages because they

○were easily transported in large quantities

○could not be produced in European countries

○could be traded for products such as perfumes and medicines

○were expected to increase in value over time

【Paragraph 3】The principal seagoing ship used throughout the Middle Ages was the galley, a long, low ship fitted with sails but driven primarily by oars. The largest galleys had as many as 50 oarsmen Since they had relatively shallow hulls, they were unstable when driven by sail or when on rough water: hence they were unsuitable for the voyage to the East. Even if they hugged the African coastline, they had little chance of surviving a crossing of the Indian Ocean Shortly after 1400, shipbuilders began developing a new type of vessel properly designed to operate in rough, open water: the caravel. It had a wider and deeper hull than the galley and hence could carry more cargo: increased stability made it possible to add multiple masts and sails. In the largest caravels, two main masts held large square sails that provided the bulk of the thrust driving the ship forward, while a smaller forward mast held a triangular-shaped sail, called a lateen sail, which could be moved into a variety of positions to maneuver the ship.

7. According to paragraph 3, all of the following statements comparing the caravel with the galley are true EXCEPT:

○The caravel had fewer masts than the galley.

○The caravel had a wider hull than the galley.

○The caravel could carry more cargo than the galley.

○The caravel was more stable in rough water than the galley.

8. According to paragraph 3, what did the lateen sail contribute to the caravel as a sailing ship?

○It provided stability for the front part of the ship.

○It made it possible for the hull to be wider and deeper.

○It added considerably to the speed of the wind-driven ship.

○It improved the capacity of the ship to be guided.

【Paragraph 4】The astrolabe had long been the primary instrument for navigation, having been introduced in the eleventh century. It operated by measuring the height of the Sun and the fixed stars: by calculating the angles created by these points, it determined the degree of latitude at which one stood (The problem of determining longitude, though, was not solved until the eighteenth century.) By the early thirteenth century. Western Europeans had also developed and put into use the magnetic compass, which helped when clouds obliterated both the Sun and the stars. Also beginning in the thirteenth century, there were new maps refined by precise calculations and the reports of sailors that made it possible to trace one's path with reasonable accuracy. Certain institutional and practical norms had become established as well. A maritime code known as the Consulate of the Sea, which originated in the western Mediterranean region in the fourteenth century, won acceptance by a majority of sea goers as the normative code for maritime conduct; it defined such matters as the authority of a ship's officers, protocols of command, pay structures, the rights of sailors, and the rules of engagement when ships met one another on the sea-lanes. Thus by about 1400 the key elements were in place to enable Europe to begin its seaward adventure.

9. Why does the author include the information that Western Europeans haddeveloped and put into use the magnetic compass

○To provide an example of an instrument that was developed after caravels had begun traveling across oceans

○To provide an example of an improvement that resulted directly from the invention of the astrolabe

○To identify one of the technological advances that made sea trade with the East possible

○To explain how the problem of determining longitude was solved

10. The wordrefined in the passage is closest in meaning to

○Completed

○Improved

○Drawn

○Checked

11. The word norms in the passage is closest in meaning to

○purposes

○skills

○activities

○rules

12. According to paragraph 4, which of the following is true of the maritime code developed in Europe in the fourteenth century?

○It mapped out lanes in the seas for trading ships to follow.

○It defined the ways in which people should behave at sea.

○It replaced an earlier code that could not be adapted to the sea trade with the East.

○It gave instructions on how to navigate a ship.

The chief problem was technological: How were the Europeans to reach the East? Europe's maritime tradition had developed in the context of easily navigable seas—the Mediterranean, the Baltic, and, to a lesser extent, the North Sea between England and the Continent—not of vast oceans. New types of ships were needed, new methods of finding one's way, new techniques for financing so vast a scheme. The sheer scale of the investment it took to begin commercial expansion at sea reflects the immensity of the profits that such East-West trade could create. ■Spices were the most sought-after commodities.■ Spices not only dramatically improved the taste of the European diet but also were used to manufacture perfumes and certain medicines.■ But even high-priced commodities like spices had to be transported in large bulk in order to justify the expense and trouble of sailing around the African continent all the way to India and China.■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**They were highly valued for a couple of reasons.**

Where would the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Because land routes to Asia had been cut off in the fourteenth century. Europeans had to find a new way to trade with Asia.

●

●

●

Answer Choices

○Reports by travelers indicated that people in Asia were interested in renewing trade with Europeans.

○For trade in Asian goods such as spices to be profitable,these items needed to be transported in large quantities by sea.

○European galleys were able to bring Asian goods across with these items needed to be transported in large quantities by Indian Ocean and around the African coastline.

○Wind-driven caravels were developed to carry cargo across the oceans.

○The development of maps, navigational instruments, and a maritime code of conduct provided crucial elements for long-distance navigation.

○Europeans wanted to import spices from Asia in order to improve the taste of food and to make perfumes and medicines.

**参考答案：**

* + - 1. 3
      2. 4
      3. 2
      4. 1
      5. 2
      6. 2
      7. 1
      8. 4
      9. 3
      10. 2
      11. 4
      12. 2
      13. 2
      14. For trade…

Wind-driven…

The development…

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## **参考译文：欧亚地区早期的海洋贸易**

自12世纪起，欧洲就已经建立起与南亚和东亚之间高度互利的贸易关系，但14世纪时，政治的发展切断了双方的陆路贸易路线。政治的发展在将欧洲经济带入谷底的同时，也提供了一个新契机，通过建立一个欧洲与东方的海上航路确保两者之间直接的贸易往来，实现长久以来的愿景。

对此有诸多报道，有些可能不足为信，威尼斯著名旅行家马可•波罗在其书中就描述了中国人希望和欧洲人通商的意愿，认为通过贸易关系欧洲可以获得巨额财富，他的这些描述让欧洲人难以抗拒。双方贸易有无限商机，前景看好，但传统的陆路贸易已然无望，所以开辟新的贸易路线势在必行。

技术问题最为重要：欧洲人如何到达东方？欧洲的航海传统是在那些易于航行的海域中建立和发展起来的——地中海、波罗的海，以及一条比较狭长的海域，英格兰和欧洲大陆之间的北海，而这些都并非广阔的海洋。因此，开辟新的航线就需要新型的轮船、新的导航技术，以及支持这一庞大计划的新的融资技术。开启海上商业扩张投入的资金规模反映出东西方贸易所能创造出的巨大财富。香料在当时成为最受欢迎的商品，不仅显著提高了欧洲菜肴的口感，同时也被用于制作香水和一些药品。但即使是香料这样的高价商品也不得不大批量运输，以平衡绕行非洲运输至中国和印度所耗费的巨额成本和麻烦。

中世纪应用最为广泛的海船是划桨帆船，船体低矮狭长能够使用帆，但主要还是靠浆操控。最大的划桨帆船有50个划手由于船体相对较浅，靠帆航行或是在汹涌的海面上航行时很难保持稳定。因此它们不适合在去往东方的航线上航行。即使紧贴着非洲海岸线行驶，这种船也很难穿越印度洋。15世纪初，造船专家们开始研制一种能够适用于波涛汹涌的开放海域的新型船只——轻快帆船。这种海船船体比划桨帆船更宽更深，因此可以运送更多的货物，稳定性的提升使得船体能够增加多个桅杆和船帆。最大型的轻快帆船上，两根主桅杆撑起大块船帆就能够提供足够的推力驱动帆船前进，同时一个小型的前桅杆撑起一块三角形船帆，这种船帆叫做三角帆，它可以移动到不同位置控制帆船。

自11世纪星盘引入欧洲以来，它已经成为航海的重要工具。星盘通过测定太阳和恒星的高度来计算罗盘与星体之间的夹角，并以此确定测量者所处的纬度（而经度测量的难题，直到18世纪才得以解决）。13世纪初，西欧人也发明并开始使用磁罗盘，在云彩遮挡住太阳和星星的情况下帮助他们辨识方向。也是在13世纪初期，经过精密计算，绘制的地图更为精准，加上航海日志，使航行变得可靠而准确。航海制度和实际规范也日趋完善。

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14世纪，一部起源于地中海西部地区的《海运法典》为大多数水手们所接受，成为海事行为的规范标准。法典规定了船长的职权范围、命令协议、薪酬结构、水手们的权利，以及航行中与其他船只的交战规则。因此，直到大约1400年，正是这些重要的因素的具备，欧洲人才能够开启他们的海上冒险之旅。

(旧时常由奴隶或犯人划桨的) 划桨帆船

三角形的船帆，最早是由阿拉伯人发明，通常用斜三角帆，大型阿拉伯三角帆船的主帆远大於後桅帆，船首呈尖形，船尾有的开有窗户，并加装饰。

## **Animal Signals in the Rain Forest**

The daytime quality of light in forests varies with the density of the vegetation, the angle of the Sun, and the amount of cloud in the sky. Both animals and plants have different appearances in these various lighting conditions. A color or pattern that is relatively indistinct in one kind of light may be quite conspicuous in another.

In the varied and constantly changing light environment of the forest, an animal must be able to send visual signals to members of its own species and at the same time avoid being detected by predators. An animal can hide from predators by choosing the light environment in which its pattern is least visible. This may require moving to different parts of the forest at different times of the day or under different weather conditions, or it may be achieved by changing color according to the changing light conditions. Many species of amphibians (frogs and toads) and reptiles (lizards and snakes) are able to change their color patterns to camouflage themselves. Some also signal by changing color. The chameleon lizard has the most striking ability to do this. Some chameleon species can change from a rather dull appearance to a full riot of carnival colors in seconds. By this means, they signal their level of aggression or readiness to mate.

Other species take into account the changing conditions of light by performing their visual displays only when the light is favorable. A male bird of paradise may put himself in the limelight by displaying his spectacular plumage in the best stage setting to attract a female. Certain butterflies move into spots of sunlight that have penetrated to the forest floor and display by opening and closing their beautifully patterned wings in the bright spotlights. They also compete with each other for the best spot of sunlight.

Very little light filters through the canopy of leaves and branches in a rain forest to reach ground level—or close to the ground—and at those levels the yellow-to-green wavelengths predominate. A signal might be most easily seen if it is maximally bright. In the green-to-yellow lighting conditions of the lowest levels of the forest, yellow and green would be the brightest colors, but when an animal is signaling, these colors would not be very visible if the animal was sitting in an area with a yellowish or greenish background. The best signal depends not only on its brightness but also on how well it contrasts with the background against which it must be seen. In this part of the rain forest, therefore, red and orange are the best colors for signaling, and they are the colors used in signals by the ground-walking Australian brush turkey. This species, which lives in the rain forests and scrublands of the east coast of Australia, has a brown-to-black plumage with bare, bright-red skin on the head and neck and a neck collar of orange-yellow loosely hanging skin. During courtship and aggressive displays, the turkey enlarges its colored neck collar by inflating sacs in the neck region and then flings about a pendulous part of the colored signaling apparatus as it utters calls designed to attract or repel. This impressive display is clearly visible in the light spectrum illuminating the forest floor.

Less colorful birds and animals that inhabit the rain forest tend to rely on other forms of signaling other than the visual, particularly over long distances. The piercing cries of the rhinoceros hornbill characterize the Southeast Asian rain forest, as do the unmistakable calls of the gibbons. In densely wooded environments, sound is the best means of communication over distance because in comparison with light, it travels with little impediment from trees and other vegetation. In forests, visual signals can be seen only at short distances, where they are not obstructed by trees. The male riflebird exploits both of these modes of signaling simultaneously in his courtship display. The sounds made as each wing is opened carry extremely well over distance and advertise his presence widely. The ritualized visual display communicates in close quarters when a female has approached.

【Paragraph 1】The daytime quality of light in forests varies with the density of the vegetation, the angle of the Sun, and the amount of cloud in the sky. Both animals and plants have different appearances in these various lighting conditions. A color or pattern that is relatively indistinct in one kind of light may be quite conspicuous in another.

1. The phraseconspicuous in the passage is closest in meaning to

○Commom

○Noticeable

○Different

○Colorful

【Paragraph 2】In the varied and constantly changing light environment of the forest, an animal must be able to send visual signals to members of its own species and at the same time avoid being detected by predators. An animal can hide from predators by choosing the light environment in which its pattern is least visible. This may require moving to different parts of the forest at different times of the day or under different weather conditions, or it may be achieved by changing color according to the changing light conditions. Many species of amphibians (frogs and toads) and reptiles (lizards and snakes) are able to change their color patterns to camouflage themselves. Some also signal by changing color. The chameleon lizard has the most striking ability to do this. Some chameleon species can change from a rather dull appearance to a full riot of carnival colors in seconds. By this means, they signal their level of aggression or readiness to mate.

2. According to paragraph 2, what is problematic about an animal's sending visual signals to members of its own species?

○Signs that make an animal visible to its species also make it visible to predators.

○An animal that changes color to avoid predators can confuse members of its species.

○Changing light may require an animal to move beyond the visual range of other members.

○The animal may mistakenly signal aggression when it meant to signal readiness to mate.

3. The word signal in the passage is closest in meaning to

○change

○imitate

○communicate

○hide

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4. According to paragraph 2, all of the following are reasons amphibians and reptiles change color EXCEPT

○changing seasons

○to signal others of their species

○to match the light

○to hide from predators

【Paragraph 3】Other species take into account the changing conditions of light by performing their visual displays only when the light is favorable. A male bird of paradise may put himself in the limelight by displaying his spectacular plumage in the best stage setting to attract a female. Certain butterflies move into spots of sunlight that have penetrated to the forest floor and display by opening and closing their beautifully patterned wings in the bright spotlights They also compete with each other for the best spot of sunlight.

5. According to paragraph 3, butterflies move into spots of sunlight in order to

○warm their wings in order to open them

○compete with each other

○take advantage of favorable light conditions on the forest floor

○imitate birds of paradise

【Paragraph 4】Very little light filters through the canopy of leaves and branches in a rain forest to reach ground level—or close to the ground—and at those levels the yellow-to-green wavelengths predominate. A signal might be most easily seen if it is maximally bright. In the green-to yellow lighting conditions of the lowest levels of the forest, yellow and green would be the brightest colors, but when an animal is signaling, these colors would not be very visible if the animal was sitting in an area with a yellowish or greenish background. The best signal depends not only on its brightness but also on how well it contrasts with the background against which it must be seen. In this part of the rain forest, therefore, red and orange are the best colors for signaling, and they are the colors used in signals by the ground-walking Australian brush turkey. This species, which lives in the rain forests and scrublands of the east coast of Australia, has a brown to-black plumage with bare, bright-red skin on the head and neck and a neck collar of orange-yellow loosely hanging skin. During courtship and aggressive displays, the turkey enlarges its colored neck collar by inflating sacs in the neck region and then flings about a pendulous part of the colored signaling apparatus as it utters calls designed to attract or repel. This impressive display is clearly visible in the light spectrum illuminating the forest floor.

6. According to paragraph 4, what is true about light that reaches ground level?

○It reveals only the yellow and green colors animals use to signal each other.

○It reflects the yellow and green colors to make the floor as bright as sunshine.

○It camouflages animals whose natural colors are yellow and green.

○It consists mostly of yellow-to-green wavelengths.

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○When an animal is signaling in an area with green-to yellow lighting condition. It’s signal will not be visible if the background is brightly lit.

○In the lowest levels of the forest, an animal's signals are not easily seen unless there is a yellowish or greenish background.

○In the green-to-yellow lighting conditions at the lowest levels of the forest, only signals that are themselves green or yellow will be bright enough to be seen in most areas.

○Although green and yellow would be the brightest colors near the forest floor, these colors would make poor signals whenever the forest background was also in the green-to-yellow range.

8. The word inflating in the passage is closest in meaning to

○Coloring

○Enlarging

○Loosening

○Heating

9. Which of the following can be inferred from paragraph 4 about yellow and green colors compared with red and orange colors at the bottom of the forest?

○Yellow and green are better colors for signaling than red and orange colors.

○Orange and red are brighter colors than yellow and green.

○Yellow and green are likely to be more common in the background than red and orange.

○Orange and red colors do not contrast as well with the forest floor as yellow and green do.

【Paragraph 5】Less colorful birds and animals that inhabit the rain forest tend to rely on forms of signaling other than the visual, particularly over long distances. The piercing cries of the rhinoceros hornbill characterize the Southeast Asian rain forest, as do the unmistakable calls of the gibbons. In densely wooded environments, sound is the best means of communication over distance because in comparison with light, it travels with little impediment from trees and other vegetation. In forests, visual signals can be seen only at short distances, where they are not obstructed by trees. The male riflebird exploits both of these modes of signaling simultaneously in his courtship display. The sounds made as each wing is opened carry extremely well over distance and advertise his presence widely. The ritualized visual display communicates in close quarters when a female has approached.

10. What can be inferred from paragraph 5 about the less colorful birds and animals that inhabit the forest?

○These species are less able to see color. and therefore they communicate with one another using nonvisual signals.

○These species generally live in less densely wooded environments than more colorful birds and animals do.

○The cries of these species do not carry as well over distances as the cries of more colorful birds and animals

○These species depend more on nonvisual signals for communication because they are less visible in their environment.

11. The word impediment in the passage is closest in meaning to

○obstruction

○effort

○delay

○resistance

12. The word exploits in the passage is closest in meaning to

○repeats

○makes use of

○increases the intensity of

○recognizes

Less colorful birds and animals that inhabit the rain forest tend to rely on forms of signaling other than the visual, particularly over long distances.■ The piercing cries of the rhinoceros hornbill characterize the Southeast Asian rain forest, as do the unmistakable calls of the gibbons.■ In densely wooded environments, sound is the best means of communication over distance because in comparison with light, it travels with little impediment from trees and other vegetation.■ In forests, visual signals can be seen only at short distances, where they are not obstructed by trees.■ The male riflebird exploits both of these modes of signaling simultaneously in his courtship display. The sounds made as each wing is opened carry extremely well over distance and advertise his presence widely. The ritualized visual display communicates in close quarters when a female has approached.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**There is also the long, rather terrifying call of the male orangutan, which carries over considerable distances to advertise his presence.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

In the rain forest, an animal must be able to send signals to members of its own species and at the same time avoid being detected by predators.

●

●

●

Answer Choices

○Animals that have different predators at different times of day change color to avoid being detected.

○To escape notice, an animal may move or change color so that its color pattern is not visible.

○To be noticed, an animal may draw attention to the contrast F between its colors and the colors of its environment.

○Yellow and green are the most common colors found in the r rain forest.

○Animals must have signals for aggression as well as to indicate readiness to mate.

○An animal may use sound rather than color to attract attention, because sound signals are not hindered by light conditions.

**参考答案：**

1. 2

2. 1

3. 3

4. 1

5. 3

6. 4

7. 4

8. 2

9. 3

10. 4

11. 1

12. 2

13. 2

14. To escape…

To be noticed…

An animal may…

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## **参考译文：雨林中的动物信号**

森林中白天的光照质量随着植被密度、太阳角度以及天空中云的数量的变化而变化。在不同的光照条件下，动植物会有不同的表现。在某种光照下相对较难辨认的颜色或式样，在另外一种光照下也许会变得相当显眼。

在多样和不断变化的森林光照环境下，动物必须能够发送视觉信号给自己的同类，同时避免被捕食者发现。动物可以选择最不易看得见的光照环境来躲避捕食者的视线。这就要求动物能在白天不同的时间或者在不同的天气条件下移动到森林的不同方位，或者，它们也可以根据不同的光照来改变自身的颜色。很多两栖动物（青蛙和蟾蜍）和爬行动物（蜥蜴和蛇）都可以通过改变颜色图案来伪装自己。有些动物还通过改变颜色来发出信号。变色龙在这方面有着最惊人的能力。有些变色龙物种可以在几秒钟之内就把暗淡的外表变得灿烂夺目。通过这种方式，它们可以传达出攻击程度和交配意愿。

其他的物种则只有在光照对它们有利的时候才会利用光照，来进行视觉上的自我展现。雄性极乐鸟会置身于汇聚的光线之下，在最佳的场景中展现自己缤纷绚烂的羽翼，以吸引雌鸟的注意。某些蝴蝶则飞到穿透森林的太阳光点处，，在明亮的光点中扇动着带有美丽图案的翅膀来展现自己。它们还会互相争夺最佳的光照位置。

很少有光能够穿透热带雨林的树冠层到达地平面——或是接近地面——而能达到底部的主要是黄绿光波。如果是色彩极为明亮的信号，可能更容易被看见。在森林底层的黄绿光照条件下，黄色和绿色是最明亮的颜色，但是当动物发送信号时，如果处于浅黄或浅绿的背景下，这些颜色就不容易看到了。最佳的信号不仅取决于其明亮度，还在于它与背景颜色的对比度。因此，在热带雨林这块区域，红色和橙色是最佳的信号颜色，而这也是地面行走的澳大利亚灌丛火鸡最善于使用的信号颜色。这个物种生活在澳大利亚东海岸的雨林和灌木丛中，长着黑棕色的羽毛，有着光秃秃、亮红色的头和脖子，颈圈上是一层橙黄色的松垮垮的皮。在求爱期和发起进攻时，火鸡通过给颈部液囊充气扩张颈圈，晃动着下垂的鲜艳的信号装置，随之发出叫声来吸引异性或击退敌人。在照亮雨林底层的光谱环境下，能够清晰地看到这种让人印象深刻的展示。

对于生活在热带雨林中的色彩不那么鲜艳的鸟类和动物来说，它们则倾向于发出其他形式的信号而非视觉信号，尤其是在跨越长距离时。比如说，东南亚雨林中极有代表性的能发出尖锐叫声的犀鸟和叫声清厉的长臂猿。在树木繁茂的环境中，声音是最好的跨距离传播手段。因为，相较于视觉信号，声音几乎不受树木和其他植被的干扰。在森林中，只能在不被树木阻挡的近距离地方看到视觉信号。雄性极乐鸟在求爱期则同时运用了这两种信号传送方式。它张开翅膀时发出的声响能够极好地传送到远距离之外，铺天盖地地宣传着它的仪表风采。而当雌鸟吸引而来时，它那仪式化的视觉展现就得以近距离地进行交流。

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## **Symbiotic Relationships**

A symbiotic relationship is an interaction between two or more species in which one species lives in or on another species. There are three main types of symbiotic relationships: parasitism, commensalism, and mutualism. The first and the third can be key factors in the structure of a biological community; that is, all the populations of organisms living together and potentially interacting in a particular area.

Parasitism is a kind of predator-prey relationship in which one organism, the parasite, derives its food at the expense of its symbiotic associate, the host. Parasites are usually smaller than their hosts. An example of a parasite is a tapeworm that lives inside the intestines of a larger animal and absorbs nutrients from its host. Natural selection favors the parasites that are best able to find and feed on hosts. At the same time, defensive abilities of hosts are also selected for. As an example, plants make chemicals toxic to fungal and bacterial parasites, along with ones toxic to predatory animals (sometimes they are the same chemicals). In vertebrates, the immune system provides a multiple defense against internal parasites.

At times, it is actually possible to watch the effects of natural selection in host-parasite relationships. For example, Australia during the 1940 s was overrun by hundreds of millions of European rabbits. The rabbits destroyed huge expanses of Australia and threatened the sheep and cattle industries. In 1950, myxoma virus, a parasite that affects rabbits, was deliberately introduced into Australia to control the rabbit population. Spread rapidly by mosquitoes, the virus devastated the rabbit population. The virus was less deadly to the offspring of surviving rabbits, however, and it caused less and less harm over the years. Apparently, genotypes (the genetic make-up of an organism) in the rabbit population were selected that were better able to resist the parasite. Meanwhile, the deadliest strains of the virus perished with their hosts as natural selection favored strains that could infect hosts but not kill them. Thus, natural selection stabilized this host-parasite relationship.

In contrast to parasitism, in commensalism, one partner benefits without significantly affecting the other. Few cases of absolute commensalism probably exist, because it is unlikely that one of the partners will be completely unaffected. Commensal associations sometimes involve one species' obtaining food that is inadvertently exposed by another. For instance, several kinds of birds feed on insects flushed out of the grass by grazing cattle. It is difficult to imagine how this could affect the cattle, but the relationship may help or hinder them in some way not yet recognized.

The third type of symbiosis, mutualism, benefits both partners in the relationship Legume plants and their nitrogen-fixing bacteria, and the interactions between flowering plants and their pollinators, are examples of mutualistic association. In the first case, the plants provide the bacteria with carbohydrates and other organic compounds, and the bacteria have enzymes that act as catalysts that eventually add nitrogen to the soil, enriching it. In the second case, pollinators (insects, birds) obtain food from the flowering plant, and the plant has its pollen distributed and seeds dispersed much more efficiently than they would be if they were carried by the wind only. Another example of mutualism would be the bull's horn acacia tree, which grows in Central and South America. The tree provides a place to live for ants of the genus Pseudomyrmex. The ants live in large, hollow thorns and eat sugar secreted by the tree. The ants also eat yellow structures at the tip of leaflets: these are protein rich and seem to have no function for the tree except to attract ants. The ants benefit the host tree by attacking virtually anything that touches it. They sting other insects and large herbivores (animals that eat only plants) and even clip surrounding vegetation that grows near the tree. When the ants are removed, the trees usually die, probably because herbivores damage them so much that they are unable to compete with surrounding vegetation for light and growing space.

The complex interplay of species in symbiotic relationships highlights an important point about communities: Their structure depends on a web of diverse connections among organisms.

【Paragraph 1】A symbiotic relationship is an interaction between two or more species in which one species lives in or on another species. There are three main types of symbiotic relationships: parasitism, commensalism, and mutualism. The first and the third can be key factors in the structure of a biological community; that is, all the populations of organisms living together and potentially interacting in a particular area.

1. Which of the following statements about commensalism can be inferred from paragraph 1?

○It excludes interactions between more than two species.

○It makes it less likely for species within a community to survive.

○Its significance to the organization of biological communities is small.

○Its role in the structure of biological populations is a disruptive one.

【Paragraph 2】Parasitism is a kind of predator-prey relationship in which one organism, the parasite, derivesits food at the expense of its symbiotic associate, the host. Parasites are usually smaller than their hosts. An example of a parasite is a tapeworm that lives inside the intestines of a larger animal and absorbs nutrients from its host. Natural selection favors the parasites that are best able to find and feed on hosts. At the same time, defensive abilities of hosts are also selected for. As an example, plants make chemicals toxic to fungal and bacterial parasites, along with ones toxic to predatory animals (sometimes they are the same chemicals). In vertebrates, the immune system provides a multiple defense against internal parasites.

2. The word derives in the passage is closest in meaning to

○Digests

○Obtains

○Controls

○Discovers

3. According to paragraph 2. which of the following is true of the action of natural selection on hosts and parasites?

○Hosts benefit more from natural selection than parasites do.

○Both aggression in predators and defensive capacities in hosts are favored for species survival.

○The ability to make toxic chemicals enables a parasite to find and isolate its host.

○Larger size equips a parasite to prey on smaller host organisms.

【Paragraph 3】At times, it is actually possible to watch the effects of natural selection in host-parasite relationships. For example, Australia during the 1940 s was overrun by hundreds of millions of European rabbits. The rabbits destroyed huge expanses of Australia and threatened the sheep and cattle industries. In 1950, myxoma virus, a parasite that affects rabbits, was deliberately introduced into Australia to control the rabbit population. Spread rapidly by mosquitoes, the virus devastated the rabbit population. The virus was less deadly to the offspring of surviving rabbits, however, and it caused less and less harm over the years. Apparently, genotypes (the genetic make-up of an organism) in the rabbit population were selected that were better able to resist the parasite. Meanwhile, the deadliest strains of the virus perished with their hosts as natural selection favored strains that could infect hosts but not kill them. Thus, natural selection stabilized this host-parasite relationship.

4. The word devastated in the passage is closest in meaning to

○Influenced

○Infected

○strengthened

○destroyed

5. Which of the following can be concluded from the discussion in paragraph 3 about the Australian rabbit population?

○Human intervention may alter the host, the parasite. and the relationship between them.

○The risks of introducing outside organisms into a biological community are not worth the benefits.

○Humans should not interfere in host-parasite relationships.

○Organisms that survive a parasitic attack do so in spite of the natural selection process.

6. According to paragraph 3, all of the following characterize the way natural selection stabilized the Australian rabbit population EXCEPT:

○The most toxic viruses died with their hosts.

○The surviving rabbits were increasingly immune to the virus.

○The decline of the mosquito population caused the spread of the virus to decline.

○Rabbits with specific genetic make-ups were favored.

【Paragraph 4】In contrast to parasitism, in commensalism, one partner benefits without significantly affecting the other. Few cases of absolute commensalism probably exist, because it is unlikely that one of the partners will be completely unaffected. Commensal associations sometimes involve one species' obtaining food that isinadvertently exposed by another. For instance, several kinds of birds feed on insects flushed out of the grass by grazing cattle. It is difficult to imagine how this could affect the cattle, but the relationship may help or hinder them in some way not yet recognized.

7. The word inadvertently in the passage is closest in meaning to

○Indefensibly

○Substantially

○Unintentionally

○Partially

【Paragraph 5】The third type of symbiosis, mutualism, benefits both partners in the relationship Legume plants and their nitrogen-fixing bacteria, and the interactions between flowering plants and their pollinators, are examples of mutualistic association. In the first case, the plants provide the bacteria with carbohydrates and other organic compounds, and the bacteria have enzymes that act as catalysts that eventually add nitrogen to the soil, enriching it. In the second case, pollinators (insects, birds) obtain food from the flowering plant, and the plant has its pollen distributed and seeds dispersed much more efficiently than they would be if they were carried by the wind only. Another example of mutualism would be the bull's horn acacia tree, which grows in Central and South America. The tree provides a place to live for ants of the genus Pseudomyrmex. The ants live in large, hollow thorns and eat sugar secreted by the tree. The ants also eat yellow structures at the tip of leaflets: these are protein rich and seem to have no function for the tree except to attract ants. The ants benefit the host tree by attacking virtually anything that touches it. They sting other insects and large herbivores (animals that eat only plants) and even clip surrounding vegetation that grows near the tree. When the ants are removed, the trees usually die, probably because herbivores damage them so much that they are unable to compete with surrounding vegetation for light and growing space.

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8. According to paragraph 5, the relationship between legumes and bacteria benefits the soil by

○adding enriching carbohydrates

○speeding the decay of organic matter

○destroying enzymes that pollute it

○contributing nitrogen to it

9. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The relationship between flowering plants and pollinators provides pollinators with food and flowers with efficient reproduction.

○In some cases birds obtain food from the seeds that are dispersed in the wind.

○The wind not only helps the flowers distribute their seeds but enables birds to find more food.

○Animals and insects are more effective in distributing pollen and seeds than the wind.

10. According to paragraph 5. which of the following is NOT true of the relationship between the bull's horn acacia tree and the Pseudomyrmex ants?

○Ants defend the host trees against the predatory actions of insects and animals.

○The acacia trees are a valuable source of nutrition for the ants.

○The ants enable the acacia tree to produce its own chemical defenses.

○The ants protect the acacia from having to compete with surrounding vegetation.

【Paragraph 6】The complex interplay of species in symbiotic relationships highlights an important point about communities: Their structure depends on a web of diverse connections among organisms.

11. The word highlights in the passage is closest in meaning to

○Defines

○Emphasizes

○Reflects

○Suggests

12. What is the main purpose of this passage?

○To explain the concept of symbiosis by expanded descriptions of its principal types

○To make a comparison between human relationships and symbiotic interactions in the natural world

○To demonstrate the unforeseen benefits of natural processes that at first seem wholly destructive

○To argue that parasitism is a problem that can be solved by scientific intervention

At times, it is actually possible to watch the effects of natural selection in host-parasite relationships. For example, Australia during the 1940 s was overrun by hundreds of millions of European rabbits.■ The rabbits destroyed huge expanses of Australia and threatened the sheep and cattle industries.■ In 1950, myxoma virus, a parasite that affects rabbits, was deliberately introduced into Australia to control the rabbit population.■ Spread rapidly by mosquitoes, the virus devastated the rabbit population.■ The virus was less deadly to the offspring of surviving rabbits, however, and it caused less and less harm over the years. Apparently, genotypes (the genetic make-up of an organism) in the rabbit population were selected that were better able to resist the parasite. Meanwhile, the deadliest strains of the virus perished with their hosts as natural selection favored strains that could infect hosts but not kill them. Thus, natural selection stabilized this host-parasite relationship.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This massive population began a century earlier as a mere twelve pairs of imported rabbits that reproduced quickly and developed into a major problem.**

Where would the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Symbiotic relationships involve the interaction of two or more organisms acting as partners.

●

●

●

Answer Choices

○Parasitic relationships involve the interplay of aggression by the parasite and resistance and adaptation by the host.

○Mutualism ordinarily involves an interaction between two members of the same species.

○Mutualism is unique among symbiotic relationships in that it r benefits both partners involved in the relationship.

○Parasitic damage to Australian rabbits was never reversed because the rabbits were unable to adapt to the parasites' attacks.

○The rarity of commensal relationships stems from the difficulty of finding relationships that benefit one species without affecting the other.

○The structure of biological communities depends on the types of relationships that exist among the species within.

**参考答案：**

* 1. 3
  2. 2
  3. 2
  4. 4
  5. 1
  6. 3
  7. 3
  8. 4
  9. 1
  10. 3
  11. 2
  12. 1
  13. 1
  14. Parasitic relationships…

The rarity of…

Mutualism is unique…

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## **参考译文：共生关系**

共生关系是两种或更多物种之间的一种交互作用，其中一个物种要么在另一个物种中生存要么依赖另外一个物种生存。共生关系共有三种类型：寄生、共栖和互利共生。其中第一种和第三种是一个生物群落结构的关键要素。所谓生物群落，指的是在某个特定区域内，所有生物体共同生存并且潜在地相互影响。

寄生现象是一种捕食式的关系，其中，寄生物通过削弱其寄主而获得自身所需食物。寄生物的形体往往小于寄主。绦虫是寄生的例子之一，它生存在较大型动物的肠道中，并吸收寄主体内的营养。自然选择青睐那些寻找寄主并且寄生能力强的寄生虫，同时，防御能力强的寄主也被选择出来。比如说，有些植物会产生对真菌和细菌寄生物有毒的化学物质，也会产生那些对捕食动物有毒的化学物质（有时这些化学物质是一样的）。而对于脊椎动物来说，其身体的免疫系统可以对体内的寄生物进行多层防御。

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有时候，寄生关系的自然选择效应也可能在现实中被观察到。比如说，二十世纪四十年代，亿万只欧洲兔在澳大利亚泛滥成灾。兔子肆虐了广袤的土地，并给牛羊业带来了极大的威胁。1950年，为了控制兔灾，澳大利亚特意引进了一种名为粘液瘤病毒的可影响兔子的寄生虫。通过蚊子的快速传播，兔子数量急剧减少。然而，这种寄生虫对于生存下来的兔群的后代就没有那么致命了，而且这种伤害逐年减小。显然，该兔群的遗传性状（生物体的基因结构）经过了自然选择，已经具备了更好地抵抗粘液瘤病毒的能力。同时，由于自然选择更倾向于那些能够感染寄主但不致其死的品系，这种病毒最致命的品系也逐渐地衰败了。这样，自然选择便使得寄主-寄生虫的关系趋于稳定。

与寄生关系相反，在共生关系之中，一方受益，也不会给另一方带来严重影响。然而在现实中，纯粹的共生关系几乎不存在，因为很难有一方会完全不受影响。共生关系有时候表现为这样一种方式，一个物种寻觅食物会经由另外一个物种不经意地暴露出来。比如说，有一些以昆虫为食的鸟类会被放牧中的牛群赶出草地。很难说这个对牛群会带来什么影响，但这样的关系也许正以一种我们尚未认知到的方式在帮助或阻碍着它们。

第三种关系，互利共生，是指共生双方能够互利互惠。其中典型的例子有豆科植物和固氮细菌，以及开花植物和授粉生物。在第一个例子中，植物可以为细菌提供碳水化合物以及其他一些化合物，而这些细菌则能产生一种起催化作用的酶，它最终增加土壤中的氮元素来丰富土壤。在第二个例子中，授粉生物（昆虫、鸟类等）从开花植物中获取食物，而植物则可以通过它们来传递花粉和种子，这比仅仅依靠风来传递要高效得多。还有一个互利共生的例子是生长在美国中南部的牛角金合欢树。这种树为一种伪蚁属的蚂蚁提供了栖居地。这些蚂蚁住在大的中空的荆棘丛中，汲取金合欢树分泌出来的糖分。它们还吃树叶末端的黄色组织：这个部分富含蛋白质，但是除了吸引蚂蚁，似乎对树本身没有任何功能。而这些蚂蚁们则可以帮助它们的寄主攻击外界几乎所有的威胁。它们会叮咬昆虫和食草动物（只以植物为食的动物），甚至可以削减生长在树周围的其他植物。一旦蚂蚁被清除掉，这种树就难以存活，很可能是因为它们被食草动物损害而无力与周围的其他植物争夺阳光和生长空间。

共生关系中物种间错综复杂的相互影响揭示了群落中很重要的一点，即结构的建立依赖于生物间千变万化的联系网络。

TPO-18

## **Industrialization in the Netherlands and Scandinavia**

While some European countries, such as England and Germany, began to industrialize in the eighteenth century, the Netherlands and the Scandinavian countries of Denmark, Norway, and Sweden developed later. All four of these countries lagged considerably behind in the early nineteenth century. However, they industrialized rapidly in the second half of the century, especially in the last two or three decades. In view of their later start and their lack of coal—undoubtedly the main reason they were not among the early industrializers—it is important to understand the sources of their success.

All had small populations. At the beginning of the nineteenth century, Denmark and Norway had fewer than 1 million people, while Sweden and the Netherlands had fewer than 2.5 million inhabitants. All exhibited moderate growth rates in the course of the century (Denmark the highest and Sweden the lowest), but all more than doubled in population by 1900. Density varied greatly. The Netherlands had one of the highest population densities in Europe, whereas Norway and Sweden had the lowest Denmark was in between but closer to the Netherlands.

Considering human capital as a characteristic of the population, however, all four countries were advantaged by the large percentages of their populations who could read and write. In both 1850 and 1914, the Scandinavian countries had the highest literacy rates in Europe, or in the world, and the Netherlands was well above the European average. This fact was of enormous value in helping the national economies find their niches in the evolving currents of the international economy.

Location was an important factor for all four countries. All had immediate access to the sea, and this had important implications for a significant international resource, fish, as well as for cheap transport, merchant marines, and the shipbuilding industry. Each took advantage of these opportunities in its own way. The people of the Netherlands, with a long tradition of fisheries and mercantile shipping, had difficulty in developing good harbors suitable for steamships: eventually they did so at Rotterdam and Amsterdam, with exceptional results for transit trade with Germany and central Europe and for the processing of overseas foodstuffs and raw materials (sugar, tobacco, chocolate, grain, and eventually oil). Denmark also had an admirable commercial history, particularly with respect to traffic through the Sound (the strait separating Denmark and Sweden). In 1857, in return for a payment of 63 million kronor from other commercial nations, Denmark abolished the Sound toll dues the fees it had collected since 1497 for the use of the Sound. This, along with other policy shifts toward free trade, resulted in a significant increase in traffic through the Sound and in the port of Copenhagen.

The political institutions of the four countries posed no significant barriers to industrialization or economic growth. The nineteenth century passed relatively peacefully for these countries, with progressive democratization taking place in all of them. They were reasonably well governed, without notable corruption or grandiose state projects, although in all of them the government gave some aid to railways, and in Sweden the state built the main lines. As small countries dependent on foreign markets, they followed a liberal trade policy in the main, though a protectionist movement developed in Sweden. In Denmark and Sweden agricultural reforms took place gradually from the late eighteenth century through the first half of the nineteenth, resulting in a new class of peasant landowners with a definite market orientation.

The key factor in the success of these countries (along with high literacy, which contributed to it) was their ability to adapt to the international division of labor determined by the early industrializers and to stake out areas of specialization in international markets for which they were especially well suited. This meant a great dependence on international commerce, which had notorious fluctuations; but it also meant high returns to those factors of production that were fortunate enough to be well placed in times of prosperity. In Sweden exports accounted for 18 percent of the national income in 1870, and in 1913, 22 percent of a much larger national income. In the early twentieth century, Denmark exported 63 percent of its agricultural production: butter, pork products, and eggs. It exported 80 percent of its butter, almost all to Great Britain, where it accounted for 40 percent of British butter imports.

【Paragraph 1】While some European countries, such as England and Germany, began to industrialize in the eighteenth century, the Netherlands and the Scandinavian countries of Denmark, Norway, and Sweden developed later. All four of these countries lagged considerably behind in the early nineteenth century. However, they industrialized rapidly in the second half of the century, especially in the last two or three decades. In view of their later start and their lack of coal—undoubtedly the main reason they were not among the early industrializers—it is important to understand the sources of their success.

1.Paragraph 1 supports which of the following ideas about England and Germany?

○They were completely industrialized by the start of the nineteenth century.

○They possessed plentiful supplies of coal.

○They were overtaken economically by the Netherlands and Scandinavia during the early nineteenth century.

○They succeeded for the same reasons that the Netherlands and Scandinavia did.

【Paragraph 2】All had small populations. At the beginning of the nineteenth century, Denmark and Norway had fewer than 1 million people, while Sweden and the Netherlands had fewer than 2.5 million inhabitants. All exhibited moderate growth rates in the course of the century (Denmark the highest and Sweden the lowest), but all more than doubled in population by 1900. Density varied greatly. The Netherlands had one of the highest population densities in Europe, whereas Norway and Sweden had the lowest Denmark was in between but closer to the Netherlands.

【Paragraph 3】Considering human capital as a characteristic of the population, however, all four countries were advantaged by the large percentages of their populations who could read and write. In both 1850 and 1914, the Scandinavian countries had the highest literacy rates in Europe, or in the world, and the Netherlands was well above the European average. This fact was of enormous value in helping the national economies find their niches in the evolving currents of the international economy.

2. Paragraph 2 suggests which of the following about the importance of population density in the industrialization of the Netherlands and Scandinavia?

○It was a more important factor than population size.

○It was more influential than the rate of population growth.

○It was more important in the early stages than it was later.

○It was not a significant factor.

3. According to paragraphs 2 and 3, which of the following contributed significantly to the successful economic development of the Netherlands and of Scandinavia?

○The relatively small size of their populations

○The rapid rate at which their populations were growing

○The large amount of capital they had available for investment

○The high proportion of their citizens who were educated

【Paragraph 4】Location was an important factor for all four countries. All had immediate access to the sea, and this had important implications for a significant international resource, fish, as well as for cheap transport, merchant marines, and the shipbuilding industry. Each took advantage of these opportunities in its own way. The people of the Netherlands, with a long tradition of fisheries and mercantile shipping, had difficulty in developing good harbors suitable for steamships: eventually they did so at Rotterdam and Amsterdam, with exceptional results for transit trade with Germany and central Europe and for the processing of overseas foodstuffs and raw materials (sugar, tobacco, chocolate, grain, and eventually oil). Denmark also had an admirable commercial history, particularly with respect to traffic through the Sound (the strait separating Denmark and Sweden). In 1857, in return for a payment of 63 million kronor from other commercial nations, Denmark abolished the Sound toll dues the fees it had collected since 1497 for the use of the Sound. This, along with other policy shifts toward free trade, resulted in a significant increase in traffic through the Sound and in the port of Copenhagen.

4.According to paragraph 4, because of their location, the Netherlands and the Scandinavian countries had all of the following advantages when they began to industrialize EXCEPT

○low-cost transportation of goods

○access to fish

○shipbuilding industries

○military control of the sea

5.The word “exceptional”in the passage is closest in meaning to

○extraordinary

○surprising

○immediate

○predictable

6.The word “abolished”in the passage is closest in meaning to

○ended

○raised

○returned

○lowered

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【Paragraph 5】The political institutions of the four countries posed no significant barriers to industrialization or economic growth. The nineteenth century passed relatively peacefully for these countries, with progressive democratization taking place in all of them. They were reasonably well governed, without notable corruption or grandiose state projects, although in all of them the government gave some aid to railways, and in Sweden the state built the main lines. As small countries dependent on foreign markets, they followed a liberal trade policy in the main, though a protectionist movement developed in Sweden. In Denmark and Sweden agricultural reforms took place gradually from the late eighteenth century through the first half of the nineteenth, resulting in a new class of peasant landowners with a definite market orientation.

7. According to paragraph 5, each of the following contributed positively to the industrialization of the Netherlands and Scandinavia EXCEPT

○generally liberal trade policies

○huge projects undertaken by the state

○relatively uncorrupt governments

○relatively little social or political disruption

8.The word “progressive”in the passage is closest in meaning to

○rapid

○partial

○increasing

* individual

9. The author includes the information that “a protectionist movement developed in Sweden”in order to

○ support the claim that the political institutions of the four countries posed no significant barriers to industrialization or economic growth

○ identify an exception to the general trend favoring liberal trade policy

○ explain why Sweden industrialized less quickly than the other Scandinavian countries and Netherlands

○ provide evidence that agricultural reforms take place more quickly in countries that have a liberal trade policy than in those that do not

【Paragraph 6】The key factor in the success of these countries (along with high literacy, which contributed to it) was their ability to adapt to the international division of labor determined by the early industrializers and to stake out areas of specialization in international markets for which they were especially well suited. This meant a great dependence on international commerce, which had notorious fluctuations; but it also meant high returns to those factors of production that were fortunate enough to be well placed in times of prosperity. In Sweden exports accounted for 18 percent of the national income in 1870, and in 1913, 22 percent of a much larger national income. In the early twentieth century, Denmark exported 63 percent of its agricultural production: butter, pork products, and eggs. It exported 80 percent of its butter, almost all to Great Britain, where it accounted for 40 percent of British butter imports.

10.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The early industrializes controlled most of the international economy, leaving these countries to stake out new areas of specialization along the margins.

○Aided by their high literacy rates these countries were able to claim key areas of specialization within established international markets.

○High literacy rates enabled these countries to take over international markets and adapt the international division of labor to suit their strengths.

○The international division of labor established by the early industrializers was suited to these countries, a key factor in their success.

11. According to paragraph 6, a major problem with depending heavily on international markets was that they

○lacked stability

○were not well suited to agricultural products

○were largely controlled by the early industrializers

○led to slower growth of local industries

12. According to paragraph 6, what advantage could a country gain from being heavily involved in international commerce?

○A steadily rising national income

○Greater control over market fluctuations

○High returns when things went well

○A reduced need for imports

While some European countries, such as England and Germany, began to industrialize in the eighteenth century, the Netherlands and the Scandinavian countries of Denmark, Norway, and Sweden developed later. ■All four of these countries lagged considerably behind in the early nineteenth century. ■However, they industrialized rapidly in the second half of the century, especially in the last two or three decades. ■In view of their later start and their lack of coal—undoubtedly the main reason they were not among the early industrializers—it is important to understand the sources of their success. ■

13.Look at the four squares [■] that indicate where the following sentence be added to passage.

**During this period, Sweden had the highest rate of growth of output per capita of any country in Europe, and Denmark was second.**

Where would the sentence best fit?

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THERR answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Although the Netherlands and Scandinavia began to industrialize relatively late, they did so very successfully**

●

●

●

○Although these countries all started with small, uneducated populations, industrialization led to significant population growth and higher literacy rates.

○Thanks to their ready access to the sea, these countries enjoyed advantages in mercantile shipping, fishing, and shipbuilding.

* Because they all started with good harbors for steamships, these countries started with an important advantage in the competition for transit trade.
* These countries were helped by the fact that their governments were relatively stable and honest and generally supported liberal trade policies.

○These countries were successful primarily because their high literacy rates helped them fill specialized market niches.

○Because they were never fully dependent on international commerce, these countries were able to survive notorious fluctuations in international markets.

**参考答案：**

* 1. 2
  2. 4
  3. 4
  4. 4
  5. 1
  6. 1
  7. 2
  8. 3
  9. 2
  10. 2
  11. 1
  12. 3
  13. 3
  14. Thanks to their ...

These countries were helped by …

These countries were successful …

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## **参考译文：荷兰和斯堪的纳维亚半岛的工业化进程**

尽管一些欧洲国家，如英国和德国，在18世纪就开始了工业化，荷兰以及丹麦、挪威、瑞典这些斯堪的纳维亚半岛国家的工业化则发展得较晚。这四个国家在19世纪早期工业化水平非常落后。但是在19世纪下半叶，尤其是在最后的二三十年间里，他们迅速地实现了工业化。鉴于这几个国家的工业化起步较晚并且缺少煤炭资源——毫无疑问，这些都是导致他们不在早期工业化国家行列中的主要原因——了解他们成功的原因非常重要。

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这些国家的人口都很少。在19世纪初，丹麦和挪威的人口总数不到100万；而瑞典和荷兰的居民数量也少于250万。在19世纪，这四个国家均展现出了缓和的人口增长率（丹麦最高，瑞典最低）。但是到了1900年，这些国家的人口数量翻了两倍有余，人口密度剧烈变化。荷兰是欧洲人口密度最大的国家之一，挪威和瑞典最小。丹麦人口密度处于这四国的中游水平，但是趋近于荷兰。

考虑到人力资本是人口的重要特征，这四个国家的优势在于受教育人口的比例非常高。在1850年和1914年，斯堪的纳维亚半岛各国的教育普及率是全欧洲或者全世界最高的，而荷兰远高于欧洲平均水平。如此高的比例对于帮助国内经济在世界经济的改革浪潮中找到自己的位置有着巨大价值。

地理位置对于这四个国家来说，同样是一个非常重要的因素。这四个国家都紧邻海洋，而且这样的地理位置对于国际资源，渔业以及价格低廉的运输、海上商运以及船舶工业有重要的影响。这四个国家因势利导，很好地利用了各自的优势。有着悠久渔业和航运业历史的荷兰人在建造可以停泊蒸汽轮船的港口时遇到了困难。最终，他们在鹿特丹和阿姆斯特丹成功建造了港口，在与德国和中欧的转口贸易以及海外食品和原材料（糖、烟草、巧克力、粮食和油）加工处理方面取得了非凡的成果。丹麦同样有着辉煌的贸易史，特别是在松德海峡（隔开丹麦和瑞典的海峡）的海上交通上。在1857年，一些贸易国家向丹麦支付了6 300万克朗，作为交换，丹麦废止了自1497年以来在松德海峡征收的通行费。这一举措与其他自由贸易政策相辅相成，使得途径松德海峡和哥本哈根港口的贸易额大增。

这四个国家的政治体制没有对工业化和经济的增长设置过多的障碍。而这四国不断发展的民主进程使他们相对平稳地度过了19世纪。这些国家被治理得井井有条，尽管政府在铁路上给予了一定的扶持，比如瑞典政府修建了一些主要的铁路干线，不过在此期间，没有出现重大的腐败和不切实际的国家工程。虽然贸易保护主义在瑞典比较比较明显，但是就如同小国家依赖外国市场一般，这四个国家总体上还是以遵循自由贸易原则为主。在丹麦和瑞典，农业改革从18世纪末逐步持续到19世纪上半叶，，这一改革导致了有着明确市场定位的农民地主阶级的出现。

这些国家成功的关键因素（教育水平高也起了促进作用）在于它们能够适应由早期工业化国家决定的国际劳动力分配，并且监视那些非常适合他们的国际市场的专业化领域。这意味着对波动剧烈的国际贸易市场存在着巨大的依赖。但它也意味着若有幸处于繁荣时期，一些生产要素的回报会特别高。1870年瑞典的出口额占国民收入的18%；在1912年更是达到国民收入的22%。在二十世纪初期，丹麦一度出口了63%的农产品：黄油、猪肉制品和蛋类等。其中，丹麦出口了将近80%的黄油，这些几乎都销往了英国，占了英国黄油进口总量的40%。

## **The Mystery of Yawning**

According to conventional theory, yawning takes place when people are bored or sleepy and serves the function of increasing alertness by reversing, through deeper breathing, the drop in blood oxygen levels that are caused by the shallow breathing that accompanies lack of sleep or boredom. Unfortunately, the few scientific investigations of yawning have failed to find any connection between how often someone yawns and how much sleep they have had or how tired they are. About the closest any research has come to supporting the tiredness theory is to confirm that adults yawn more often on weekdays than at weekends, and that school children yawn more frequently in their first year at primary school than they do in kindergarten.

Another flaw of the tiredness theory is that yawning does not raise alertness or physiological activity, as the theory would predict. When researchers measured the heart rate, muscle tension and skin conductance of people before, during and after yawning, they did detect some changes in skin conductance following yawning, indicating a slight increase in physiological activity. However, similar changes occurred when the subjects were asked simply to open their mouths or to breathe deeply. Yawning did nothing special to their state of physiological activity. Experiments have also cast serious doubt on the belief that yawning is triggered by a drop in blood oxygen or a rise in blood carbon dioxide. Volunteers were told to think about yawning while they breathed either normal air, pure oxygen, or an air mixture with an above-normal level of carbon dioxide. If the theory was correct, breathing air with extra carbon dioxide should have triggered yawning, while breathing pure oxygen should have suppressed yawning. In fact, neither condition made any difference to the frequency of yawning, which remained constant at about 24 yawns per hour. Another experiment demonstrated that physical exercise, which was sufficiently vigorous to double the rate of breathing, had no effect on the frequency of yawning. Again the implication is that yawning has little or nothing to do with oxygen.

A completely different theory holds that yawning assists in the physical development of the lungs early in life, but has no remaining biological function in adults. It has been suggested that yawning and hiccupping might serve to clear out the fetuses airways. The lungs of a fetus secrete a liquid that mixes with its mother's amniotic fluid. Babies with congenital blockages that prevent this fluid from escaping from their lungs are sometimes born with deformed lungs. It might be that yawning helps to clear out the lungs by periodically lowering the pressure in them. According to this theory, yawning in adults is just a developmental fossil with no biological function. But, while accepting that not everything in life can be explained by Darwinian evolution, there are sound reasons for being skeptical of theories like this one, which avoid the issue of what yawning does for adults. Yawning is distracting, consumes energy and takes time. It is almost certainly doing something significant in adults as well as in fetuses. What could it be?

The empirical evidence, such as it is, suggests an altogether different function for yawning—namely, that yawning prepares us for a change in activity level. Support for this theory came from a study of yawning behavior in everyday life. Volunteers wore wrist-mounted devices that automatically recorded their physical activity for up to two weeks: the volunteers also recorded their yawns by pressing a button on the device each time they yawned. The data showed that yawning tended to occur about 15 minutes before a period of increased behavioral activity. Yawning bore no relationship to sleep patterns, however. This accords with anecdotal evidence that people often yawn in situations where they are neither tired nor bored, but are preparing for impending mental and physical activity. Such yawning is often referred to as "incongruous" because it seems out of place, at least on the tiredness view: soldiers yawning before combat, musicians yawning before performing, and athletes yawning before competing. Their yawning seems to have nothing to do with sleepiness or boredom—quite the reverse—but it does precede a change in activity level.

【Paragraph 1】According to conventional theory, yawning takes place when people are bored or sleepy and serves the function of increasing alertness by reversing, through deeper breathing, the drop in blood oxygen levels that are caused by the shallow breathing that accompanies lack of sleep or boredom. Unfortunately, the few scientific investigations of yawning have failed to find any connection between how often someone yawns and how much sleep they have had or how tired they are. About the closest any research has come to supporting the tiredness theory is to confirm that adults yawn more often on weekdays than at weekends, and that school children yawn more frequently in their first year at primary school than they do in kindergarten.

1.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○It is the conventional theory that when people are bored or sleepy, they often experience a drop in blood oxygen levels due to their shallow breathing.

○The conventional theory is that people yawn when bored or sleepy because yawning raises blood oxygen levels, which in turn raises alertness.

○According to conventional theory, yawning is more likely to occur when people are bored or sleepy than when they are alert and breathing deeply.

○Yawning, according to the conventional theory, is caused by boredom or lack of sleep and can be avoided through deeper breathing.

2.In paragragh1, what point does the author make about the evidence for the tiredness theory of yawning?

○There is no scientific evidence linking yawning with tiredness.

○The evidence is wide-ranging because it covers multiple age-groups.

○The evidence is reliable because it was collected over a long period of time.

○The evidence is questionable because the yawning patterns of children and adults should be different.

【Paragraph 2】Another flaw of the tiredness theory is that yawning does not raise alertness or physiological activity, as the theory would predict. When researchers measured the heart rate, muscle tension and skin conductance of people before, during and after yawning, they did detect some changes in skin conductance following yawning, indicating a slight increase in physiological activity. However, similar changes occurred when the subjects were asked simply to open their mouths or to breathe deeply. Yawning did nothing special to their state of physiological activity. Experiments have also cast serious doubt on the belief that yawning is triggered by a drop in blood oxygen or a rise in blood carbon dioxide. Volunteers were told to think about yawning while they breathed either normal air, pure oxygen, or an air mixture with an above-normal level of carbon dioxide. If the theory was correct, breathing air with extra carbon dioxide should have triggered yawning, while breathing pure oxygen should have suppressed yawning. In fact, neither condition made any difference to the frequency of yawning, which remained constant at about 24 yawns per hour. Another experiment demonstrated that physical exercise, which was sufficiently vigorous to double the rate of breathing, had no effect on the frequency of yawning. Again the implication is that yawning has little or nothing to do with oxygen.

3.The word “flaw”in the passage is closest in meaning to

○fault

○aspect

○confusion

○mystery

4.In the paragraph 2, why does the author note that there were physiological changes when subjects opened their mouths or breathed deeply?

○To present an argument in support of the tiredness theory

○To cast doubt on the reliability of the tests that measured heart rate, muscle tension and skin conductance

○To argue against the hypothesis that yawning provides a special way to improve alertness or raise physiological activity

○To support the idea that opening the mouth or breathing deeply can affect blood oxygen levels

5.The word “triggered”in the passage is closest in meaning to

○removed

○followed

○increased

○caused

6.Paragraph 2 answers all of the following questions about yawning EXCEPT

○Does yawning increase alertness or physiological activity?

○Does thinking about yawning increase yawning over not thinking about yawning?

○Does the amount of carbon dioxide and oxygen in the air affect the rate at which people yawn?

○Does the rate of breathing affect the rate at which people yawn?

【Paragraph 3】A completely different theory holds that yawning assists in the physical development of the lungs early in life, but has no remaining biological function in adults. It has been suggested that yawning and hiccupping might serve to clear out the fetuses airways. The lungs of a fetus secrete a liquid that mixes with its mother's amniotic fluid. Babies with congenital blockages that prevent this fluid from escaping from their lungs are sometimes born with deformed lungs. It might be that yawning helps to clear out the lungs by periodically lowering the pressure in them. According to this theory, yawning in adults is just a developmental fossil with no biological function. But, while accepting that not everything in life can be explained by Darwinian evolution, there are sound reasons for being skeptical of theories like this one, which avoid the issue of what yawning does for adults. Yawning is distracting, consumes energy and takes time. It is almost certainly doing something significant in adults as well as in fetuses. What could it be?

7.The word “periodically”in the passage is closest in the meaning to

○continuously

○quickly

○regularly

○carefully

8.According to the developmental theory of yawning presented in paragraph 3, what is the role of yawning?

○It caused hiccups, which aid in the development of the lungs.

○It controls the amount of pressure the lungs place on other developing organs.

○It prevents amniotic fluid from entering the lungs.

○It removes a potentially harmful fluid from the lungs.

9.Paragraph 3 supports which of the following statements about the development theory of yawning?

○The theory is attractive because it explains yawning from the perspective of Darwinian evolution.

○The theory is unsatisfactory because it cannot explain the lung deformities of infants.

○The theory is questionable because it does not explain why a useless and inconvenient behavior would continue into adulthood.

○The theory is incomplete because it does not explain all the evolutionary stages in the development of yawning.

【Paragraph 4】The empirical evidence, such as it is, suggests an altogether different function for yawning—namely, that yawning prepares us for a change in activity level. Support for this theory came from a study of yawning behavior in everyday life. Volunteers wore wrist-mounted devices that automatically recorded their physical activity for up to two weeks: the volunteers also recorded their yawns by pressing a button on the device each time they yawned. The data showed that yawning tended to occur about 15 minutes before a period of increased behavioral activity. Yawning bore no relationship to sleep patterns, however. This accords with anecdotal evidence that people often yawn in situations where they are neither tired nor bored, but are preparing for impending mental and physical activity. Such yawning is often referred to as "incongruous" because it seems out of place, at least on the tiredness view: soldiers yawning before combat, musicians yawning before performing, and athletes yawning before competing. Their yawning seems to have nothing to do with sleepiness or boredom—quite the reverse—but it does precede a change in activity level.

10.The word “empirical”in the passage is closest in meaning to

○reliable

○based on common sense

○relevant

○based on observation

11.The study of yawning behavior discussed in paragraph 4 supports which of the following conclusions?

○Yawning is associated with an expectation of increased physical activity.

○Yawning occurs more frequently when people are asked to record their yawning.

○People tend to yawn about fifteen minutes before they become tired or bored.

* Mental or physical stress tends to make people yawn.

12. Why does the author mention “soldiers yawning before combat, musicians yawning before performing, and athletes yawning before competing”?

○To argue that just the expectation of physical activity can make some people feel tired

○To explain how the view that people yawn because they are tired accounts for yawning before stressful situations

○To support the view that yawning helps prepare a person for mental or physical exertion

○To provide anecdotal evidence that conflicts with the experience of the volunteers in the study

Another flaw of the tiredness theory is that yawning does not raise alertness or physiological activity, as the theory would predict. When researchers measured the heart rate, muscle tension and skin conductance of people before, during and after yawning, they did detect some changes in skin conductance following yawning, indicating a slight increase in physiological activity. However, similar changes occurred when the subjects were asked simply to open their mouths or to breathe deeply. Yawning did nothing special to their state of physiological activity. Experiments have also cast serious doubt on the belief that yawning is triggered by a drop in blood oxygen or a rise in blood carbon dioxide. ■Volunteers were told to think about yawning while they breathed either normal air, pure oxygen, or an air mixture with an above-normal level of carbon dioxide. ■If the theory was correct, breathing air with extra carbon dioxide should have triggered yawning, while breathing pure oxygen should have suppressed yawning. ■In fact, neither condition made any difference to the frequency of yawning, which remained constant at about 24 yawns per hour. ■Another experiment demonstrated that physical exercise, which was sufficiently vigorous to double the rate of breathing, had no effect on the frequency of yawning Again the implication is that yawning has little or nothing to do with oxygen.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This, however, was not the case.**

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THERR answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**The tiredness theory of yawning does not seem to explain why yawning occurs.**

○Although earlier scientific studies strongly supported the tiredness theory, new evidence has cast doubt on these findings.

○Evidence has shown that yawning is almost completely unrelated to amount of oxygen in the blood and is unrelated to sleep behavior.

○Some have proposed that yawning plays a role in the development of the lungs before birth but that it serves no purpose in adults.

○Fluids in the lungs of the fetus prevent yawning from occurring, which disproves the developmental theory of yawning.

○New studies, along with anecdotal evidence, have shown that the frequency of yawning increases during extended periods of inactivity.

○There is some evidence that suggests that yawning prepares the body and mind for a change in activity level.

**参考答案：**

* 1. 2
  2. 1
  3. 1
  4. 3
  5. 4
  6. 2
  7. 3
  8. 4
  9. 3
  10. 4
  11. 1
  12. 3
  13. 3
  14. Evidence has shown …

Some have proposed …

There is some evidence …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：打哈欠的奥秘**

根据传统理论，当人们无聊或者困倦时就会打哈欠。伴随睡眠不足或无聊的是浅呼吸，而浅呼吸会降低血液中氧的含量。打哈欠可以通过深呼吸逆转这一点，增加血液中氧的含量从而达到提高警觉性的功能。但遗憾的是，少量关于打哈欠的科学研究并没有找到任何打哈欠频率与个人睡眠时长或者疲劳程度之间的联系。最近所有用于支持疲劳理论的研究是为了确认成人在工作日比在周末打哈欠的频率更高；学生在小学一年级比在幼儿园时打哈欠的频率要高。

疲劳理论的另一个缺陷是打哈欠并不如该理论所预期的那样提高警觉性或生理活动。研究人员在（志愿者）打哈欠的前、中、后三个阶段均测量了心率、肌肉张力以及皮肤传导性，而他们测得皮肤传导性在打哈欠后的确存在一些变化，这一变化表明生理活动有轻微的增强。但是，在实验者被要求只是张开嘴或深呼吸时，皮肤传导性也发生了相似的变化。打哈欠对于生理活动的状态并无特殊作用。实验结果也对“打哈欠是由血液中氧含量下降或由血液中二氧化碳含量上升所引起的”这一论断产生了严重怀疑。志愿者被告知当他们吸入普通空气、纯氧或者是含有高于正常水平的二氧化碳的空气混合物时要想着打哈欠。如果疲劳理论是正确的，那么当人吸入额外的二氧化碳时，应该能够激发打哈欠；当吸入纯氧时应该能够抑制打哈欠。但实际上，在这两种条件下，打哈欠的频率并无任何差异，均维持在稳定的约24个每小时。另一个实验证明，即使是可以让呼吸频率翻倍的剧烈运动对于打哈欠频率也毫无影响。这再一次说明打哈欠几乎或完全与氧气无关。

一个完全不同的理论认为，打哈欠有助于早期肺部的发育，但是对于成年人来说并无任何生理功效。这也暗示了打哈欠和打嗝或许能够清理胎儿的呼吸道。胎儿的肺会分泌一种混合着母亲羊水的液体。当患有先天性肺不张的婴儿的肺部阻止这种液体从肺中流出时，这些婴儿出生时肺部就会变形。打哈欠很可能是通过周期性的降低肺部压力，帮助清除肺部中的这些液体。按照该理论，成年人打哈欠只是一个没有生理功效的发育阶段的化石。但是，当人们已认同达尔文的进化论并不能解释所有现象时，我们有充分的理由去怀疑这一没有解释成年人打哈欠的问题的理论。打哈欠是分散精力的，费时又耗力。但是，几乎可以肯定是，打哈欠不仅对胎儿，对成年人也有重要的作用。那么，究竟是什么作用呢？

经验结果表明，虽然如此，打哈欠确实有着完全不同的功能——换而言之，我们打哈欠是为活动水平的变化而做的准备。一个“对日常生活中打哈欠行为的研究”支撑了这一论断。志愿者在手腕上携带一种装置，这一装置会自动记录他们在两周里的身体活动情况。另外，志愿者也要通过点击装置上的按钮来记录自己每一次打哈欠的情况。数据显示，打哈欠大多在增强性行为活动的15分钟前发生。但同时指出，打哈欠与睡眠状态没有关系。这一论断符合坊间的传闻：人们通常是既不疲惫也不无聊，但要准备接下来的脑力活动和体力活动时才会打哈欠。这样的哈欠通常被认为是“不协调的”，因为至少从疲倦状态下的角度看，这样的哈欠似乎与疲惫无关：比如战士们在开始战斗前会打哈欠；音乐家在表演前会打哈欠；运动员在比赛前会打哈欠。他们的哈欠看上去似乎与困倦、疲乏无关，但是恰恰相反，这一行为的确出现在了活动水平的变化之前。

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## **Lightning**

Lightning is a brilliant flash of light produced by an electrical discharge from a storm cloud. The electrical discharge takes place when the attractive tension between a region of negatively charged particles and a region of positively charged particles becomes so great that the charged particles suddenly rush together. The coming together of the oppositely charged particles neutralizes the electrical tension and releases a tremendous amount of energy, which we see as lightning. The separation of positively and negatively charged particles takes place during the development of the storm cloud.

The separation of charged particles that forms in a storm cloud has a sandwich-like structure. Concentrations of positively charged particles develop at the top and bottom of the cloud, but the middle region becomes negatively charged. Recent measurements made in the field together with laboratory simulations offer a promising explanation of how this structure of charged particles forms. What happens is that small (millimeter-to centimeter-size) pellets of ice form in the cold upper regions of the cloud. When these ice pellets fall, some of them strike much smaller ice crystals in the center of the cloud. The temperature at the center of the cloud is about -15℃or lower. At such temperatures, the collision between the ice pellets and the ice crystals causes electrical charges to shift so that the ice pellets acquire a negative charge and the ice crystals become positively charged. Then updraft wind currents carry the light, positively charged ice crystals up to the top of the cloud. The heavier negatively charged ice pellets are left to concentrate in the center. This process explains why the top of the cloud becomes positively charged, while the center becomes negatively charged. The negatively charged region is large: several hundred meters thick and several kilometers in diameter. Below this large, cold, negatively charged region, the cloud is warmer than -15℃, and at these temperatures, collisions between ice crystals and falling ice pellets produce positively charged ice pellets that then populate a small region at the base of the cloud.

Most lightning takes place within a cloud when the charge separation within the cloud collapses. However, as the storm cloud develops, the ground beneath the cloud becomes positively charged and lightning can take place in the form of an electrical discharge between the negative charge of the cloud and the positively charged ground. Lightning that strikes the ground is the most likely to be destructive, so even though it represents only 20 percent of all lightning, it has received a lot of scientific attention.

Using high-speed photography, scientists have determined that there are two steps to the occurrence of lightning from a cloud to the ground. First, a channel, or path, is formed that connects the cloud and the ground. Then a strong current of electrons follows that path from the cloud to the ground, and it is that current that illuminates the channel as the lightning we see.

The formation of the channel is initiated when electrons surge from the cloud base toward the ground. When a stream of these negatively charged electrons comes within 100 meters of the ground it is met by a stream of positively charged particles that comes up from the ground. When the negatively and positively charged streams meet, a complete channel connecting the cloud and the ground is formed. The channel is only a few centimeters in diameter, but that is wide enough for electrons to follow the channel to the ground in the visible form of a flash of lightning. The stream of positive particles that meets the surge of electrons from the cloud often arises from a tall pointed structure such as a metal flagpole or a tower. That is why the subsequent lightning that follows the completed channel often strikes a tall structure.

Once a channel has been formed, it is usually used by several lightning discharges, each of them consisting of a stream of electrons from the cloud meeting a stream of positive particles along the established path. Sometimes, however, a stream of electrons following an established channel is met by a positive stream making a new path up from the ground. The result is a forked lightning that strikes the ground in two places.

【Paragraph 1】Lightning is a brilliant flash of light produced by an electrical discharge from a storm cloud. The electrical discharge takes place when the attractive tension between a region of negatively charged particles and a region of positively charged particles becomes so great that the charged particles suddenly rush together. The coming together of the oppositely charged particles neutralizes the electrical tension and releases a tremendous amount of energy, which we see as lightning. The separation of positively and negatively charged particles takes place during the development of the storm cloud.

1. According to paragraph 1, all of the following take place in the development of a flash of lightening EXCEPT

○great tension between two oppositely charged regions

○ an increase in negatively charged particles over positively charged particles

○oppositely charged particles coming together

○the release of electrical energy in the form of visible light

2.The word “tremendous”in the passage is closest in meaning to

○distinct

○growing

○huge

○immediate

【Paragraph 2】The separation of charged particles that forms in a storm cloud has a sandwich-like structure. Concentrations of positively charged particles develop at the top and bottom of the cloud, but the middle region becomes negatively charged. Recent measurements made in the field together with laboratory simulations offer a promising explanation of how this structure of charged particles forms. What happens is that small (millimeter-to centimeter-size) pellets of ice form in the cold upper regions of the cloud. When these ice pellets fall, some of them strike much smaller ice crystals in the center of the cloud. The temperature at the center of the cloud is about -15℃or lower. At such temperatures, the collision between the ice pellets and the ice crystals causes electrical charges to shift so that the ice pellets acquire a negative charge and the ice crystals become positively charged. Then updraft wind currents carry the light, positively charged ice crystals up to the top of the cloud. The heavier negatively charged ice pellets are left to concentrate in the center. This process explains why the top of the cloud becomes positively charged, while the center becomes negatively charged. The negatively charged region is large: several hundred meters thick and several kilometers in diameter. Below this large, cold, negatively charged region, the cloud is warmer than -15℃, and at these temperatures, collisions between ice crystals and falling ice pellets produce positively charged ice pellets that then populate a small region at the base of the cloud.

3.According to paragraph2, what causes ice crystal to become positively charged?

○Collisions with ice pellets

○Collisions with negatively charged ice crystals at the base of the cloud

○Becoming concentrated in the central region of the cloud

○Forming at a temperature greater than -15℃

4.The word “acquire”in the passage is closest in meaning to

* reject
* obtain

○need

○produce

5. According to paragraph2, why are positively charged ice pellets produced in the lower part of the cloud?

○Collisions between ice crystals and ice pellets increase in number in the lower part of the cloud.

* The lower part of the cloud is smaller than the region above it.
* More ice pellets than ice crystals reach the lower part of the cloud.

○Temperature in the lower part of the cloud are warmer than -15℃.

6.According to paragraph2, the middle region of a cloud becomes negatively charged due to all of the following EXCEPT

○ a shift of electrical charged between ice pellets and ice crystals

○negatively charged ice pellets that remain in the middle

○a temperature of -15℃or less

○the development of a positive charge at the base of the cloud

7.It can be inferred from paragraph 2 that part of the reason that the top of a storm cloud becomes positively charged is that

○the top of the cloud is warmer than the middle of the cloud

○ the middle of the cloud is already occupied by positively charged particles

○ the negatively charged ice pellets are too heavy to be carried by the updrafts that move ice crystals

○collisions between ice pellets in the top of the cloud produce mainly positively charged particles

【Paragraph 3】Most lightning takes place within a cloud when the charge separation within the cloud collapses. However, as the storm cloud develops, the ground beneath the cloud becomes positively charged and lightning can take place in the form of an electrical discharge between the negative charge of the cloud and the positively charged ground. Lightning that strikes the ground is the most likely to be destructive, so even though it represents only 20 percent of all lightning, it has received a lot of scientific attention.

8.The author remarks that “Lightning that strikes the ground is the most likely to be destructive”in order to explain why

○this form of lightning has been investigated so much

○ this form of lightning is not as common as lightning within a cloud

○ scientific understanding of this form of lightning is important

○ the buildup of positive charge on the ground beneath a storm cloud can have serious consequences

【Paragraph 4】Using high-speed photography, scientists have determined that there are two steps to the occurrence of lightning from a cloud to the ground. First, a channel, or path, is formed that connects the cloud and the ground. Then a strong current of electrons follows that path from the cloud to the ground, and it is that current that illuminates the channel as the lightning we see.

9.The word “illuminates”in the passage is closet in meaning to

○opens

○completes

○lights

○electrifies

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【Paragraph 5】The formation of the channel is initiated when electrons surge from the cloud base toward the ground. When a stream of these negatively charged electrons comes within 100 meters of the ground it is met by a stream of positively charged particles that comes up from the ground. When the negatively and positively charged streams meet, a complete channel connecting the cloud and the ground is formed. The channel is only a few centimeters in diameter, but that is wide enough for electrons to follow the channel to the ground in the visible form of a flash of lightning. The stream of positive particles that meets the surge of electrons from the cloud often arises from a tall pointed structure such as a metal flagpole or a tower. That is why the subsequent lightning that follows the completed channel often strikes a tall structure.

10. According to paragraph5, which of the following is true of the stream of charged particles from the ground?

○It prevents streams of electrons from the cloud from striking the ground.

○It completes a channel that connects the storm cloud with the ground.

○It produces a stream of electrons from the cloud.

○It widens the path made by the initial stream of electrons from the cloud.

11.Which of the following claims about lightning strikes can be inferred from paragraph 5?

○During a lightning strike the diameter of the channel the electrons follow is considerably enlarged beyond a few centimeters.

○A building is unlikely to be hit by lightning unless it is at least 100 meters tall.

○A building is hit by a lightning strike because the building itself has first determined the path the lightening then takes to it.

○The light of a lightning strike first appears at the point where the streams of negative and positive particles meet.

12.The word “initiated”is closet in meaning to

○started

○intensified

○finished

○expected

The formation of the channel is initiated when electrons surge from the cloud base toward the ground. When a stream of these negatively charged electrons comes within 100 meters of the ground it is met by a stream of positively charged particles that comes up from the ground. When the negatively and positively charged streams meet, a complete channel connecting the cloud and the ground is formed. The channel is only a few centimeters in diameter, but that is wide enough for electrons to follow the channel to the ground in the visible form of a flash of lightning. The stream of positive particles that meets the surge of electrons from the cloud often arises from a tall pointed structure such as a metal flagpole or a tower.

That is why the subsequent lightning that follows the completed channel often strikes a tall structure. ■

Once a channel has been formed, it is usually used by several lightning discharges, each of them consisting of a stream of electrons from the cloud meeting a stream of positive particles along the established path. ■Sometimes, however, a stream of electrons following an established channel is met by a positive stream making a new path up from the ground. ■The result is a forked lightning that strikes the ground in two places. ■

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**The descending stream of electrons divides at the point where the new positive-stream channel intersects the established path.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THERR answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**Lightning takes place when a separation of a positive and negative electrical particles that develops in a storm could suddenly collapses**.

○A storm cloud first develops a positively charged layer at the top, then a negatively charged middle layer, and finally, a positively charged layer at the bottom.

○A separation of oppositely charged particles in clouds develops from collisions of falling ice pellets with ice crystals, from updrafts, and from temperature variations.

○Lightning from cloud to ground follows a channel that forms when a stream of electrons moving down meets a stream of positive particles coming up from the ground.

○Field studies, laboratory simulations, and high-speed photography have all been used to investigate the way charge separations develop in clouds.

○Lightning from a cloud to the ground is more likely to be destructive than is lightning that takes place within a cloud.

○Once a channel has been formed, it is usually used by several successive electrical discharges that illuminate the channel as flashes of lightning.

**参考答案：**

* 1. 2
  2. 3
  3. 1
  4. 2
  5. 4
  6. 4
  7. 3
  8. 1
  9. 3
  10. 2
  11. 3
  12. 1
  13. 3
  14. A separation of …

Lightning from cloud to ground …

Once a channel has …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：闪电**

闪电是由雷雨云放电产生的一道明亮夺目的闪光。当带正电荷粒子区域与带负电荷粒子区域之间的吸引力大到使带电粒子瞬间碰撞到一起就会发生放电现象。相反的带电粒子的结合中和了电压并释放出巨大的能量，这就是我们看到的闪电。在雷雨云形成的过程中正负带电粒子相互分离。

形成雷雨云的带电粒子的分离具有一种三明治结构。带正电的粒子聚集在云的顶部和底部，但是中间区域形成的是带负电的粒子。近期的野外测量以及实验室模拟为这种带电粒子的排列结构提供了可能的解释。实际上在此过程中在云层较冷的上部区域形成了细小的（毫米到厘米大小）冰丸。当这些冰丸飘落时，一部分会与云层中心比冰丸小得多的冰晶相撞。云层中心的温度大约在零下15摄氏度或者更低。在此温度下，冰丸和冰晶的撞击会使电荷发生转移，冰丸由此获得了负电而冰晶获得了正电。随后上升气流会将较轻的正电冰晶带到云的顶部。较重的负电冰丸会留在云层中部并积累起来。这个过程解释了为什么云的顶部带正电而中部带负电。带负电的区域非常大：厚度达数百米，直径达几千米。位于这片又大又冷的带负电区域之下的云层的温度要高于零下15摄氏度，在此温度下，冰晶和降落的冰丸的碰撞会产生带正电荷的冰丸，于是在云层的底部聚集成一小片区域。

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大部分的闪电发生在云层塌陷电荷分离的云层内部。但是，随着雷雨云的发展，云层下方的地面会带上正电，闪电就能够在带负电的云和带正电的陆地之间以放电的形式发生。击中地面的闪电是最有可能带有破坏性的，所以即使它只占所有闪电的20%，还是受到了很大的科学关注。

通过高速摄影，科学家已经确定从云层到地面发生闪电的过程有两步。首先，要建立连接云层和地面的通道或者路径。然后强电流会沿着这条通道从云层传向地面，这股照亮通道的电流就是我们看到的闪电。

电子从云层基部涌向地面就会开始形成通道。当这些负电荷距离地面不到100米的时候，会遇到来自地面的带正电的粒子流。一旦正负带电粒子流相遇，一条连接云层和地面的完整的通道便形成了。这个通道直径仅有几厘米，但是已经足以使电子以一道闪电这种可见的形式通过通道到达地面。那些与从云层涌来的电子相遇的带正电的粒子流通常来自于高大的带尖顶的建筑物，例如金属旗杆或塔。这就是为什么接下来通过完整通道的闪电往往会击中高层建筑的原因。

一旦通道形成，同一条通道可以发生多次闪电放电，每一次都是来自云层的电子流在已有通道上遇到带正电的粒子。但是有时候，通过已有通道的电子流会遇到从地面新路径来的带正电的电子流。结果就是形成在两处击中地面的叉状闪电。

TPO-19

## **The Roman Army's Impact on Britain**

In the wake of the Roman Empire's conquest of Britain in the first century A.D., a large number of troops stayed in the new province, and these troops had a considerable impact on Britain with their camps, fortifications, and participation in the local economy. Assessing the impact of the army on the civilian population starts from the realization that the soldiers were always unevenly distributed across the country. Areas rapidly incorporated into the empire were not long affected by the military. Where the army remained stationed, its presence was much more influential. The imposition of a military base involved the requisition of native lands for both the fort and the territory needed to feed and exercise the soldiers' animals. The imposition of military rule also robbed local leaders of opportunities to participate in local government, so social development was stunted and the seeds of disaffection sown. This then meant that the military had to remain to suppress rebellion and organize government.

Economic exchange was clearly very important as the Roman army brought with it very substantial spending power. Locally[[1]](#footnote-2) a fort had two kinds of impact. Its large population needed food and other supplies. Some of these were certainly brought from long distances, but demands were inevitably placed on the local area. Although goods could be requisitioned, they were usually paid for, and this probably stimulated changes in the local economy. When not campaigning, soldiers needed to be occupied; otherwise they represented a potentially dangerous source of friction and disloyalty. Hence a writing tablet dated 25 April tells of 343 men at one fort engaged on tasks like shoemaking, building a bathhouse, operating kilns, digging clay, and working lead. Such activities had a major effect on the local area, in particular with the construction of infrastructure such as roads, which improved access to remote areas.

Each soldier received his pay, but in regions without a developed economy there was initially little on which it could be spent. The pool of excess cash rapidly stimulated a thriving economy outside fort gates. Some of the demand for the services and goods was no doubt fulfilled by people drawn from far afield, but some local people certainly became entwined in this new economy. There was informal marriage with soldiers, who until AD 197 were not legally entitled to wed, and whole new communities grew up near the forts. These settlements acted like small towns, becoming centers for the artisan and trading populations.

The army also provided a mean of personal advancement for auxiliary soldiers recruited from the native peoples, as a man obtained hereditary Roman citizenship on retirement after service in an auxiliary regiment. Such units recruited on an ad hoc (as needed) basis from the area in which they were stationed, and there was evidently large-scale recruitment within Britain. The total numbers were at least 12,500 men up to the reign of the emperor Hadrian (A.D. 117-138), with a peak around A.D. 80. Although a small proportion of the total population, this perhaps had a massive local impact when a large proportion of the young men were removed from an area. Newly raised regiments were normally transferred to another province from whence it was unlikely that individual recruits would ever return. Most units raised in Britain went elsewhere on the European continent, although one is recorded in Morocco. The reverse process brought young men to Britain, where many continued to live after their 20 to 25 years of service, and this added to the cosmopolitan Roman character of the frontier population. By the later Roman period, frontier garrisons (groups of soldiers) were only rarely transferred, service in units became effectively hereditary, and forts were no longer populated or maintained at full strength.

This process of settling in as a community over several generations, combined with local recruitment, presumably accounts for the apparent stability of the British northern frontier in the later Roman period. It also explains why some of the forts continued in occupation long after Rome ceased to have any formal authority in Britain, at the beginning of the fifth century A.D. The circumstances that had allowed natives to become Romanized also led the self-sustaining military community of the frontier area to become effectively British.

【Paragraph 1】In the wake of the Roman Empire's conquest of Britain in the first century A.D., a large number of troops stayed in the new province, and these troops had a considerable impact on Britain with their camps, fortifications, and participation in the local economy. Assessing the impact of the army on the civilian population starts from the realization that the soldiers were always unevenly distributed across the country. Areas rapidly incorporated into the empire were not long affected by the military. Where the army remained stationed, its presence was much more influential. The imposition of a military base involved the requisition of native lands for both the fort and the territory needed to feed and exercise the soldiers' animals. The imposition of military rule also robbed local leaders of opportunities to participate in local government, so social development was stunted and the seeds of disaffection sown. This then meant that the military had to remain to suppress rebellion and organize government.

1. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

* Many Roman soldiers remained in Britain after conquering it, and their presence had a strong influence.
* The new Roman province of Britain seemed to awaken in the first century A.D. as the local economy improved.
* Camps, fortifications, and economic change contributed to the Roman conquest of Britain.
* With the conquest of Britain by Roman troops, the Roman Empire gained considerable economic strength.

2. According to paragraph 1, the Roman army had the most influence on those areas of Britain that were

* conquered first
* near population centers
* used as military bases
* rapidly incorporated into the empire

3. According to paragraph 1, what effect did military occupation have on the local population?

○It encouraged more even distribution of the population and the settlement of previously undeveloped territory.

○It created discontent and made continuing military occupation necessary.

○It required local labor to construct forts and feed and exercise the soldiers’animals.

○It provided local leaders with opportunities to participate in governance.

4. The word “suppress”in the passage is closest in meaning to

* respond to
* warn against
* avoid the impact of
* stop by force

【Paragraph 2】Economic exchange was clearly very important as the Roman army brought with it very substantial spending power. Locally a fort had two kinds of impact. Its large population needed food and other supplies. Some of these were certainly brought from long distances, but demands were inevitably placed on the local area. Although goods could be requisitioned, they were usually paid for, and this probably stimulated changes in the local economy. When not campaigning, soldiers needed to be occupied; otherwise they represented a potentially dangerous source of friction and disloyalty. Hence a writing tablet dated 25 April tells of 343 men at one fort engaged on tasks like shoemaking, building a bathhouse, operating kilns, digging clay, and working lead. Such activities had a major effect on the local area, in particular with the construction of infrastructure such as roads, which improved access to remote areas.

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5. The word “friction”in the passage is closest in meaning to

* rebellion
* conflict
* neglect
* crime

6.The author mentions “343 men at one fort engaged on tasks like shoemaking, building a bathhouse, operating kilns, digging clay, and working lead”in order to

* describe the kinds of tasks soldiers were required to perform as punishment for disloyalty or misdeeds
* illustrate some of the duties assigned to soldiers to keep them busy and well-behaved when not involved in military campaigns
* provide evidence that Roman soldiers had a negative effect on the local area by performing jobs that had been performed by native workers
* argue that the soldiers would have been better employed in the construction of infrastructure such as roads

【Paragraph 3】Each soldier received his pay, but in regions without a developed economy there was initially little on which it could be spent. The pool of excess cash rapidly stimulated a thriving economy outside fort gates. Some of the demand for the services and goods was no doubt fulfilled by people drawn from far afield, but some local people certainly became entwined in this new economy. There was informal marriage with soldiers, who until AD 197 were not legally entitled to wed, and whole new communities grew up near the forts. These settlements acted like small towns, becoming centers for the artisan and trading populations.

7.The phrase “entitled to”in the passage is closest in meaning to

* given the right to
* able to afford to
* encouraged to
* required to

8.According to paragraph 3, how did the soldiers meet their needs for goods and services?

* Their needs were met by the army, and all of their economic transactions took place within the fort.
* Most of their needs were met by traveling tradespeople who visit the forts.
* During their days off, soldiers traveled to distant towns to make purchases.
* They bought what they needed from the artisans and traders in nearby towns.

【Paragraph 4】The army also provided a means of personal advancement for auxiliary soldiers recruited from the native peoples, as a man obtained hereditary Roman citizenship on retirement after service in an auxiliary regiment. Such units recruited on an ad hoc (as needed) basis from the area in which they were stationed, and there was evidently large-scale recruitment within Britain. The total numbers were at least 12,500 men up to the reign of the emperor Hadrian (A.D. 117-138), with a peak around A.D. 80. Although a small proportion of the total population, this perhaps had a massive local impact when a large proportion of the young men were removed from an area. Newly raised regiments were normally transferred to another province from whence it was unlikely that individual recruits would ever return. Most units raised in Britain went elsewhere on the European continent, although one is recorded in Morocco. The reverse process brought young men to Britain, where many continued to live after their 20 to 25 years of service, and this added to the cosmopolitan Roman character of the frontier population. By the later Roman period, frontier garrisons (groups of soldiers) were only rarely transferred, service in units became effectively hereditary, and forts were no longer populated or maintained at full strength.

9. According to paragraph 4, which of the following is true of Britain’s auxiliary regiments of the Roman army?

* Membership in these regiments reached its highest point during the region of the emperor Hadrian.
* Most of the units recruited in Britain were sent to Morocco and other stations outside Europe.
* Soldiers served in the regiments for many years and after retirement generally stayed where they had been stationed.
* Most of the regiments stationed on the frontier were new units transferred from a neighboring province.

10. According to paragraph 4, all of the following changes could be seen in the frontier garrisons by the later Roman period EXCEPT:

* Membership in the units passed from father to son.
* Fewer soldiers were stationed at the forts.
* Soldiers usually were not transferred to different locations.
* Frontier units became more effective and proficient.

【Paragraph 5】This process of settling in as a community over several generations, combined with local recruitment, presumably accounts for the apparent stability of the British northern frontier in the later Roman period. It also explains why some of the forts continued in occupation long after Rome ceased to have any formal authority in Britain, at the beginning of the fifth century A.D. The circumstances that had allowed natives to become Romanized also led the self-sustaining military community of the frontier area to become effectively British.

11.Why does the author mention that “some of the forts continued in occupation long after Rome ceased to have any formal authority in Britain”?

* To emphasize the degree to which the stability of the British northern frontier depended on firm military control
* To suggest that the Romans continued to occupy Britain even after they had formally given up the right to do so
* To support the claim that forts continued to serve an import economic function even after they ceased to be of any military use
* To describe one of the things that resulted from frontier garrisons’becoming part of the local community over a long period

12.The word “circumstances”in the passage is closest in meaning to

experiences

* communities
* conditions
* laws

【Paragraph 2】Economic exchange was clearly very important as the Roman army brought with it very substantial spending power. Locally a fort had two kinds of impact. Its large population needed food and other supplies. ■Some of these were certainly brought from long distances, but demands were inevitably placed on the local area. ■Although goods could be requisitioned, they were usually paid for, and this probably stimulated changes in the local economy. ■When not campaigning, soldiers needed to be occupied; otherwise they represented a potentially dangerous source of friction and disloyalty. ■Hence a writing tablet dated 25 April tells of 343 men at one fort engaged on tasks like shoemaking, building a bathhouse, operating kilns, digging clay, and working lead. Such activities had a major effect on the local area, in particular with the construction of infrastructure such as roads, which improved access to remote areas.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**One solution was to keep them busy as sources of labor.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentence do not belong to the summary because they express ideas that are no presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**The Roman army’s occupation of Britain influenced and changed the local population.**

●

●

●

Answer Choices

○Although the presence of the army in certain areas caused resentment among the local population, it provided important services such as building infrastructure.

* By recruiting unemployed young men for its auxiliary units, the army made it possible for them to stay in their home towns and provide financial support for their families.
* Large quantities of cash from soldiers’pay stimulated development, but also drove up prices, making it hard for local residents to afford goods and services.
* Though the army appropriated land and some goods, it also paid for many supplies, stimulating local economic growth.
* The forts contributed to the quality of local crafts by bringing in artisans from distant places who brought with them new skills and techniques.
* Roman soldiers started families with local inhabitants, and over the generations, the military community became a stable part of British society.

**参考答案：**

* 1. 1
  2. 3
  3. 2
  4. 4
  5. 2
  6. 2
  7. 1
  8. 4(2和4选项都不合适)
  9. 3
  10. 4
  11. 4
  12. 3
  13. 4th square
  14. Although the presence...

Though the army...

Roman soldiers started...

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## **参考译文：罗马军队对不列颠的影响**

在公元1世纪罗马帝国成功征服不列颠之后，有大量军队驻守在这片新省区，这些军队的军营和城防以及他们参与当地经济都对英国产生了重要的影响。评估军队对人口数量的影响要从士兵在国家内不均匀的分布开始讲起。那些很快就并入帝国的地区并未长期受到军队的影响。而那些保留军队的地区，军队的影响更大。建立军事基地需要征用当地的土地建造要塞，喂养并训练士兵的动物。实行军事统治也强行剥夺了本地领导参与政府事务的机会，因而社会的发展受到了阻碍，由此播下了不满的种子。这就意味着军队不得不维持对反叛的高压政策以及承担组织政府的责任。

因为罗马军队有着强大的消费潜力，经济交流就显得非常重要。在当地，一个军事基地有两种影响，一方面大量的人口需要食物和其他供给。有些食物和供给确实是从远方带来的，但是需求不可避免地由本地承担。尽管这些商品可以强征，但是军队会给予报酬，这些都会刺激当地经济的发展。另一方面当没有战争时，士兵们需要有事可做，否则他们就会成为摩擦和叛变的潜在根源。因此4月25日的一块写字板说一个基地内343名士兵干着诸如做鞋，造浴室，操作炉子，挖泥土和铸铅之类的工作。这样的活动对当地有着显著的影响，特别是基础设施（如道路）的建设使得偏远地区的交通很便利。。

每一个士兵都会有报酬，但是在那些经济欠发达地区花不了那么多的钱。所以这些多余的钱迅速刺激了基地外的经济。一些服务和商品的需求毫无疑问是由外地的人来完成的，但是本地人当然也会卷入到这个新的经济体系中。士兵中出现了非正式婚姻，这种婚姻直到公元197年才得到了法律的承认，从而在这些军事基地周围发展出一些全新的社会群体。这些定居地就像城镇一样，成为了工匠和生意人的聚集地。

军队还为当地征召的后备兵提供了个人升迁途径，一个人从后备队退役之后就可以成为世袭罗马公民。这样的人就是从这些驻地中特别招募而来，并且不列颠的招募规模特别的大。在哈德良皇帝(A.D. 117-138)统治时期总人数至少是12 500人，在公元80年时达到顶峰。尽管这只占总人口的一小部分，但当有大量年轻人离开一个地方时，这可能对当地有非常大的影响。新建立起来的军团通常会被转移到一个不可能回到原籍的省区。大多数不列颠的军团都去了欧洲大陆别的地方，尽管记载下来的只有摩洛哥一个地方。逆过程把年轻人带回英国，在英国很多士兵持续服务20到25年，这样又给驻守边境的人增添了四海为家的罗马情怀。在后罗马时期，前线卫戍部队很少调动，军团中的服务得到了有效的延续，而军事基地也没有人居住或者全力去维持。

这种像群落一样的定居过程持续了好几代，再结合当地的士兵招募大概就是罗马帝国后期英国北部边境比较稳定的原因。这也解释了为什么五世纪初时这些军事基地在罗马已经不再统治英国之后依然存在。这种情况使得本地人罗马化的同时也使得在边境自给自足的军事组织英国化了。

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## **Succession, Climax, and Ecosystems**

In the late nineteenth century, ecology began to grow into an independent science from its roots in natural history and plant geography. The emphasis of this new "community ecology" was on the composition and structure of communities consisting of different species. In the early twentieth century, the American ecologist Frederic Clements pointed out that a succession of plant communities would develop after a disturbance such as a volcanic eruption, heavy flood, or forest fire. An abandoned field, for instance, will be invaded successively by herbaceous plants (plants with little or no woody tissue), shrubs, and trees, eventually becoming a forest. Light-loving species are always among the first invaders, while shade-tolerant species appear later in the succession.

Clements and other early ecologists saw almost lawlike regularity in the order of succession, but that has not been substantiated. A general trend can be recognized, but the details are usually unpredictable. Succession is influenced by many factors: the nature of the soil, exposure to sun and wind, regularity of precipitation, chance colonizations, and many other random processes.

The final stage of a succession, called the climax by Clements and early ecologists, is likewise not predictable or of uniform composition. There is usually a good deal of turnover in species composition, even in a mature community. The nature of the climax is influenced by the same factors that influenced succession. Nevertheless, mature natural environments are usually in equilibrium. They change relatively little through time unless the environment itself changes.

For Clements, the climax was a "superorganism," an organic entity. Even some authors who accepted the climax concept rejected Clements' characterization of it as a superorganism, and it is indeed a misleading metaphor. An ant colony may be legitimately called a superorganism because its communication system is so highly organized that the colony always works as a whole and appropriately according to the circumstances. But there is no evidence for such an interacting communicative network in a climax plant formation. Many authors prefer the term "association" to the term "community" in order to stress the looseness of the interaction.

Even less fortunate was the extension of this type of thinking to include animals as well as plants. This resulted in the "biome," a combination of coexisting flora and fauna. Though it is true that many animals are strictly associated with certain plants, it is misleading to speak of a "spruce-moose biome," for example, because there is no internal cohesion to their association as in an organism. The spruce community is not substantially affected by either the presence or absence of moose. Indeed, there are vast areas of spruce forest without moose. The opposition to the Clementsian concept of plant ecology was initiated by Herbert Gleason, soon joined by various other ecologists. Their major point was that the distribution of a given species was controlled by the habitat requirements of that species and that therefore the vegetation types were a simple consequence of the ecologies of individual plant species.

With "climax,""biome,""superorganism," and various other technical terms for the association of animals and plants at a given locality being criticized, the term "ecosystem" was more and more widely adopted for the whole system of associated organisms together with the physical factors of their environment. Eventually, the energy-transforming role of such a system was emphasized. Ecosystems thus involve the circulation, transformation, and accumulation of energy and matter through the medium of living things and their activities. The ecologist is concerned primarily with the quantities of matter and energy that pass through a given ecosystem, and with the rates at which they do so.

Although the ecosystem concept was very popular in the 1950s and 1960s, it is no longer the dominant paradigm. Gleason's arguments against climax and biome are largely valid against ecosystems as well. Furthermore, the number of interactions is so great that they are difficult to analyze, even with the help of large computers. Finally, younger ecologists have found ecological problems involving behavior and life-history adaptations more attractive than measuring physical constants. Nevertheless, one still speaks of the ecosystem when referring to a local association of animals and plants, usually without paying much attention to the energy aspects.

【Paragraph 2】Clements and other early ecologists saw almost lawlike regularity in the order of succession, but that has not been substantiated. A general trend can be recognized, but the details are usually unpredictable. Succession is influenced by many factors: the nature of the soil, exposure to sun and wind, regularity of precipitation, chance colonizations, and many other random processes.

1. According to paragraph 2, which of the following is a criticism of Clements’view of succession?

○The principles of succession are more lawlike than Clements thought they are.

○More evidence is needed to establish Clements’predictions about succession.

○The details of succession are affected by random processes.

○Many of the factors that determine which plants will grow in an environment, such as the nature of the soil and the exposure to sun, do not change at all.

2.The word “substantiated”in the passage is closest in meaning to

○confirmed

○noticed

○defined

○publicized

3.The word “trend”in the passage is closest in meaning to

○probability

○picture

○lawlike regularity

○tendency

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【Paragraph 3】The final stage of a succession, called the climax by Clements and early ecologists, is likewise not predictable or of uniform composition. There is usually a good deal of turnover in species composition, even in a mature community. The nature of the climax is influenced by the same factors that influenced succession. Nevertheless, mature natural environments are usually in equilibrium. They change relatively little through time unless the environment itself changes.

4.The word “likewise”in the passage is closest in meaning to

○sometimes

○similarly

○apparently

○consequently

【Paragraph 4】For Clements, the climax was a "superorganism," an organic entity. Even some authors who accepted the climax concept rejected Clements' characterization of it as a superorganism, and it is indeed a misleading metaphor. An ant colony may be legitimately called a superorganism because its communication system is so highly organized that the colony always works as a whole and appropriately according to the circumstances. But there is no evidence for such an interacting communicative network in a climax plant formation. Many authors prefer the term "association" to the term "community" in order to stress the looseness of the interaction.

5.The word “legitimately”in the passage is closest in meaning to

○commonly

○broadly

○properly

○officially

6.According to paragraph 4, why do many authors prefer the term “association”to “community”when describing a climax plant formation?

○Because the term “association”does not suggest the presence of a tight network involving interactive communication.

○ Because the term “association”indicates that the grouping is not necessarily beneficial to all members.

○Because the term “community”indicates continuing dynamic development that a climax formation does not have.

○Because the term “community”suggests an organization that has been designed for a specific purpose.

【Paragraph 5】Even less fortunate was the extension of this type of thinking to include animals as well as plants. This resulted in the "biome," a combination of coexisting flora and fauna. Though it is true that many animals are strictly associated with certain plants, it is misleading to speak of a "spruce-moose biome," for example, because there is no internal cohesion to their association as in an organism. The spruce community is not substantially affected by either the presence or absence of moose. Indeed, there are vast areas of spruce forest without moose. The opposition to the Clementsian concept of plant ecology was initiated by Herbert Gleason, soon joined by various other ecologists. Their major point was that the distribution of a given species was controlled by the habitat requirements of that species and that therefore the vegetation types were a simple consequence of the ecologies of individual plant species.

7.In paragraph 5, the author challenges the idea of a “biome”by noting that

○there are usually no very strong connections among the plants and animals living in a place

○plants and animals respond in the same way to the same circumstances

○particular combinations of flora and fauna do not generally come about purely by chance

○some animals are dependent on specific kinds of plants for food

8.Why does the author make the statement, “Indeed, there are vast areas of spruce forest without moose”?

○To highlight a fact whose significance the ecologist Herbert Gleason had missed

○To propose the idea that a spruce forest is by itself a superorganism

○To emphasize that moose are not limited to a single kind of environment

○To criticize the idea of a spruce-moose biome

9.The word “initiated”in the passage is closest in meaning to

○approved

○identified

○started

○foreseen

10.According to paragraph 5, Gleason’s opposition to the Clementsian views of plant ecology was based on the claim that plant species grow in places where

○they can enter into mutually beneficial relationships with other species

○conditions suit them, regardless of whether particular other species are present

○habitats are available for a wide variety of plant and animal species

○their requirements are met, and those of most other species are not

【Paragraph 6】With "climax,""biome,""superorganism," and various other technical terms for the association of animals and plants at a given locality being criticized, the term "ecosystem" was more and more widely adopted for the whole system of associated organisms together with the physical factors of their environment. Eventually, the energy-transforming role of such a system was emphasized. Ecosystems thus involve the circulation, transformation, and accumulation of energy and matter through the medium of living things and their activities. The ecologist is concerned primarily with the quantities of matter and energy that pass through a given ecosystem, and with the rates at which they do so.

11.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Unlike the terms “climax”, “biome,”and “superorganism,”which refer to the particular association of plants and animals at a given location, the term “ecosystem”refers specifically to the physical factors within an environment.

○The terms “climax,”“biome,”“superorganism,”and “ecosystem”all refer to the system of plants and animals in an associated environment, but some are more controversial than others.

○When the older terms of ecology became too technical, they were replaced by the more popular and more widely used term “ecosystem.”

○The term “ecosystem”gradually replaced discredited terms for the combination of a physical environment and the plants and animals living together in it.

12.According to paragraph 6, what did ecologists mainly study when the ecosystem concept was the dominant paradigm?

○The physical factors present in different environments

○The typical activities of animals and the effect of those activities on plants

○The rates at which ecosystems changed from one kind to another

○The flow of energy and matter through ecosystems

【Paragraph 7】Although the ecosystem concept was very popular in the 1950s and 1960s, it is no longer the dominant paradigm. ■Gleason's arguments against climax and biome are largely valid against ecosystems as well. ■Furthermore, the number of interactions is so great that they are difficult to analyze, even with the help of large computers. Finally, younger ecologists have found ecological problems involving behavior and life-history adaptations more attractive than measuring physical constants. ■Nevertheless, one still speaks of the ecosystem when referring to a local association of animals and plants, usually without paying much attention to the energy aspects. ■

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**They may be more interested in researching, for example, the adaptations that some aquatic animals undergo to survive in dry desert environments.**

Where would the sentence best fit ?

**14.【Directions】**An introductory sentence for a brief summary of the passage is provied below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**The study of the combination of plant species that inhabit a particular locality became a scientific discipline toward the end of the nineteenth century.**

●

●.

●

Answer Choices

○Areas that are recovering from serious disturbances like volcanic eruptions and heavy floods provide special opportunities to observe the development of plant communities.

○Whether a given species will be found in a given ecosystem strongly depends on what other species it would interact with in that ecosystem.

○Computer-aided studies of entire system of associated organisms together with their environment provide a solid basis for current studies of specific ecological problems.

○According to the earliest theories of ecology, the development of plant communities proceeds in lawlike fashion and results in stable climax communities.

○The idea of associations of plants and animals that function as “superorganisms”was later rejected by biologists who saw no strong evidence in support of that idea.

○The once popular idea of communities as integrated ecosystems has been largely rejected by modern ecologists, who are more interested in problems involving behavior and adaptations.

**参考答案：**

1. 3
2. 1
3. 4
4. 2
5. 3
6. 1
7. 1
8. 4
9. 3
10. 2
11. 4
12. 4

13. 3rd square

14. According to the...

The idea of....

The once popular...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：演替、顶级群落与生态系统**

在19世纪末期，生态学开始从它的源头——自然历史学和植物地理学中脱离出来成为一门独立的学科。这种新的概念“群落生态”强调的是不同物种构成的群落中的组成和结构。在20世纪早期，美国生态学家弗雷德里克•克莱门茨指出植物群落会在一个大变动（比如火山爆发、泥石流或者森林大火）之后发生演变。比如一块废弃的土地，就会接连受到草类植物（那些没有或只有很少木质结构的植物）、灌木和树木的入侵，最终形成一片森林。喜阳植物总是第一批入侵者，而那些喜阴植物随后出现。

克莱门茨和其他早期的生态学家从演变的顺序中看到了类似定律的规律性，但这个规律性还没有得到证实。我们可以看出大概的趋势，但是细节通常无法预见。演变受很多因素影响：土壤状况，曝光和曝风，降水规律，意外殖民和其他随机过程。

演变的最后阶段被克莱门茨和早期生态学家称为顶级群落，它同样不可预测，组成也不单一。通常会发生大量的物种组成的更替，即使是在成熟的群落也同样如此。顶级群落本质上同样受到那些影响演变的因素的影响。尽管如此，成熟的自然环境通常处于平衡状态。它们随时间改变相对较少，除非环境本身发生变化。

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对于克莱门茨来讲，顶级群落是一个“超级有机体”，一个有机的个体。即使那些接受顶级群落概念的作者也拒绝接受克莱门茨关于超级有机体的描述，它的确是一个误导人的隐喻。一个蚁群被称作超级有机体还比较合理，因为它的通信系统组织非常严密，在某些情形下这些群落能够像一个整体一样巧妙运作。但是没有证据表明在顶级群落植物系统中有这样一种相互影响的交流系统。相比“群落”，很多作者更喜欢用“联系”用以强调交互的松散性。

更不幸的是这种思考方式从植物扩展到了动物。于是就产生了生物群落的概念——一种动物群落和植物群落共存的结合体。尽管很多动物确实和一些植物紧密联系，但诸如“云杉麋鹿生态系统”的说法仍然具有误导性，因为云杉和麋鹿之间并没有像一个有机体那样有内在联系。云杉群落并没有极大地受到麋鹿存在或者不存在的影响。实际上有很多云杉林并没有麋鹿。对克莱门茨关于植物群落概念的反对意见最早是由赫伯特•格里森提出来的，并且获得了很多其他生态学家的支持。他们的主要观点是给定物种的分布是由栖息地物种需求决定的，因此植被类型是简单的单个植物类型生态的结果。

尽管顶级群落，生态群落，超级有机体和许多对给定区域动植物联系描述的专业术语都被批评，但“生态系统”越来越被广泛接受，它用以描述相互联系的有机体以及生态环境物理因素的系统。最终，这个系统强调的是能量转变模式。因此生态系统包括通过生物媒介和活动而产生的循环、转换和能量及物质的积累。生态学家主要关注的是在给定系统下流过系统的物质和能量的量以及它们流过的速率。

尽管生态系统的概念在二十世纪五六十年代特别流行，但它也不是最权威的范例。格里森反对顶级群落和生物群系的论点用来反驳生态系统同样很有效。进一步讲，交互的数量如此之大以至于即使借助计算机也很难去分析它们。最后，年轻一代的生态学家发现关于行为和生命历史进化的问题比测试物理常量更有趣。尽管如此，当谈到某地的动植物联系的时候还是会使用生态系统，通常也就不关注能量的方面了。

## **Discovering the Ice Ages**

In the middle of the nineteenth century, Louis Agassiz, one of the first scientists to study glaciers, immigrated to the United States from Switzerland and became a professor at Harvard University, where he continued his studies in geology and other sciences. For his research, Agassiz visited many places in the northern parts of Europe and North America, from the mountains of Scandinavia and New England to the rolling hills of the American Midwest. In all these diverse regions, Agassiz saw signs of glacial erosion and sedimentation. In flat plains country, he saw moraines (accumulations of earth and loose rock that form at the edges of glaciers) that reminded him of the terminal moraines found at the end of valley glaciers in the Alps. The heterogeneous material of the drift (sand, clay, and rocks deposited there) convinced him of its glacial origin.

The areas covered by this material were so vast that the ice that deposited it must have been a continental glacier larger than Greenland or Antarctica. Eventually, Agassiz and others convinced geologists and the general public that a great continental glaciation had extended the polar ice caps far into regions that now enjoy temperate climates. For the first time, people began to talk about ice ages. It was also apparent that the glaciation occurred in the relatively recent past because the drift was soft, like freshly deposited sediment. We now know the age of the glaciation accurately from radiometric dating of the carbon-14 in logs buried in the drift. The drift of the last glaciation was deposited during one of the most recent epochs of geologic time, the Pleistocene, which lasted from 1.8 million to 10,000 years ago. Along the east coast of the United States, the southernmost advance of this ice is recorded by the enormous sand and drift deposits of the terminal moraines that form Long Island and Cape Cod.

It soon became clear that there were multiple glacial ages during the Pleistocene, with warmer interglacial intervals between them. As geologists mapped glacial deposits in the late nineteenth century, they became aware that there were several layers of drift, the lower ones corresponding to earlier ice ages. Between the older layers of glacial material were well-developed soils containing fossils of warm-climate plants. These soils were evidence that the glaciers retreated as the climate warmed. By the early part of the twentieth century, scientists believed that four distinct glaciations had affected North America and Europe during the Pleistocene epoch.

This idea was modified in the late twentieth century, when geologists and oceanographers examining oceanic sediment found fossil evidence of warming and cooling of the oceans. Ocean sediments presented a much more complete geologic record of the Pleistocene than continental glacial deposits did. The fossils buried in Pleistocene and earlier ocean sediments were of foraminifera—small, single-celled marine organisms that secrete shells of calcium carbonate, or calcite. These shells differ in their proportion of ordinary oxygen (oxygen-16) and the heavy oxygen isotope (oxygen-18). The ratio of oxygen-16 to oxygen-18 found in the calcite of a foraminifer's shell depends on the temperature of the water in which the organism lived. Different ratios in the shells preserved in various layers of sediment reveal the temperature changes in the oceans during the Pleistocene epoch.

Isotopic analysis of shells allowed geologists to measure another glacial effect. They could trace the growth and shrinkage of continental glaciers, even in parts of the ocean where there may have been no great change in temperature—around the equator, for example. The oxygen isotope ratio of the ocean changes as a great deal of water is withdrawn from it by evaporation and is precipitated as snow to form glacial ice. During glaciations, the lighter oxygen-16 has a greater tendency to evaporate from the ocean surface than the heavier oxygen-18 does. Thus, more of the heavy isotope is left behind in the ocean and absorbed by marine organisms. From this analysis of marine sediments, geologists have learned that there were many shorter, more regular cycles of glaciation and deglaciation than geologists had recognized from the glacial drift of the continents alone.

【Paragraph 1】In the middle of the nineteenth century, Louis Agassiz, one of the first scientists to study glaciers, immigrated to the United States from Switzerland and became a professor at Harvard University, where he continued his studies in geology and other sciences. For his research, Agassiz visited many places in the northern parts of Europe and North America, from the mountains of Scandinavia and New England to the rolling hills of the American Midwest. In all these diverse regions, Agassiz saw signs of glacial erosion and sedimentation. In flat plains country, he saw moraines (accumulations of earth and loose rock that form at the edges of glaciers) that reminded him of the terminal moraines found at the end of valley glaciers in the Alps. The heterogeneous material of the drift (sand, clay, and rocks deposited there) convinced him of its glacial origin.

1.The word “accumulations”in the passage is closest in meaning to

○signs

○pieces

○types

○deposits

2.The word “heterogeneous”in the passage is closest in meaning to

○remaining

○varied

○familiar

○layered

3.According to paragraph 1, what persuaded Louis Agassiz that glaciation in the past had been widespread?

○Geologic differences between mountain valleys and flat plains

○The presence of similar glacial material in many different regions

○Geologic research on mountain glaciers in the Alps

○Evidence of regional differences in the drift caused by glacial erosion

【Paragraph 2】The areas covered by this material were so vast that the ice that deposited it must have been a continental glacier larger than Greenland or Antarctica. Eventually, Agassiz and others convinced geologists and the general public that a great continental glaciation had extended the polar ice caps far into regions that now enjoy temperate climates. For the first time, people began to talk about ice ages. It was also apparent that the glaciation occurred in the relatively recent past because the drift was soft, like freshly deposited sediment. We now know the age of the glaciation accurately from radiometric dating of the carbon-14 in logs buried in the drift. The drift of the last glaciation was deposited during one of the most recent epochs of geologic time, the Pleistocene, which lasted from 1.8 million to 10,000 years ago. Along the east coast of the United States, the southernmost advance of this ice is recorded by the enormous sand and drift deposits of the terminal moraines that form Long Island and Cape Cod.

4.The word “enjoy”in the passage is closest in meaning to

○experience

○resemble

○expect

○dominate

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5.It can be inferred from paragraph 2 that Agassiz and other geologists of his time were not able to determine

○which geographic regions had been covered with ice sheets in the last ice age

○the exact dates at which drifts had been deposited during the last ice age

○the exact composition of the drifts laid during the last ice age

○how far south along the east coast of the United States the ice had advanced during the last ice age

【Paragraph 3】It soon became clear that there were multiple glacial ages during the Pleistocene, with warmer interglacial intervals between them. As geologists mapped glacial deposits in the late nineteenth century, they became aware that there were several layers of drift, the lower ones corresponding to earlier ice ages. Between the older layers of glacial material were well-developed soils containing fossils of warm-climate plants. These soils were evidence that the glaciers retreated as the climate warmed. By the early part of the twentieth century, scientists believed that four distinct glaciations had affected North America and Europe during the Pleistocene epoch.

6.According to paragraph 3, what did geologists conclude as a result of finding well-developed soils containing warm-climate plant fossils between layers of glacial drift?

○There had been only one warm period before the Pleistocene epoch.

○There had been multiple periods of mild weather between ice ages.

○Several glacial periods occurred after the Pleistocene epoch.

○Some earlier epochs were warmer thant the Pleistocene.

【Paragraph 4】This idea was modified in the late twentieth century, when geologists and oceanographers examining oceanic sediment found fossil evidence of warming and cooling of the oceans. Ocean sediments presented a much more complete geologic record of the Pleistocene than continental glacial deposits did. The fossils buried in Pleistocene and earlier ocean sediments were of foraminifera—small, single-celled marine organisms that secrete shells of calcium carbonate, or calcite. These shells differ in their proportion of ordinary oxygen (oxygen-16) and the heavy oxygen isotope (oxygen-18). The ratio of oxygen-16 to oxygen-18 found in the calcite of a foraminifer's shell depends on the temperature of the water in which the organism lived. Different ratios in the shells preserved in various layers of sediment reveal the temperature changes in the oceans during the Pleistocene epoch.

7.According to paragraph 3 and 4, scientists modified their theory about the exact number of glaciations because of evidence obtained from

○ ocean sediments

○interglacial soils

○glacial deposits

○air samples

8.The word “reveal”in the passage is closest in meaning to

○result from

○vary with

○show

○preserve

9.According to paragraph 4, scientists use foraminifera shells to learn about Pleistocene ocean conditions by

○measuring the amount of calcium carbonate present in the shells

○determining the proportion of shell in each layer of sediment

○comparing shells deposited during the Pleistocene with those buried earlier

○calculating the relative quantity of two oxygen isotopes in the calcite

【Paragraph 5】Isotopic analysis of shells allowed geologists to measure another glacial effect. They could trace the growth and shrinkage of continental glaciers, even in parts of the ocean where there may have been no great change in temperature—around the equator, for example. The oxygen isotope ratio of the ocean changes as a great deal of water is withdrawn from it by evaporation and is precipitated as snow to form glacial ice. During glaciations, the lighter oxygen-16 has a greater tendency to evaporate from the ocean surface than the heavier oxygen-18 does. Thus, more of the heavy isotope is left behind in the ocean and absorbed by marine organisms. From this analysis of marine sediments, geologists have learned that there were many shorter, more regular cycles of glaciation and deglaciation than geologists had recognized from the glacial drift of the continents alone.

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10.In can be inferred from paragraph 5 that foraminifera fossil shells containing calcite with high percentages of oxygen-16 were deposited at times when

○polar ice extended as far as equatorial regions of land and sea

○extensive glaciation was not occurring

○there were no great increases in ocean temperature

○there was heavy snowfall on continental glaciers

11.In paragraph 5, why does the author include the information that the “oxygen isotope ratio of the ocean changes as a great deal of water is withdrawn from it by evaporation and is precipitated as snow to form glacial ice”?

○To explain how scientists were able to calculate how frequently the continental ice sheets expanded and contracted

○To explain how scientists have determined that there was no great change in ocean temperatures at the equator during past glaciations

○To provide evidence that oxygen-16 has a greater tendency to evaporate than does oxygen-18

○To suggest that equatorial marine organisms absorb more heavy isotopes than do marine organisms elsewhere

12.According to the passage, when did scientists begin to realize that more than one ice age had occurred ?

○In the mid nineteenth century

○In the late nineteenth century

○In the early twentieth century

○In the late twentieth century

【Paragraph 1】In the middle of the nineteenth century, Louis Agassiz, one of the first scientists to study glaciers, immigrated to the United States from Switzerland and became a professor at Harvard University, where he continued his studies in geology and other sciences. For his research, Agassiz visited many places in the northern parts of Europe and North America, from the mountains of Scandinavia and New England to the rolling hills of the American Midwest. ■In all these diverse regions, Agassiz saw signs of glacial erosion and sedimentation. ■In flat plains country, he saw moraines (accumulations of earth and loose rock that form at the edges of glaciers) that reminded him of the terminal moraines found at the end of valley glaciers in the Alps. ■The heterogeneous material of the drift (sand, clay, and rocks deposited there) convinced him of its glacial origin. ■

1. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**In his view, there could be no other explanation for the composition of such drift.**

Where would the sentence best fit ?

1. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**Louis Agassiz was the first to note signs of glacial erosion and sedimentation in diverse regions of Europe and North America.**

●

●

●

Answer Choices

○Evidence of a pattern of glacier-like deposits eventually convinced most geologists that an enormous continental glacier had extended into the temperate zone.

○Glacial research showed that many layers of ice were deposited, with each new period of glaciation extending farther south than the one before.

○Isotopic analysis of marine sediments showed that periods of glaciation and deglaciation were more frequent, shorter, and more cyclic than previously thought.

○Nineteenth-century geologists came to accept the idea that the areas covered by polar ice had reached as far as the equator, a far larger area than Agassiz had thought.

○Nineteenth-century geologists studying the layers of drift concluded that during the Pleistocene epoch, several glaciations had occurred with warm periods between them.

○Research involving foraminifera fossil shells show that ocean temperatures in the Northern Hemisphere varied greatly during the most extensive periods of glaciation.

**参考答案：**

1. 4

2. 2

3. 2

4. 1

5. 2

6. 2

7. 1

8. 3

9. 4

10. 2

11. 1

12. 2

13. 4th square

14. Evidence of a ...

Nineteenth-century geologists studying…

Isotopic analysis of...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：发现冰河时代**

在19世纪中期，路易斯•阿加西是第一批研究冰川的科学家中的一个，他从瑞士移民到美国成为哈佛大学的一位教授，在那里继续研究地质和其他科学。从他的研究看，他访问了欧洲北部和北美的很多地方，从斯堪的纳维亚和新英格兰到美国中西部的波状丘陵地带。在所有这些不同的地区里，阿加西看到了冰川侵蚀和沉积的迹象。在平原国家，他看见了冰碛石（冰川边缘泥土和松散岩石的聚集体），这些东西让他想起了在阿尔卑斯山谷冰川里发现的终碛石。漂流物（沉积的沙子、粘土和岩石）的混杂异质物使他相信这就是冰山的起源。

这些碛石覆盖的区域是如此之大以至于那些使它们沉积下来的冰川肯定是比格林兰或者南极洲还要大的大陆冰川。最终，阿加西和他的支持者说服了地质学家和公众相信大型的大陆冰川已经把极地冰盖延伸到如今的温带气候地区。人们第一次开始讨论冰河时代。很明显冰川作用就发生在相对不远的过去，因为漂流物很软，像新鲜的沉积物。我们现在通过测量掩埋在漂流物中木头放射性的碳-14来精确确定冰川作用的时期。上次冰川作用的漂流物在最近的一个地质时期——更新世，从180万年持续到1万年前——被沉淀下来。沿着美国东海岸，最南边的冰川运动被来自长岛和科德角的大量的沙子和终磧石的漂流沉积物所记录下来。

很快我们就知道了在更新代有多个冰川代，这中间还有温暖的间冰期。当地质学家绘制出19世纪后期冰河沉积的地图之后，他们开始意识到有好几层漂流物，底层漂流物对应的是早期冰河时代。在这些年代更久远的冰层里有永冻土，其中包含了温带植物的化石。这些土壤是冰川随气候转暖而消失的证据。到了20世纪初期，科学家们相信4个不同的冰川作用影响着更新世时期的北美和欧洲。

在20世纪末期，当地质学家和海洋学家研究海洋沉积发现海洋变暖和变冷的化石证据时，这种观点得到了修正。相比大陆冰川沉积，海洋沉积呈现出更新世时期更完整的地质记录。埋在更新世时期的化石和更早的海洋沉积物是有孔虫类，它们是一种小的单细胞海洋生物，会分泌碳酸钙壳或者方解石。这些壳的普通氧（氧16）和重氧同位素（氧18）的比例不同。有孔虫类壳的方解石中氧16与氧18的比例取决于生物居住的水域的温度。不同沉积层中保存的壳有不同的含量，这显示出更新代海洋温度的变化。

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对壳的同位素分析使得地质学家能够测量一些其他的冰川影响。他们能够追踪大型冰川的增长和减小，即使是那些海洋中温度变化不太大的区域，比如说赤道附近。当大量水被蒸发并以雪的形式沉积形成冰川冰时，海洋中氧的同位素比率会发生变化。在冰川作用时期，轻一些的氧16比重一些的氧18更容易从海洋的表面蒸发。这样，更多的重氧同位素留在了海洋里并被有机物吸收。从这些海洋沉积物的分析来看，地质学家了解到有很多更短更有规律的冰川作用和去冰川作用的发生，这比之前地质学家仅仅从大陆冰川漂流物中识别出的要多。

TPO-20

## **Westward Migration**

The story of the westward movement of population in the United States is, in the main, the story of the expansion of American agriculture—of the development of new areas for the raising of livestock and the cultivation of wheat, corn, tobacco, and cotton. After 1815 improved transportation enabled more and more western farmers to escape a self-sufficient way of life and enter a national market economy. During periods when commodity prices were high, the rate of westward migration increased spectacularly. "Old America seemed to be breaking up and moving westward," observed an English visitor in 1817,during the first great wave of migration. Emigration to the West reached a peak in the 1830's. Whereas in 1810 only a seventh of the American people lived west of the Appalachian Mountains, by 1840 more than a third lived there.

Why were these hundreds of thousands of settlers—most of them farmers, some of them artisans—drawn away from the cleared fields and established cities and villages of the East? Certain characteristics of American society help to explain this remarkable migration. The European ancestors of some Americans had for centuries lived rooted to the same village or piece of land until some religious, political, or economic crisis uprooted them and drove them across the Atlantic. Many of those who experienced this sharp break thereafter lacked the ties that had bound them and their ancestors to a single place. Moreover, European society was relatively stratified; occupation and social status were inherited. In American society, however, the class structure was less rigid; some people changed occupations easily and believed it was their duty to improve their social and economic position. As a result, many Americans were an inveterately restless, rootless, and ambitious people. Therefore, these social traits helped to produce the nomadic and daring settlers who kept pushing westward beyond the fringes of settlement. In addition, there were other immigrants who migrated west in search of new homes, material success, and better lives.

The West had plenty of attractions: the alluvial river bottoms, the fecund soils of the rolling forest lands, the black loams of the prairies were tempting to New England farmers working their rocky, sterile land and to southeastern farmers plagued with soil depletion and erosion. In 1820 under a new land law, a farm could be bought for $100. The continued proliferation of banks made it easier for those without cash to negotiate loans in paper money. Western Farmers borrowed with the confident expectation that the expanding economy would keep farm prices high, thus making it easy to repay loans when they fell due.

Transportation was becoming less of a problem for those who wished to move west and for those who hand farm surpluses to send to market. Prior to 1815, western farmers who did not live on navigable waterways were connected to them only by dirt roads and mountain trails. Livestock could be driven across the mountains, but the cost of transporting bulky grains in this fashion was several times greater than their value in eastern markets. The first step toward an improvement of western transportation was the construction of turnpikes. These roads made possible a reduction in transportation costs and thus stimulated the commercialization of agriculture along their routes.

Two other developments presaged the end of the era of turnpikes and started a transportation revolution that resulted in increased regional specialization and the growth of a national market economy. First came the steamboat; although flatboats and keelboats continued to be important until the 1850’s steamboats eventually superseded all other craft in the carrying of passengers and freight. Steamboats were not only faster but also transported upriver freight for about one tenth of what it had previously cost on hand-propelled keelboats. Next came the Erie Canal, an enormous project in its day, spanning about 350 miles. After the canal went into operation, the cost per mile of transporting a ton of freight from Buffalo to New York City declined from nearly 20 cents to less than 1 cent. Eventually, the western states diverted much of their produce from the rivers to the Erie Canal, a shorter route to eastern markets.

【Paragraph 1】The story of the westward movement of population in the United States is, in the main, the story of the expansion of American agriculture—of the development of new areas for the raising of livestock and the cultivation of wheat, corn, tobacco, and cotton. After 1815 improved transportation enabled more and more western farmers to escape a self-sufficient way of life and enter a national market economy. During periods when commodity prices were high, the rate of westward migration increased spectacularly. "Old America seemed to be breaking up and moving westward," observed an English visitor in 1817,during the first great wave of migration. Emigration to the West reached a peak in the 1830's. Whereas in 1810 only a seventh of the American people lived west of the Appalachian Mountains, by 1840 more than a third lived there.

1.What can be inferred from paragraph 1 about western farmers prior to 1815?

○They had limited their crop production to wheat, corn, tobacco, and cotton.

○They were able to sell their produce at high prices.

○They had not been successful in raising cattle.

○They did not operate in a national market economy.

2.What is the purpose of the statement, “Whereas in 1810 only a seventh of the American people lived west of the Appalachian Mountains, by 1840 more than a third lived there”?

○To illustrate that generally population shifts occur rapidly

○To correct a mistaken impression of American agriculture from 1810 to 1840

○To emphasize the range and speed with which the westward migration occurred

○To demonstrated how attractive the Appalachian Mountains were to Americans

【Paragraph 2】Why were these hundreds of thousands of settlers—most of them farmers, some of them artisans—drawn away from the cleared fields and established cities and villages of the East? Certain characteristics of American society help to explain this remarkable migration. The European ancestors of some Americans had for centuries lived rooted to the same village or piece of land until some religious, political, or economic crisis uprooted them and drove them across the Atlantic. Many of those who experienced this sharp break thereafter lacked the ties that had bound them and their ancestors to a single place. Moreover, European society was relatively stratified; occupation and social status were inherited. In American society, however, the class structure was less rigid; some people changed occupations easily and believed it was their duty to improve their social and economic position. As a result, many Americans were an inveterately restless, rootless, and ambitious people. Therefore, these social traits helped to produce the nomadic and daring settlers who kept pushing westward beyond the fringes of settlement. In addition, there were other immigrants who migrated west in search of new homes, material success, and better lives.

3.The word "fringes" in the passage is closest in meaning to

○borders

○groups

○types

○directions

4.According to paragraph 2, all of the following are reasons why Americans migrated westward EXCEPT

○the desire to move from one place to the next

○the hope of improving their socioeconomic status

○the opportunity to change jobs

○the need to escape religious or political crises

【Paragraph 3】The West had plenty of attractions: the alluvial river bottoms, the fecund soils of the rolling forest lands, the black loams of the prairies were tempting to New England farmers working their rocky, sterile land and to southeastern farmers plagued with soil depletion and erosion. In 1820 under a new land law, a farm could be bought for $100. The continued proliferation of banks made it easier for those without cash to negotiate loans in paper money. Western Farmers borrowed with the confident expectation that the expanding economy would keep farm prices high, thus making it easy to repay loans when they fell due.

5.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Because the West had more rivers and forests than the East, its soil was more productive.

○The fertile soils of the West drew farmers from regions with barren soils.

○Farmers living in western areas of the United States were more affected by soil erosion than farmers living in eastern areas.

○The soil in western areas of the United States was richer than soil in eastern areas.

6.According to paragraph 3, what was the significance of the land law passed in 1820?

○It granted government-supported loans to farmers.

○It provided farmland at an affordable price.

○It required banks to offer loans to farmers.

○It enabled farmers to sell their land for a profit.

7.The word "proliferation" in the passage is closest in meaning to

○growth

○cooperation

○importance

○success

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【Paragraph 4】Transportation was becoming less of a problem for those who wished to move west and for those who hand farm surpluses to send to market. Prior to 1815, western farmers who did not live on navigable waterways were connected to them only by dirt roads and mountain trails. Livestock could be driven across the mountains, but the cost of transporting bulky grains in this fashion was several times greater than their value in eastern markets. The first step toward an improvement of western transportation was the construction of turnpikes. These roads made possible a reduction in transportation costs and thus stimulated the commercialization of agriculture along their routes.

8.Paragraph 4 suggests that turnpikes affected farmers by

○making the price of grain uniform for both eastern and western farmers

○making western farm products more profitable than eastern farm products

○allowing farmers to drive their livestock across mountain trails

○allowing a greater number of farmers to sell their farm products in a commercial market

【Paragraph 5】Two other developments presaged the end of the era of turnpikes and started a transportation revolution that resulted in increased regional specialization and the growth of a national market economy. First came the steamboat; although flatboats and keelboats continued to be important until the 1850’s steamboats eventually superseded all other craft in the carrying of passengers and freight. Steamboats were not only faster but also transported upriver freight for about one tenth of what it had previously cost on hand-propelled keelboats. Next came the Erie Canal, an enormous project in its day, spanning about 350 miles. After the canal went into operation, the cost per mile of transporting a ton of freight from Buffalo to New York City declined from nearly 20 cents to less than 1 cent. Eventually, the western states diverted much of their produce from the rivers to the Erie Canal, a shorter route to eastern markets.

9.The word "superseded" in the passage is closest in meaning to

○replaced

○reformed

○equaled

○increased

10.The word "diverted" in the passage is closest in meaning to

○collected

○shifted

○transported

○sold

11.Which of the following can be inferred from paragraph 5 about flatboats and keelboats?

○They ceased to be used as soon as the first turnpikes were built.

○They were slower and more expensive to operate than steamboats.

○They were used for long-distance but not for regional transportation.

○They were used primarily on the Erie Canal.

12.Paragraph 5 mentions that the Erie Canal led to a reduction in all of the following EXCEPT

○the length of the route that goods from the West traveled across to reach eastern markets

○the cost of transporting freight

○the price of produce from western states

○the amount of produce from western states that was shipped on rivers

Transportation was becoming less of a problem for those who wished to move west and for those who had farm surpluses to send to market. ■Prior to 1815, western farmers who did not live on navigable waterways were connected to them only by dirt roads and mountain trails. ■Livestock could be driven across the mountains, but the cost of transporting bulky grains in this fashion was several times greater than their value in eastern markets. ■The first step toward an improvement of western transportation was the construction of turnpikes. ■These roads made possible a reduction in transportation costs and thus stimulated the commercialization of agriculture along their routes.

13.Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**In fact, goods could be shipped more cheaply across the much greater distance of the Atlantic Ocean than they could from western New York to coastal cities.**

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage.

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**The westward movement of population across the United States led to expanded agricultural production.**

●

●

●

Answer Choices

○The desire to improve their livelihood often inspired people to move west.

○Among the people who moved to the western United States were a number of artisans.

○The fertility of western farmland as well as favorable government policies supported agricultural gains.

○Steamboats were originally used to transport passengers rather than freight.

○Commercial farming in the West was greatly enhanced by improvements in land and water transportation.

○The transportation revolution resulted in regional economies that operated independently of a national market economy.

**参考答案：**

1. 4

2. 3

3. 1

4. 4

5. 2

6. 2

7. 1

8. 4

9. 1

10. 2

11. 2

12. 3

13. 3

14. The desire to ...

The fertility of...

Commercial farming...

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## **参考译文:移居西部**

美国西进运动的故事大体说来其实就是美国农业扩张的故事，也就是一场开辟用于饲养家畜以及种植小麦、玉米、烟草和棉花的新土地的运动。1815年之后，交通的改善使得越来越多的西部农民摆脱了自给自足的生活方式，进入了国家市场经济。在商品价格较高的那些年，西迁的比率飞速增长。一名英国游客于1817年评价道：“看来旧美国正在瓦解，并移向西部”，当时正值第一次迁移浪潮。西进运动在1830年达到了顶峰。1810年的时候，还仅有七分之一的美国人生活在阿巴拉契亚山的西侧，到1840年的时候这个数字超过了三分之一。

为什么这几十万的移民——大部分是农民，还有些是工匠——会离开东部开垦好的土地和建设好的城镇？美国社会的某些特征有助于解释这场声势浩大的移民。一些美国人的欧洲祖先几个世纪以来都扎根于同一个村庄或者同一片土地，直到宗教、政治或者经济危机才迫使他们离开故土，穿越大西洋。很多经历过这场巨变的人此后都失去了把他们祖先束缚在一个地方的纽带。而且，欧洲社会相对阶层化，职业和社会地位是世袭的。而在美国社会，等级结构没有这么严格，一部分人轻易就换了工作，并且他们相信提高社会和经济地位是他们的职责。这就导致很多美国人骨子里就是不安于现状、无根而且野心勃勃的人。因此这些社会特征有利于造就出那些会冲破居住地边缘向西行进的游牧民和勇敢的移民。此外，还有一些移民迁到西部是为了找寻新的家园，获得物质上的成功，过上更好的生活。

西部吸引人的地方很多：冲积河床、绵延起伏的林地下的肥沃的土壤、大草原上的黑土，这些都吸引着在布满岩石又贫瘠的土地上劳作的新英格兰农民和饱受土壤损耗和流失困扰的东南部农民。根据1820年的一部新土地法，100美元就可以买一个农场。银行的不断发展使得那些没有现金的人贷款变得更容易了。西部的农民在贷款的时候都满怀信心，他们预期经济的发展会使农场的价格节节攀升，因此到期时要偿还贷款就比较容易。

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对于那些想要迁往西部的人以及手里有多余的农产品可以供给市场的人来讲，交通也已经不成问题。1815年前，那些没有生活在通航的水路旁的西部农民只能从土路和山道去往市场。可以用家畜翻越大山，但是以这种方式运输谷物的成本是这些谷物在东部市场上的价值的好几倍。改善西部交通的第一步就是修建收费高速公路。这些公路使得运输成本有降低的可能，并且因此刺激了沿途农业的商品化。

还有两个发展预示着高速公路时代的终结，并引发了一场运输革命，使得生产日益地区专业化，国家市场经济持续增长。第一个是蒸汽船，虽然在1850年蒸汽船最终取代了所有其它的船来运输乘客和货物之前，平底船和龙骨船一直是相当重要的交通工具。蒸汽船不仅快，而且向上游运输货物的成本约是先前用手划龙骨船的十分之一。第二个就是伊利运河，它在当时是一项庞大的工程，跨越了约350英里。运河投入运营后，从布法罗（“水牛城”）向纽约运输一吨货物的成本从每英里20美分下降到了不到1美分。最终，西部各州都将不少农产品从以往的水路转到了伊利运河这条通往东部市场的捷径上来。

## **Early Settlements in the Southwest Asia**

The universal global warming at the end of the Ice Age had dramatic effects on temperate regions of Asia, Europe, and North America. Ice sheets retreated and sea levels rose. The climatic changes in southwestern Asia were more subtle, in that they involved shifts in mountain snow lines, rainfall patterns, and vegetation cover. However, these same cycles of change had momentous impacts on the sparse human populations of the region. At the end of the Ice Age, no more than a few thousand foragers lived along the eastern Mediterranean coast, in the Jordan and Euphrates valleys. Within 2,000 years, the human population of the region numbered in the tens of thousands, all as a result of village life and farming. Thanks to new environmental and archaeological discoveries, we now know something about this remarkable change in local life.

Pollen samples from freshwater lakes in Syria and elsewhere tell us forest cover expanded rapidly at the end of the Ice Age, for the southwestern Asian climate was still cooler and considerably wetter than today. Many areas were richer in animal and plant species than they are now, making them highly favorable for human occupation. About 9000 B.C., most human settlements lay in the area along the Mediterranean coast and in the Zagros Mountains of Iran and their foothills. Some local areas, like the Jordan River valley, the middle Euphrates valley, and some Zagros valleys, were more densely populated than elsewhere. Here more sedentary and more complex societies flourished. These people exploited the landscape intensively, foraging on hill slopes for wild cereal grasses and nuts, while hunting gazelle and other game on grassy lowlands and in river valleys. Their settlements contain exotic objects such as seashells, stone bowls, and artifacts made of obsidian (volcanic glass), all traded from afar. This considerable volume of intercommunity exchange brought a degree of social complexity in its wake.

Thanks to extremely fine-grained excavation and extensive use of flotation methods (through which seeds are recovered from soil samples), we know a great deal about the foraging practices of the inhabitants of Abu Hureyra in Syria's Euphrates valley. Abu Hureyra was founded about 9500B.C, a small village settlement of cramped pit dwellings (houses dug partially in the soil) with reed roofs supported by wooden uprights. For the next 1,500 years, its inhabitants enjoyed a somewhat warmer and damper climate than today, living in a well-wooded steppe area where wild cereal grasses were abundant. They subsisted off spring migrations of Persian gazelles from the south. With such a favorable location, about 300 to 400 people lived in a sizable, permanent settlement. They were no longer a series of small bands but lived in a large community with more elaborate social organization, probably grouped into clans of people of common descent.

The flotation samples from the excavations allowed botanists to study shifts in plant-collecting habits as if they were looking through a telescope at a changing landscape. Hundreds of tiny plant remains show how the inhabitants exploited nut harvests in nearby pistachio and oak forests. However, as the climate dried up, the forests retreated from the vicinity of the settlement. The inhabitants turned to wild cereal grasses instead, collecting them by the thousands, while the percentage of nuts in the diet fell. By 8200B.C., drought conditions were so severe that the people abandoned their long-established settlement, perhaps dispersing into smaller camps.

Five centuries later, about 7700B.C., a new village rose on the mound. At first the inhabitants still hunted gazelle intensively. Then, about 7000 B.C., within the space of a few generations, they switched abruptly to herding domesticated goats and sheep and to growing einkorn, pulses, and other cereal grasses. Abu Hureyra grew rapidly until it covered nearly 30 acres. It was a close-knit community of rectangular, one-story mud-brick houses, joined by narrow lanes and courtyards, finally abandoned about 5000 B.C.. Many complex factors led to the adoption of the new economies, not only at Abu Hureyra, but at many other locations such as 'Ain Ghazal, also in Syria, where goat toe bones showing the telltale marks of abrasion caused by foot tethering (binding) testify to early herding of domestic stock.

【Paragraph 1】The universal global warming at the end of the Ice Age had dramatic effects on temperate regions of Asia, Europe, and North America. Ice sheets retreated and sea levels rose. The climatic changes in southwestern Asia were more subtle, in that they involved shifts in mountain snow lines, rainfall patterns, and vegetation cover. However, these same cycles of change had momentous impacts on the sparse human populations of the region. At the end of the Ice Age, no more than a few thousand foragers lived along the eastern Mediterranean coast, in the Jordan and Euphrates valleys. Within 2,000 years, the human population of the region numbered in the tens of thousands, all as a result of village life and farming. Thanks to new environmental and archaeological discoveries, we now know something about this remarkable change in local life.

1.The word "momentous" in the passage is closest in meaning to

○numerous

○regular

○very important

○very positive

2.Major climatic changes occurred by the end of the Ice Age in all of the following geographic areas EXCEPT

○temperate regions of Asia

○southwestern Asia

○North America

○Europe

3.The phrase "this remarkable change" in the passage refers to

○warming at the end of the Ice Age

○shifts in mountain snow lines

○the movement of people from farms to villages

○a dramatic increase in the population

【Paragraph 2】Pollen samples from freshwater lakes in Syria and elsewhere tell us forest cover expanded rapidly at the end of the Ice Age, for the southwestern Asian climate was still cooler and considerably wetter than today. Many areas were richer in animal and plant species than they are now, making them highly favorable for human occupation. About 9000 B.C., most human settlements lay in the area along the Mediterranean coast and in the Zagros Mountains of Iran and their foothills. Some local areas, like the Jordan River valley, the middle Euphrates valley, and some Zagros valleys, were more densely populated than elsewhere. Here more sedentary and more complex societies flourished. These people exploited the landscape intensively, foraging on hill slopes for wild cereal grasses and nuts, while hunting gazelle and other game on grassy lowlands and in river valleys. Their settlements contain exotic objects such as seashells, stone bowls, and artifacts made of obsidian (volcanic glass), all traded from afar. This considerable volume of intercommunity exchange brought a degree of social complexity in its wake.

4.The word "exploited" in the passage is closest in meaning to

○explored

○utilized

○inhabited

○improved

5.Why does the author mention "seashells, stone bowls, and artifacts made of obsidian"?

○To give examples of objects obtained through trade with other societies

○To illustrate the kinds of objects that are preserved in a cool climate

○To provide evidence that the organization of work was specialized

○To give examples of the artistic ability of local populations

【Paragraph 3】Thanks to extremely fine-grained excavation and extensive use of flotation methods (through which seeds are recovered from soil samples), we know a great deal about the foraging practices of the inhabitants of Abu Hureyra in Syria's Euphrates valley. Abu Hureyra was founded about 9500B.C, a small village settlement of cramped pit dwellings (houses dug partially in the soil) with reed roofs supported by wooden uprights. For the next 1,500 years, its inhabitants enjoyed a somewhat warmer and damper climate than today, living in a well-wooded steppe area where wild cereal grasses were abundant. They subsisted off spring migrations of Persian gazelles from the south. With such a favorable location, about 300 to 400 people lived in a sizable, permanent settlement. They were no longer a series of small bands but lived in a large community with more elaborate social organization, probably grouped into clans of people of common descent.

6.The word "cramped" in the passage is closest in meaning to

○primitive

○secure

○extended

○confined

7.Paragraph 3 suggests which of the following about the settlement of Abu Hureyra?

○The settlement was inhabited by small groups of people from nearby areas.

○Small bands of people migrated in and out of the settlement.

○The location of the settlement made permanent development difficult.

○The easy availability of food led to the growth of the settlement.

【Paragraph 4】The flotation samples from the excavations allowed botanists to study shifts in plant-collecting habits as if they were looking through a telescope at a changing landscape. Hundreds of tiny plant remains show how the inhabitants exploited nut harvests in nearby pistachio and oak forests. However, as the climate dried up, the forests retreated from the vicinity of the settlement. The inhabitants turned to wild cereal grasses instead, collecting them by the thousands, while the percentage of nuts in the diet fell. By 8200B.C., drought conditions were so severe that the people abandoned their long-established settlement, perhaps dispersing into smaller camps.

8.The word "shifts" in the passage is closest in meaning to

○effects

○similarities

○changes

○exceptions

9.Paragraph 4 suggests that the people of Abu Hureyra abandoned their long-established settlement because

○the inhabitants had cleared all the trees from the forests

○wild cereal grasses took over pistachio and oak forests

○people wanted to explore new areas

○lack of rain caused food shortages

【Paragraph 5】Five centuries later, about 7700B.C., a new village rose on the mound. At first the inhabitants still hunted gazelle intensively. Then, about 7000 B.C., within the space of a few generations, they switched abruptly to herding domesticated goats and sheep and to growing einkorn, pulses, and other cereal grasses. Abu Hureyra grew rapidly until it covered nearly 30 acres. It was a close-knit community of rectangular, one-story mud-brick houses, joined by narrow lanes and courtyards, finally abandoned about 5000 B.C.. Many complex factors led to the adoption of the new economies, not only at Abu Hureyra, but at many other locations such as 'Ain Ghazal, also in Syria, where goat toe bones showing the telltale marks of abrasion caused by foot tethering (binding) testify to early herding of domestic stock.

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10.According to paragraph 5, after 7000 B.C. the settlement of Abu Hureyra differed from earlier settlements at that location in all of the following EXCEPT

○the domestication of animals

○the intensive hunting of gazelle

○the size of the settlement

○the design of the dwellings

11.The word "abruptly" in the passage is closest in meaning to

○informally

○briefly

○suddenly

○surprisingly

12.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○In many areas besides Abu Hureyra, complex factors led to new economies including the herding of domestic stock.

○In 'Ain Ghazal and Syria, domestic stock was more important than it was at Abu Hureyra.

○Once early methods of herding animals improved, new economies were adopted.

○Many complex theories attempt to explain the early domestication of animals.

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13.Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**One of the major effects was the rapid growth of the human population itself.**

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage.

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

At the end of the Ice Age, patterns of human settlement changed in southwestern Asia.

●

●

●

Answer Choices

○Wild cereals, grasses, and nuts were exchanged for exotic objects.

○Changes in climatic conditions made southwestern Asia highly beneficial to human occupants.

○Social organization in Abu Hureyra decreased as the population grew.

○The favorable location of Abu Hureyra kept the city from experiencing hardship during drought years.

○Within 2,000 years, populations in southwestern Asia greatly increased in number.

○In rich, fertile areas permanent societies evolved to a high level of complexity.

**参考答案：**

1. 3

2. 2

3. 4

4. 2

5. 1

6. 4

7. 4

8. 3

9. 4

10. 2

11. 3

12. 1

13. 3

14. Changes in climatic ...

Within 2,000 years...

In rich, fertile...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：西南亚的早期定居点**

冰河时代末期全球普遍升温，这对亚洲、欧洲和北美洲的温带地区产生了巨大的影响。冰原后退，海平面上升。亚洲西南部气候的变化则更加细微，因为涉及到山脉雪线、降水类型和植被覆盖的变化。然而，这些相同的变化周期对该地区稀少的人口产生了重要的影响。在冰河时代末期，地中海东部沿岸的约旦河和幼发拉底河流域仅生活着数千人。随后的两千年内，农村生活和农业使该地区的人口数量变成了数以万计人。正是由于在环境和考古学方面的新发现，我们才得以了解当地生活中发生的这种显著变化。

来自叙利亚和其他地方的淡水湖的花粉样本向我们揭示出在冰河时代末期森林覆盖迅速增长，这是因为当时亚洲西南部的气候比现在要更凉爽，而且要湿润得多。当时很多地区的动植物种类要比现在丰富，这就使得这些地区非常适宜人类居住。大约在公元前9ooo年，大部分人类定居点都位于地中海沿岸以及伊朗的扎格罗斯山脉和丘陵地带。某些局部地区，例如约旦河谷、幼发拉底河谷中部以及某些扎格罗斯谷地的人口就比别的地方要更密集。迁移性更低、更为复杂的社会在这里兴旺发展起来。这些人对该地貌进行高强度的开发，他们在山坡上采集野生的谷物和坚果，在长满青草的低地和河谷中捕捉瞪羚及其他猎物。在他们的定居点发现了从远方交易获得的外来物品，例如贝壳、石碗和黑曜石（火山玻璃）制成的古器。这种数量可观的社会间的交换随后给社会带来了一定的复杂度。

极精细的挖掘和浮选法（可以从土壤样本中发现种子）的广泛使用使得我们对叙利亚境内的幼发拉底河流域阿布胡赖拉的居民的觅食习惯有了深入的了解。阿布胡赖拉是建于公元前9500年的一座小村庄，村庄里都是狭小的洞穴房（房子的一部分是挖到地下的），芦苇做的屋顶是用木头柱子支撑的。随后的1 500年，该地的居民享受着比我们现在略为温暖潮湿的气候，他们居住在树木繁茂的大草原，那里生长着大量的野生谷类植物。他们喂养着从南部地区迁移过来的波斯瞪羚的后代。在这个地理位置绝佳的地方，大约有300～400人居住在一个比较大的永久定居点。他们不再是一系列的小型部落而是住在一起的大社区，拥有更复杂的社会组织，很有可能是按照共同祖先划分的部族。

从挖掘物中获取的浮选样本使得植物学家可以研究他们采集植物习性的变化，就像是通过望远镜观看变化的景致。几百个小型植物残留物显示了这些居民是如何采集附近森林里的开心果和橡子的。然而，随着气候变干燥，森林从定居点的附近向后退缩。居民就转而采集大量的野生谷物，而坚果在饮食中所占的比例下降了。到公元前8200年的时候，干旱变得非常严重以至于人们放弃了他们的长久居住地，也许分散成小的群落了。

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五个世纪以后，大约是公元前7700年，高地上出现了一个新的村庄。最初那里的居民仍然集中于猎取瞪羚。后来大约在公元前7000年，没过几代，这些居民就忽然转向饲养家养的山羊和绵羊，并种植单粒小麦、豆类及其它谷类植物。阿布胡赖拉迅速壮大，最终扩张到了近30英亩。它是一座结构紧凑的矩形村庄，单层的泥砖房屋与狭窄的小道和院子相连，这座村庄最终于公元前5000年被废弃。有很多复杂的因素导致人们采用新的经济形式，这不只是发生在阿布胡赖拉，在其它很多地方例如在艾因加扎勒和叙利亚发现的山羊的趾骨上就有显示足部被栓（绑）造成的磨损的迹象，这就证明该地出现了早期的畜牧业。

## **Fossil Preservation**

When one considers the many ways by which organisms are completely destroyed after death, it is remarkable that fossils are as common as they are. Attack by scavengers and bacteria, chemical decay, and destruction by erosion and other geologic agencies make the odds against preservation very high. However, the chances of escaping complete destruction are vastly improved if the organism happens to have a mineralized skeleton and dies in a place where it can be quickly buried by sediment. Both of these conditions are often found on the ocean floors, where shelled invertebrates (organisms without spines) flourish and are covered by the continuous rain of sedimentary particles. Although most fossils are found in marine sedimentary rocks, they also are found in terrestrial deposits left by streams and lakes. On occasion, animals and plants have been preserved after becoming immersed in tar or quicksand, trapped in ice or lava flows, or engulfed by rapid falls of volcanic ash.

The term "fossil" often implies petrifaction, literally a transformation into stone. After the death of an organism, the soft tissue is ordinarily consumed by scavengers and bacteria. The empty shell of a snail or clam may be left behind, and if it is sufficiently durable and resistant to dissolution, it may remain basically unchanged for a long period of time. Indeed, unaltered shells of marine invertebrates are known from deposits over 100 million years old. In many marine creatures, however, the skeleton is composed of a mineral variety of calcium carbonate called aragonite. Although aragonite has the same composition as the more familiar mineral known as calcite, it has a different crystal form, is relatively unstable, and in time changes to the more stable calcite.

Many other processes may alter the shell of a clam or snail and enhance its chances for preservation. Water containing dissolved silica, calcium carbonate, or iron may circulate through the enclosing sediment and be deposited in cavities such as marrow cavities and canals in bone once occupied by blood vessels and nerves. In such cases, the original composition of the bone or shell remains, but the fossil is made harder and more durable. This addition of a chemically precipitated substance into pore spaces is termed "permineralization."

Petrifaction may also involve a simultaneous exchange of the original substance of a dead plant or animal with mineral matter of a different composition. This process is termed " replacement" because solutions have dissolved the original material and replaced it with an equal volume of the new substance. Replacement can be a marvelously precise process, so that details of shell ornamentation, tree rings in wood, and delicate structures in bone are accurately preserved.

Another type of fossilization, known as carbonization, occurs when soft tissues are preserved as thin films of carbon. Leaves and tissue of soft-bodied organisms such as jellyfish or worms may accumulate, become buried and compressed, and lose their volatile constituents. The carbon often remains behind as a blackened silhouette.

Although it is certainly true that the possession of hard parts enhances the prospect of preservation, organisms having soft tissues and organs are also occasionally preserved. Insects and even small invertebrates have been found preserved in the hardened resins of conifers and certain other trees. X-ray examination of thin slabs of rock sometimes reveals the ghostly outlines of tentacles, digestive tracts, and visual organs of a variety of marine creatures. Soft parts, including skin, hair, and viscera of ice age mammoths, have been preserved in frozen soil or in the oozing tar of oil seeps.

The probability that actual remains of soft tissue will be preserved is improved if the organism dies in an environment of rapid deposition and oxygen deprivation. Under such conditions, the destructive effects of bacteria are diminished. The Middle Eocene Messel Shale (from about 48 million years ago) of Germany accumulated in such an environment. The shale was deposited in an oxygen-deficient lake where lethal gases sometimes bubbled up and killed animals. Their remains accumulated on the floor of the lake and were then covered by clay and silt. Among the superbly preserved Messel fossils are insects with iridescent exoskeletons (hard outer coverings), frogs with skin and blood vessels intact, and even entire small mammals with preserved fur and soft tissue.

【Paragraph 1】When one considers the many ways by which organisms are completely destroyed after death, it is remarkable that fossils are as common as they are. Attack by scavengers and bacteria, chemical decay, and destruction by erosion and other geologic agencies make the odds against preservation very high. However, the chances of escaping complete destruction are vastly improved if the organism happens to have a mineralized skeleton and dies in a place where it can be quickly buried by sediment. Both of these conditions are often found on the ocean floors, where shelled invertebrates (organisms without spines) flourish and are covered by the continuous rain of sedimentary particles. Although most fossils are found in marine sedimentary rocks, they also are found in terrestrial deposits left by streams and lakes. On occasion, animals and plants have been preserved after becoming immersed in tar or quicksand, trapped in ice or lava flows, or engulfed by rapid falls of volcanic ash.

1.The word "agencies" in the passage is closest in meaning to

○combinations

○problems

○forces

○changes

2.In paragraph 1, what is the author's purpose in providing examples of how organisms are destroyed?

○To emphasize how surprising it is that so many fossils exist

○To introduce a new geologic theory of fossil preservation

○To explain why the fossil record until now has remained incomplete

○To compare how fossils form on land and in water

3.The word "terrestrial" in the passage is closest in meaning to

○land

○protected

○alternative

○similar

【Paragraph 2】The term "fossil" often implies petrifaction, literally a transformation into stone. After the death of an organism, the soft tissue is ordinarily consumed by scavengers and bacteria. The empty shell of a snail or clam may be left behind, and if it is sufficiently durable and resistant to dissolution, it may remain basically unchanged for a long period of time. Indeed, unaltered shells of marine invertebrates are known from deposits over 100 million years old. In many marine creatures, however, the skeleton is composed of a mineral variety of calcium carbonate called aragonite. Although aragonite has the same composition as the more familiar mineral known as calcite, it has a different crystal form, is relatively unstable, and in time changes to the more stable calcite.

4.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○When snail or clam shells are left behind, they must be empty in order to remain durable and resist dissolution.

○Although snail and clam shells are durable and resist dissolving, over time they slowly begin to change.

○Although the soft parts of snails or clams dissolve quickly, their hard shells resist dissolution for a long time.

○Empty snail or clam shells that are strong enough not to dissolve may stay in their original state for a long time.

5.Why does the author mention "aragonite" in the passage?

○To emphasize that some fossils remain unaltered for millions of years

○To contrast fossil formation in organisms with soft tissue and in organisms with hard shells

○To explain that some marine organisms must undergo chemical changes in order to fossilize

○To explain why fossil shells are more likely to survive than are fossil skeletons

【Paragraph 3】Many other processes may after the shell of a clam or snail and enhance its chances for preservation. Water containing dissolved silica, calcium carbonate, or iron may circulate through the enclosing sediment and be deposited in cavities such as marrow cavities and canals in bone once occupied by blood vessels and nerves. In such cases, the original composition of the bone or shell remains, but the fossil is made harder and more durable. This addition of a chemically precipitated substance into pore spaces is termed "permineralization."

6.The word "enhance" in the passage is closest in meaning to

○control

○limit

○combine

○increase

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7.Which of the following best explains the process of permineralization mentioned in paragraph 3?

○Water containing calcium carbonate circulates through a shell and deposits sediment.

○Liquid containing chemicals hardens an already existing fossil structure.

○Water passes through sediment surrounding a fossil and removes its chemical content.

○A chemical substance enters a fossil and changes its shape.

【Paragraph 4】Petrifaction may also involve a simultaneous exchange of the original substance of a dead plant or animal with mineral matter of a different composition. This process is termed " replacement" because solutions have dissolved the original material and replaced it with an equal volume of the new substance. Replacement can be a marvelously precise process, so that details of shell ornamentation, tree rings in wood, and delicate structures in bone are accurately preserved.

8.The word "precise" in the passage is closest in meaning to

○complex

○quick

○exact

○reliable

【Paragraph 5】Another type of fossilization, known as carbonization, occurs when soft tissues are preserved as thin films of carbon. Leaves and tissue of soft-bodied organisms such as jellyfish or worms may accumulate, become buried and compressed, and lose their volatile constituents. The carbon often remains behind as a blackened silhouette.

9.Paragraph 5 suggests which of the following about the carbonization process?

○It is completed soon after an organism dies.

○It does not occur in hard-shell organisms.

○It sometimes allows soft-tissued organisms to be preserved with all their parts.

○It is a more precise process of preservation than is replacement.

【Paragraph 6】Although it is certainly true that the possession of hard parts enhances the prospect of preservation, organisms having soft tissues and organs are also occasionally preserved. Insects and even small invertebrates have been found preserved in the hardened resins of conifers and certain other trees. X-ray examination of thin slabs of rock sometimes reveals the ghostly outlines of tentacles, digestive tracts, and visual organs of a variety of marine creatures. Soft parts, including skin, hair, and viscera of ice age mammoths, have been preserved in frozen soil or in the oozing tar of oil seeps.

10.The word "prospect" in the passage is closest in meaning to

○completion

○variety

○possibility

○speed

【Paragraph 7】The probability that actual remains of soft tissue will be preserved is improved if the organism dies in an environment of rapid deposition and oxygen deprivation. Under such conditions, the destructive effects of bacteria are diminished. The Middle Eocene Messel Shale (from about 48 million years ago) of Germany accumulated in such an environment. The shale was deposited in an oxygen-deficient lake where lethal gases sometimes bubbled up and killed animals. Their remains accumulated on the floor of the lake and were then covered by clay and silt. Among the superbly preserved Messel fossils are insects with iridescent exoskeletons (hard outer coverings), frogs with skin and blood vessels intact, and even entire small mammals with preserved fur and soft tissue.

11.According to paragraph 7, how do environments containing oxygen affect fossil preservation?

○They increase the probability that soft-tissued organisms will become fossils.

○They lead to more bacteria production.

○They slow the rate at which clay and silt are deposited.

○They reduce the chance that animal remains will be preserved.

12.According to the passage, all of the following assist in fossil preservation EXCEPT

○the presence of calcite in an organism's skeleton

○the presence of large open areas along an ocean floor

○the deposition of a fossil in sticky substances such as sap or tar

○the rapid burial of an organism under layers of silt

■Another type of fossilization, known as carbonization, occurs when soft tissues are preserved as thin films of carbon. ■Leaves and tissue of soft-bodied organisms such as jellyfish or worms may accumulate, become buried and compressed, and lose their volatile constituents. ■The carbon often remains behind as a blackened silhouette.■

13.Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**But the evidence of past organic life is not limited to petrifaction.**

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage.

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**The remains of ancient life are amazingly well preserved in the form of fossils.**

●

●.

●

Answer Choices

○Environmental characteristics like those present on ocean floors increase the likelihood that plant and animal fossils will occur.

○Fossils are more likely to be preserved in shale deposits than in deposits of clay and silt.

○The shells of organisms can be preserved by processes of chemical precipitation or mineral exchange.

○Freezing enables the soft parts of organisms to survive longer than the hard parts.

○Comparatively few fossils are found in the terrestrial deposits of streams and lakes.

○Thin films of carbon may remain as an indication of soft tissue or actual tissue may be preserved if exposure to bacteria is limited.

**参考答案：**

1. 3

2. 1

3. 1

4. 4

5. 3

6. 4

7. 2

8. 3

9. 2

10. 3

11. 4

12. 2

13. 1

14. Environmental characteristics ...

The shells of organisms ...

Thin films of carbon ...

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## **参考译文：化石保存**

如果想想生物在死之后被完全摧毁的种种方式，能够这样频繁出现化石是一件很令人惊讶的事。食腐动物和细菌的破坏、化学性腐烂、腐蚀以及其它地质因素都会非常不利于保存。不过，如果生物体碰巧具有矿化的骨骼并且死于可以迅速被沉积物掩埋的地方，摆脱被完全摧毁的几率便会大大增加。海底通常就具有上述的两方面条件，这里生活着很多带壳的无脊椎动物（没有脊椎的动物），不断累积的似雨的沉积颗粒会把它们掩埋起来。虽然多数的化石是在海洋沉积岩中发现的，但是在溪流和湖泊留下的陆相沉积物中也发现过。有时，浸入焦油和流沙、陷入冰或熔岩流或被急速降落的火山灰吞噬的动植物得以保存下来。

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术语“化石”常常意味着石化，字面意思就是变成了石头。生物体死后，软组织一般会被食腐动物和细菌吃掉。可能会留下蜗牛或蛤蜊空壳，如果空壳足够坚固并且能抵御分解，就有可能在很长一段时间内基本上保持原样。事实上，我们现在所知的在沉积物中发现的海洋无脊椎动物保存良好的壳已超过了1亿年之久。不过，很多海洋生物的骨骼是由称为霰石的各式碳酸钙矿物质组成的。虽然霰石与我们更为熟悉的矿物方解石具有同样的组成，但是它的晶型不同，相对不稳定，最终会变成更稳定的方解石。

很多其他过程也许会改变哈喇壳或蜗牛壳并且增加它被保存下来的几率。含有溶解的二氧化硅、碳酸钙或铁的水可能会在封闭的沉积物中流动，并沉积到诸如骨髓腔和骨头管道内，这些骨头管道曾经由血管和神经占据。这种情况下，骨和壳的原始组成没有改变，但是形成的化石更坚硬并且更持久。这种在孔隙中填充化学沉积物的过程就叫做“完全矿化”。

石化还可能同时涉及死亡的动植物的原有物质与不同组成的矿物质的交换作用。该过程叫做“置换作用”，因为溶液溶解了原始物质并将其置换成为等体积的新物质。置换是一个让人难以置信的精确过程，贝壳装饰的细节、树木的年轮以及骨骼的精细结构都被精准地保存下来。

另一种类型的石化，称为“碳化”，当软组织以碳薄膜的形式保存时会发生碳化。树叶和软体动物例如水母或蠕虫的组织可能会堆积起来，被掩埋并被压实，然后其中的挥发性成分会消失。碳通常以一种黑色轮廓的形式被保留下来。

虽然拥有坚硬的部分的确会增加保存的可能性，但是具有软组织和器官的生物偶尔也会被保存下来。在针叶树以及某些其它的树种的凝固树脂中就发现了昆虫甚至是很小的无脊椎动物。对岩石薄片的X射线检查有时会发现可怕的触角轮廓、消化道和很多种海洋生物的视觉器官。冻土或石油渗漏时渗出的焦油中保存了包括皮肤、毛发和冰河时代猛犸象的内脏在内的软组织。

如果生物体死于一个快速沉积和缺氧的环境，会有助于软组织残骸的保存。在这种条件下，细菌的破坏性影响会降低。德国始新世中期的麦塞尔页岩（来自4800万年前）就是在这种环境下积累起来的。该页岩在一个缺氧的湖泊里沉积，那里时有致命的气体冒出并杀死动物。动物的残骸在湖底聚集，然后被粘土和淤泥所覆盖。在保存完好的麦塞尔化石中有带闪亮外骨骼（硬质外部覆盖物）的昆虫，皮肤和血管完好无损的青蛙，甚至是毛皮和软组织都完整保存的小型哺乳动物。

TPO-21

## **Geothermal Energy**

Earth's internal heat, fueled by radioactivity, provides the energy for plate tectonics and continental drift, mountain building, and earthquakes. It can also be harnessed to drive electric generators and heat homes. Geothermal energy becomes available in a practical form when underground heat is transferred by water that is heated as it passes through a subsurface region of hot rocks (a heat reservoir) that may be hundreds or thousands of feet deep. The water is usually naturally occurring groundwater that seeps down along fractures in the rock; less typically, the water is artificially introduced by being pumped down from the surface. The water is brought to the surface, as a liquid or steam, through holes drilled for the purpose.

By far the most abundant form of geothermal energy occurs at the relatively low temperatures of 80°to 180°centigrade. Water circulated through heat reservoirs in this temperature range is able to extract enough heat to warm residential, commercial, and industrial spaces. More than 20,000 apartments in France are now heated by warm underground water drawn from a heat reservoir in a geologic structure near Paris called the Paris Basin. Iceland sits on a volcanic structure known as the Mid-Atlantic Ridge. Reykjavik, the capital of Iceland, is entirely heated by geothermal energy derived from volcanic heat.

Geothermal reservoirs with temperatures above 180°centigrade are useful for generating electricity. They occur primarily in regions of recent volcanic activity as hot, dry rock; natural hot water; or natural steam. The latter two sources are limited to those few areas where surface water seeps down through underground faults or fractures to reach deep rocks heated by the recent activity of molten rock material. The world's largest supply of natural steam occurs at The Geysers, 120 kilometers north of San Francisco, California. In the 1990s enough electricity to meet about half the needs of San Francisco was being generated there. This facility was then in its third decade of production and was beginning to show signs of decline, perhaps because of over development. By the late 1990s some 70 geothermal electric-generating plants were in operation in California, Utah, Nevada, and Hawaii, generating enough power to supply about a million people. Eighteen countries now generate electricity using geothermal heat.

Extracting heat from very hot, dry rocks presents a more difficult problem: the rocks must be fractured to permit the circulation of water, and the water must be provided artificially. The rocks are fractured by water pumped down at very high pressures. Experiments are under way to develop technologies for exploiting this resource.

Like most other energy sources, geothermal energy presents some environmental problems. The surface of the ground can sink if hot groundwater is withdrawn without being replaced. In addition, water heated geothermally can contain salts and toxic materials dissolved from the hot rock. These waters present a disposal problem if they are not returned to the ground from which they were removed.

The contribution of geothermal energy to the world's energy future is difficult to estimate. Geothermal energy is in a sense not renewable, because in most cases the heat would be drawn out of a reservoir much more rapidly than it would be replaced by the very slow geological processes by which heat flows through solid rock into a heat reservoir. However, in many places (for example, California, Hawaii, the Philippines, Japan, Mexico, the rift valleys of Africa)the resource is potentially so large that its future will depend on the economics of production. At present, we can make efficient use of only naturally occurring hot water or steam deposits. Although the potential is enormous, it is likely that in the near future geothermal energy can make important local contributions only where the resource is close to the user and the economics are favorable, as they are in California, New Zealand, and Iceland. Geothermal energy probably will not make large-scale contributions to the world energy budget until well into the twenty-first century, if ever.

【Paragraph 1】Earth’s internal heat, fueled by radioactivity, provides the energy for plate tectonics and continental drift, mountain building, and earthquakes. It can also be harnessed to drive electric generators and heat homes. Geothermal energy becomes available in a practical form when underground heat is transferred by water that is heated as it passes through a subsurface region of hot rocks (a heat reservoir) that may be hundreds or thousands of feet deep. The water is usually naturally occurring groundwater that seeps down along fractures in the rock; less typically, the water is artificially introduced by being pumped down from the surface. The water is brought to the surface, as a liquid or steam, through holes drilled for the purpose.

1.According to the processes described in paragraph 1, what is the relationship between radioactivity and the steam produced by geothermal heat?

○Geothermally heated steam is produced when water is exposed to radioactivity deep underground.

○When water is introduced into holes drilled thousands of feet in the ground, it becomes radioactive and turns to steam.

○Radioactivity heats Earth's interior rock, which in turn can heat water to the point it becomes steam.

○When a reservoir of steam in subsurface rock is produced by radioactivity, it is said to be geothermally heated.

2.The word "practical" in the passage is closest in meaning to

○usable

○plentiful

○economical

○familiar

【Paragraph 2】By far the most abundant form of geothermal energy occurs at the relatively low temperatures of 80°to 180°centigrade. Water circulated through heat reservoirs in this temperature range is able to extract enough heat to warm residential, commercial, and industrial spaces. More than 20,000 apartments in France are now heated by warm underground water drawn from a heat reservoir in a geologic structure near Paris called the Paris Basin. Iceland sits on a volcanic structure known as the Mid-Atlantic Ridge. Reykjavik, the capital of Iceland, is entirely heated by geothermal energy derived from volcanic heat.

3.The word "abundant" in the passage is closest in meaning to

○economical

○familiar

○plentiful

○useful

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4.According to paragraph 2, which of the following is true about heat reservoirs with a temperature in the range of 80°to 180°centigrade?

○They are under international control.

○They are more common than reservoirs that have a higher temperature.

○Few of them produce enough heat to warm large industrial spaces.

○They are used to generate electricity.

【Paragraph 3】Geothermal reservoirs with temperatures above 180°centigrade are useful for generating electricity. They occur primarily in regions of recent volcanic activity as hot, dry rock; natural hot water; or natural steam. The latter two sources are limited to those few areas where surface water seeps down through underground faults or fractures to reach deep rocks heated by the recent activity of molten rock material. The world's largest supply of natural steam occurs at The Geysers, 120 kilometers north of San Francisco, California. In the 1990s enough electricity to meet about half the needs of San Francisco was being generated there. This facility was then in its third decade of production and was beginning to show signs of decline, perhaps because of over development. By the late 1990s some 70 geothermal electric-generating plants were in operation in California, Utah, Nevada, and Hawaii, generating enough power to supply about a million people. Eighteen countries now generate electricity using geothermal heat.

5.According to paragraph 3, what is the connection between underground faults and naturally occurring steam?

○Underground faults enable the heat from molten-rock material to escape upward to regions where it can heat surface water enough to produce steam.

○Underground faults are created by steam that is produced in geothermal reservoirs deep inside Earth.

○Underground faults create spaces in which natural steam is sometimes trapped.

○Underground faults allow surface water to reach deep rocks that are hot enough to turn it into steam.

6.In paragraph 3, why does the author mention that in the 1990s The Geysers was in its third decade of production?

○To provide the historical context of the geothermal production of electricity in the United States

○To imply that The Geysers was the first geothermal site to be put into production in California

○To help explain the signs of decline shown by The Geysers

○To explain why 70 new geothermal sites were put into electricity production in the late 1990s

7.Which of the following can be inferred from paragraphs 2 and 3 about geothermal reservoirs?

○Volcanic heat is associated only with geothermal reservoirs that have a temperature over 180°centigrade.

○More countries produce power from geothermal reservoirs than use them for heating buildings.

○Most geothermal reservoirs are suitable for producing electricity.

○A higher geothermal reservoir temperature is needed to generate electricity than is needed to heat homes.

【Paragraph 4】Extracting heat from very hot, dry rocks presents a more difficult problem: the rocks must be fractured to permit the circulation of water, and the water must be provided artificially. The rocks are fractured by water pumped down at very high pressures. Experiments are under way to develop technologies for exploiting this resource.

8.According to paragraph 4, extracting heat from very hot, dry rocks is difficult in part because

○the underground rock must be fractured before heat can be removed from it

○the water above the rock is under very high pressure

○the rock breaks apart when water is pumped into it

○the water circulated through the rock must be much cooler than the rock itself

9.The word "exploiting" in the passage is closest in meaning to

○locating

○increasing

○making use of

○estimating the size of

【Paragraph 5】Like most other energy sources, geothermal energy presents some environmental problems. The surface of the ground can sink if hot groundwater is withdrawn without being replaced. In addition, water heated geothermally can contain salts and toxic materials dissolved from the hot rock. These waters present a disposal problem if they are not returned to the ground from which they were removed.

10.How is the problem that the surface may sink related to the problem that water heated geothermally may contain toxic materials?

○Both problems could be solved by returning groundwater that is removed from an underground heat reservoir back to the reservoir after heat is extracted from it.

○The problem of sinking is more difficult to solve than is the problem of toxic materials.

○Land at the surface sinks because the rock beneath the surface is weakened when salts and toxic materials are removed from it in the process of extracting geothermal energy.

○Both problems are caused by the fact that the hot groundwater in a heat reservoir dissolves the rock, which weakens the rock and makes the water toxic with salt.

【Paragraph 6】The contribution of geothermal energy to the world's energy future is difficult to estimate. Geothermal energy is in a sense not renewable, because in most cases the heat would be drawn out of a reservoir much more rapidly than it would be replaced by the very slow geological processes by which heat flows through solid rock into a heat reservoir. However, in many places (for example, California, Hawaii, the Philippines, Japan, Mexico, the rift valleys of Africa)the resource is potentially so large that its future will depend on the economics of production. At present, we can make efficient use of only naturally occurring hot water or steam deposits. Although the potential is enormous, it is likely that in the near future geothermal energy can make important local contributions only where the resource is close to the user and the economics are favorable, as they are in California, New Zealand, and Iceland. Geothermal energy probably will not make large-scale contributions to the world energy budget until well into the twenty-first century, if ever.

11.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Heat flows through solid rock very slowly, so it takes a very long time for geological processes to produce a reservoir of geothermal energy.

○Geothermal energy is not renewable because heat flows very slowly through solid rock into or out of a heat reservoir.

○The heat quickly removed from a heat reservoir is replaced so slowly by geological processes that geothermal energy is not practically speaking, renewable.

○In most cases, heat travels into a heat reservoir so slowfy that it is a much quicker process to remove the heat from a reservoir than to replace it.

12.In paragraph 6, the author implies that in California, Hawaii, the Philippines, Japan, Mexico, and the rift valleys of Africa the potential size of the geothermal resource is so large that

○it might be economically worth developing these sites even though geothermal energy is not renewable

○these sites will be the first geothermal energy sites to be developed with new technology

○these sites are likely to make a large-scale contribution to the world energy budget in the twenty-first century

○it does not matter whether they have naturally occurring deposits of hot water or steam

Earth's internal heat, fueled by radioactivity, provides the energy for plate tectonics and continental drift, mountain building, and earthquakes. It can also be harnessed to drive electric generators and heat homes. Geothermal energy becomes available in a practical form when underground heat is transferred by water that is heated as it passes through a subsurface region of hot rocks (a heat reservoir) that may be hundreds or thousands of feet deep. ■The water is usually naturally occurring groundwater that seeps down along fractures in the rock; less typically, the water is artificially introduced by being pumped down from the surface. ■The water is brought to the surface, as a liquid or steam, through holes drilled for the purpose.■

By far the most abundant form of geothermal energy occurs at the relatively low temperatures of 80°to 180°centigrade. ■Water circulated through heat reservoirs in this temperature range is able to extract enough heat to warm residential, commercial, and industrial spaces. More than 20,000 apartments in France are now heated by warm underground water drawn from a heat reservoir in a geologic structure near Paris called the Paris Basin. Iceland sits on a volcanic structure known as the Mid-Atlantic Ridge. Reykjavik, the capital of Iceland, is entirely heated by geothermal energy derived from volcanic heat.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**In either case, the heated water will usually be under considerable pressure, and so may have a temperature that is well above its sea-level boiling point of 100°centigrade.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Heat reservoirs in the form of hot rock far beneath Earth's surface are a potential source of usable geothermal energy.**

●

●

●

Answer Choices

○Heat reservoirs with a temperature from 80°to 180°centigrade can be used, as in France and Iceland, to heat buildings.

○A number of countries now use geothermal reservoirs that contain water or steam above 180°centigrade to generate electricity.

○Most heat reservoirs with a temperature above 180°centigrade cannot be used for energy because they are usually too close to recent volcanic activity.

○The sinking of land above heat reservoirs and other environmental problems arise when water is pumped into a heat reservoir under high pressure.

○Experiments are under way to determine if geothermally heated waters could be used as a source of certain minerals that have been dissolved out of hot rocks deep within Earth.

○A number of issues, including how to extract heat from reservoirs that do not have a natural supply of water, will significantly limit the use of geothermal energy for the foreseeable future.

**参考答案：**

1. 3

2. 1

3. 3

4. 2

5. 4

6. 3

7. 4

8. 1

9. 3

10. 1

11. 3

12. 1

13. 2

14. Heat reservoirs with ...

A number of countries...

A number of issues ...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：地热能**

地球内部因放射产生的热量为板块运动、大陆漂移、造山运动和地震提供了能量。这种热量还可以用来驱动发电机发电以及为家庭供暖。水流经地表下可能几百甚至几千英尺深的热岩区域（一种热储）被加热，当被加热的水将热量传递出来时，地热能就可以实际形式加以利用了。这些水通常是沿着岩石的断面下渗的天然地下水，少数情况下是人为从地表泵入的水。通过为了采集地热能所钻的孔，这些水会以液体或蒸汽的形式被带到地表。

到目前为止，最丰富的地热能形式介于相对较低的80到180摄氏度的温度。在此温度范围内的热储内循环的水可以提取出足够的热量供居住区、商业区和工业区取暖。目前在法国有20 000间以上的公寓是由温暖的地下水供暖的，这些地下水来自位于巴黎附近叫做巴黎盆地的地质构造的热储。冰岛位于一个被称为是大西洋中脊的火山构造之上。冰岛的首都雷克雅维克完全是用火山热产生的地热能供暖的。

温度高于180摄氏度的地热储集层可用来发电。这类地热储集层主要位于有近期火山活动的区域，以干热的岩石、天然热水或天然蒸汽的形式存在。后两种形式的储集层局限于少数区域，在这些区域，地表水通过地下断层或断裂渗入到被近期的熔岩活动加热的深层岩石。世界上最大的天然蒸汽供应位于加州旧金山以北120公里处的盖沙斯。二十世纪九十年代，那里产出的电能足够满足旧金山半数的需求。当时该电厂已经有三十个年头了，开始显示出发电量下降的迹象，这可能是由于过度的开发所致。到二十世纪九十年代末，加州、犹他州、内华达州和夏威夷约有70个地热发电厂在运转，产生的电能足够满足一百万人的需求。目前有18个国家在利用地热能发电。

要从极干热的岩石中提取热量存在一个更大的难题：岩石需要有裂缝才能让水流通，而且水必须是人工提供的。通过泵入高压水可以将岩石断裂。开发利用此能源的技术的实验正在进行之中。

就像大多数其它能源一样，地热能也具有一些环境问题。如果抽取地下热水而又不泵回，地表就会下沉。此外，地热加热的水含有从热岩中溶出的盐分和有毒物质。这些水如果不能被输送回抽取的地方，将会产生处理方面的问题。

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地热能对世界能源未来的贡献是难以估量的。地热能在某种意义上讲是不可再生的，因为多数情况下，与热量流经坚硬的岩石到达热储这个极为缓慢的地质作用的更新速度相比，从热储提取热量的速度要快得多。不过，在很多地区（例如加州、夏威夷、菲律宾、日本、墨西哥、非洲的裂谷），这种能源可能非常可观，它的前景将取决于经济的生产。目前，我们只能有效地利用天然形成的热水或蒸汽形式的地热能。尽管潜能巨大，近期之内地热能可能只能对毗邻用户以及经济状况良好的地区做出重要的局部贡献，就像在加州、新西兰和冰岛地区的情况一样。如果可能的话，地热能估计要到二十一世纪才能对世界的能源预算做出大的贡献。

## **The Origins of Agriculture**

How did it come about that farming developed independently in a number of world centers (the Southeast Asian mainland, Southwest Asia, Central America, lowland and highland South America, and equatorial Africa) at more or less the same time? Agriculture developed slowly among populations that had an extensive knowledge of plants and animals. Changing from hunting and gathering to agriculture had no immediate advantages. To start with, it forced the population to abandon the nomad's life and become sedentary, to develop methods of storage and, often, systems of irrigation. While hunter-gatherers always had the option of moving elsewhere when the resources were exhausted, this became more difficult with farming. Furthermore, as the archaeological record shows, the state of health of agriculturalists was worse than that of their contemporary hunter-gatherers.

Traditionally, it was believed that the transition to agriculture was the result of a worldwide population crisis. It was argued that once hunter-gatherers had occupied the whole world, the population started to grow everywhere and food became scarce; agriculture would have been a solution to this problem. We know, however, that contemporary hunter-gatherer societies control their population in a variety of ways. The idea of a world population crisis is therefore unlikely, although population pressure might have arisen in some areas.

Climatic changes at the end of the glacial period 13,000 years ago have been proposed to account for the emergence of farming. The temperature increased dramatically in a short period of time (years rather than centuries), allowing for a growth of the hunting-gathering population due to the abundance of resources. There were, however, fluctuations in the climatic conditions, with the consequences that wet conditions were followed by dry ones, so that the availability of plants and animals oscillated brusquely.

It would appear that the instability of the climatic conditions led populations that had originally been nomadic to settle down and develop a sedentary style of life, which led in turn to population growth and to the need to increase the amount of food available. Farming originated in these conditions. Later on, it became very difficult to change because of the significant expansion of these populations. It could be argued, however, that these conditions are not sufficient to explain the origins of agriculture. Earth had experienced previous periods of climatic change, and yet agriculture had not been developed.

It is archaeologist Steven Mithen's thesis, brilliantly developed in his book *The Prehistory of the Mind* (1996), that approximately 40,000 years ago the human mind developed cognitive fluidity, that is, the integration of the specializations of the mind: technical, natural history (geared to understanding the behavior and distribution of natural resources), social intelligence, and the linguistic capacity. Cognitive fluidity explains the appearance of art, religion, and sophisticated speech. Once humans possessed such a mind, they were able to find an imaginative solution to a situation of severe economic crisis such as the farming dilemma described earlier. Mithen proposes the existence of four mental elements to account for the emergence of farming: (1) the ability to develop tools that could be used intensively to harvest and process plant resources; (2) the tendency to use plants and animals as the medium to acquire social prestige and power; (3) the tendency to develop "social relationships" with animals structurally similar to those developed with people—specifically, the ability to think of animals as people (anthropomorphism) and of people as animals (totemism); and (4) the tendency to manipulate plants and animals.

The fact that some societies domesticated animals and plants, discovered the use of metal tools, became literate, and developed a state should not make us forget that others developed pastoralism or horticulture (vegetable gardening) but remained illiterate and at low levels of productivity; a few entered the modern period as hunting and gathering societies. It is anthropologically important to inquire into the conditions that made some societies adopt agriculture while others remained hunter-gatherers or horticulturalists. However, it should be kept in mind that many societies that knew of agriculture more or less consciously avoided it. Whether Mithen's explanation is satisfactory is open to contention, and some authors have recently emphasized the importance of other factors.

【Paragraph 1】How did it come about that farming developed independently in a number of world centers (the Southeast Asian mainland, Southwest Asia, Central America, lowland and highland South America, and equatorial Africa) at more or less the same time? Agriculture developed slowly among populations that had an extensive knowledge of plants and animals. Changing from hunting and gathering to agriculture had no immediate advantages. To start with, it forced the population to abandon the nomad's life and become sedentary, to develop methods of storage and, often, systems of irrigation. While hunter-gatherers always had the option of moving elsewhere when the resources were exhausted, this became more difficult with farming. Furthermore, as the archaeological record shows, the state of health of agriculturalists was worse than that of their contemporary hunter-gatherers.

1.The word "option" in the passage is closest in meaning to

○choice

○benefit

○idea

○experience

2.According to paragraph 1, all of the following are advantages of hunting and gathering over agriculture EXCEPT:

○It is a healthier lifestyle.

○It requires less knowledge of plants and animals.

○It does not need storage capabilities.

○It is not tied to any specific location.

【Paragraph 2】Traditionally, it was believed that the transition to agriculture was the result of a worldwide population crisis. It was argued that once hunter-gatherers had occupied the whole world, the population started to grow everywhere and food became scarce; agriculture would have been a solution to this problem. We know, however, that contemporary hunter-gatherer societies control their population in a variety of ways. The idea of a world population crisis is therefore unlikely, although population pressure might have arisen in some areas.

3.The word "therefore" in the passage is closest in meaning to

○in theory

○obviously

○frequently

○as a result

4.Which of the following best describes the way paragraph 2 is organized?

○A possible explanation for a phenomenon is presented and then criticized

○Two similar ways of accounting for a puzzling fact are considered.

○Early societies' response to a problem is contrasted with contemporary societies' response.

○A prehistoric development is first explained in traditional terms and then in contemporary terms.

【Paragraph 3】Climatic changes at the end of the glacial period 13,000 years ago have been proposed to account for the emergence of farming.The temperature increased dramatically in a short period of time (years rather than centuries), allowing for a growth of the hunting-gathering population due to the abundance of resources. There were, however, fluctuations in the climatic conditions, with the consequences that wet conditions were followed by dry ones, so that the availability of plants and animals oscillated brusquely.

5.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The resources needed by the growing hunting and gathering population increased rapidly once temperatures rose.

○Dramatic temperature increases and the simultaneous growth of the hunting and gathering population led to the need for more resources.

○Higher temperatures led to the existence of increased resources, thus enabling the hunting and gathering population to grow.

○The dramatic temperature increase occurred during the few years when abundant resources allowed the hunting and gathering population to grow.

6.According to paragraph 3, the abundance of resources fluctuated sharply after the end of the glacial period because

○locally abundant resources were quickly exhausted by hunter-gatherers

○the temperature became much higher in some areas over others

○different types of plants and animals became available as the climate changed

○the amount of rainfall varied radically from one period to the next

【Paragraph 4】It would appear that the instability of the climatic conditions led populations that had originally been nomadic to settle down and develop a sedentary style of life, which led in turn to population growth and to the need to increase the amount of food available. Farming originated in these conditions. Later on, it became very difficult to change because of the significant expansion of these populations. It could be argued, however, that these conditions are not sufficient to explain the origins of agriculture.Earth had experienced previous periods of climatic change, and yet agriculture had not been developed.

7.It can be inferred from paragraph 4 that it was difficult for people to change from farming back to hunting and gathering because

○people had become more used to different types of food

○climatic conditions were no longer favorable for hunting and gathering

○populations had become too large to be supported by hunting and gathering

○the farmer's sedentary life was easier than the hunter-gatherer's nomadic life

8. Why does the author state that "Earth had experienced previous periods of climatic change, and yet agriculture had not been developed"?

○To suggest that climate change had occurred long before the development of agriculture

○To argue that climate change does not properly explain why agriculture developed

○To challenge the assumption that agriculture developed only in some parts of the world

○To question the claim that climate change occurred at the time when agriculture developed

【Paragraph 5】It is archaeologist Steven Mithen's thesis, brilliantly developed in his book *The Prehistory of the Mind* (1996), that approximately 40,000 years ago the human mind developed cognitive fluidity, that is, the integration of the specializations of the mind: technical, natural history (geared to understanding the behavior and distribution of natural resources), social intelligence, and the linguistic capacity. Cognitive fluidity explains the appearance of art, religion, and sophisticated speech. Once humans possessed such a mind, they were able to find an imaginative solution to a situation of severe economic crisis such as the farming dilemma described earlier. Mithen proposes the existence of four mental elements to account for the emergence of farming: (1) the ability to develop tools that could be used intensively to harvest and process plant resources; (2) the tendency to use plants and animals as the medium to acquire social prestige and power; (3) the tendency to develop "social relationships" with animals structurally similar to those developed with people—specifically, the ability to think of animals as people (anthropomorphism) and of people as animals (totemism); and (4) the tendency to manipulate plants and animals.

9.The word "imaginative" in the passage is closest in meaning to

○complex

○creative

○immediate

○reliable

10.According to paragraph 5, Steven Mithen believes that all of the following contributed to the emergence of farming EXCEPT

○the development of a mind flexible enough to come up with solutions to complex problems

○the tendency to use plants and animals to acquire power

○the tendency to emphasize the differences between animals and people

○the ability to make tools that could be used for the large-scale harvesting of plants

【Paragraph 6】The fact that some societies domesticated animals and plants, discovered the use of metal tools, became literate, and developed a state should not make us forget that others developed pastoralism or horticulture (vegetable gardening) but remained illiterate and at low levels of productivity; a few entered the modern period as hunting and gathering societies. It is anthropologically important to inquire into the conditions that made some societies adopt agriculture while others remained hunter-gatherers or horticulturalists. However, it should be kept in mind that many societies that knew of agriculture more or less consciously avoided it. Whether Mithen's explanation is satisfactory is open to contention, and some authors have recently emphasized the importance of other factors.

11.The word "contention" in the passage is closest in meaning to

○investigation

○improvement

○debate

○interpretation

12.According to paragraph 6, which of the following is a weakness of Mithen's explanation?

○It does not clearly distinguish agriculture from pastoralism and horticulture.

○It fails to explain why some societies adopted agriculture while others did not.

○It explains the domestication of plants and animals but not the development of metal tools.

○It overlooks the fact that illiteracy and low productivity remain problems even today

【Paragraph 7】How did it come about that farming developed independently in a number of world centers (the Southeast Asian mainland, Southwest Asia, Central America, lowland and highland South America, and equatorial Africa) at more or less the same time? Agriculture developed slowly among populations that had an extensive knowledge of plants and animals. ■Changing from hunting and gathering to agriculture had no immediate advantages. ■To start with, it forced the population to abandon the nomad's life and became sedentary, to develop methods of storage and, often, systems of irrigation. ■While hunter-gatherers always had the option of moving elsewhere when the resources were exhausted, this became more difficult with farming. ■Furthermore, as the archaeological record shows, the state of health of agriculturalists was worse than that of their contemporary hunter-gatherers.

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13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Because humans had built up this knowledge as hunter-gatherers, it is logical to conclude that over time they would have become extremely efficient.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14.【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**It is unclear why hunter-gatherers in different parts of the world independently developed agriculture at roughly the same time.**

●

●

●

Answer Choices

○One obstacle to the transition from a nomadic lifestyle to the sedentary lifestyle required by agriculture was that hunter-gatherers had not developed storage techniques.

○It seems unlikely that agriculture emerged in response to a food shortage brought on by a worldwide population crisis that developed once the whole world was occupied.

○The origins of agriculture maybe linked to climate change at the end of the last ice age, but this does not explain why earlier climatic instability had not led to agriculture.

○The only available means of understanding the social organization and technical abilities of ancient hunter-gatherer societies is the study of contemporary hunter-gatherers.

○One recent theory suggests that the invention of agriculture was made possible by the integration of various mental capacities in the human mind.

○Little is known about why only some societies that adopted agriculture rapidly progressed to using metal tools, becoming literate, and developing a state.

**参考答案：**

1. 1

2. 2

3. 4

4. 1

5. 3

6. 4

7. 3

8. 2

9. 2

10. 3

11. 3

12. 2

13. 1

14. It seems unlikely ...

The origins of ...

One recent theory...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：农业的起源**

农业是如何独立的在多个世界中心（东南亚大陆、西南亚、中美洲、南美的高地与低地以及赤道非洲地区）几乎同时发展起来的呢？在那些熟知动植物的人中农业发展得相当缓慢。从狩猎和采集转变为农耕并没有显而易见的好处。首先，它会迫使人们放弃游牧生活并定居下来，发明贮存方法和通常所需的灌溉系统。采集狩猎者往往可以选择在资源耗尽的时候迁到他处，对于耕作者来说就没这么容易。而且，考古学记录显示，农民的健康状况要比同时代的采集狩猎者差。

传统上认为向农业转变是世界性人口危机带来的结果。有人认为一旦采集狩猎者遍及全世界，人口开始增长，食物变得匮乏，农业便是解决这个问题的一个方法。但是，众所周知，当代的采集狩猎者具有很多种控制人口的方法。因此世界性人口危机的想法就不太可能成立了，虽然在某些地区可能会存在人口压力。

有人提出冰河时代末期，也就是13000年前的气候变化是农业起源的原因。短时期内（以年而不是以世纪为单位）温度急剧上升使得食物资源丰富，采集狩猎者人口增加。但是，气候条件存在波动，造成干湿交替，以致可以获取的动植物数量忽高忽低。

似乎是气候条件的不稳定性使得那些原本放牧的人安定下来，逐渐发展出了定居的生活方式，这也反过来造成人口增长以及所需食物量的增加。在这些条件下，农业诞生了。后来，由于人口的急剧膨胀，这种生活方式就难以改变了。但是，我们可以说这些条件并不足以解释农业的起源。先前地球经历了多个气候变化的时期，但是也没有发展出农业。

考古学家斯蒂文•米森有一个观点，这在他的《思维的史前史》一书中有精彩的阐述，该观点认为约在40000年前，人类的思维形成了认知流动性，即对各种特化的思维加以整合：技术史、博物学（以理解自然资源的行为和分布）、社交智能以及语言能力。认识流动性解释了艺术、宗教以及复杂演讲的出现。一旦人类拥有了这样的思维，他们就可以找到创造性方法来解决严重的经济危机，例如先前所述的农业困境。米森提出存在四种可以解释农业起源的心理因素：（1）打造集中用于收割以及加工植物资源的工具的能力；（2）将动植物作为获取社会声望和权力的手段的趋势；（3）与动物发展出与人类结构相似的“社会关系”的趋势——具体说就把动物当做人（神人同形同性论）以及把人当做动物（图腾崇拜）；（4）驯化动植物的趋势。

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一些社会驯化动植物、发现金属工具的使用、开始识字并且形成国家，这些事实不应使我们忘记其他社会虽发展出了畜牧或园艺（蔬菜园艺）但是仍停留在文盲状态，并且生产力较低；只有少数社会进入了现代的狩猎采集社会。探究使某些社会选择农业而其他社会停留在狩猎采集或园艺的条件具有重要的人类学意义。但是，我们应该记住有很多知晓农业的社会几乎是有意不选择它。米森的解释是否恰当还有待讨论，而且近来有些作者已经强调其它因素的重要性了。

## **Autobiographical Memory**

Think back to your childhood and try to identify your earliest memory. How old were you? Most people are not able to recount memories for experiences prior to the age of three years, a phenomenon called infantile amnesia. The question of why infantile amnesia occurs has intrigued psychologists for decades, especially in light of ample evidence that infants and young children can display impressive memory capabilities. Many find that understanding the general nature of autobiographical memory, that is, memory for events that have occurred in one's own life, can provide some important clues to this mystery. Between ages three and four, children begin to give fairly lengthy and cohesive descriptions of events in their past. What factors are responsible for this developmental turning point?

Perhaps the explanation goes back to some ideas raised by influential Swiss psychologist Jean Piaget—namely, that children under age two years represent events in a qualitatively different form than older children do. According to this line of thought, the verbal abilities that blossom in the two year old allow events to be coded in a form radically different from the action-based codes of the infant. Verbal abilities of one year olds are, in fact, related to their memories for events one year later. When researchers had one year olds imitate an action sequence one year after they first saw it, there was correlation between the children's verbal skills at the time they first saw the event and their success on the later memory task. However, even children with low verbal skills showed evidence of remembering the event; thus, memories may be facilitated by but are not dependent on those verbal skills.

Another suggestion is that before children can talk about past events in their lives, they need to have a reasonable understanding of the self as a psychological entity. The development of an understanding of the self becomes evident between the first and second years of life and shows rapid elaboration in subsequent years. The realization that the physical self has continuity in time, according to this hypothesis, lays the foundation for the emergence of autobiographical memory.

A third possibility is that children will not be able to tell their own "life story" until they understand something about the general form stories take, that is, the structure of narratives. Knowledge about narratives arises from social interactions, particularly the storytelling that children experience from parents and the attempts parents make to talk with children about past events in their lives. When parents talk with children about "what we did today" or "last week" or "last year," they guide the children's formation of a framework for talking about the past. They also provide children with reminders about the memory and relay the message that memories are valued as part of the cultural experience. It is interesting to note that some studies show Caucasian American children have earlier childhood memories than Korean children do. Furthermore, other studies show that Caucasian American mother-child pairs talk about past events three times more often than do Korean mother-child pairs. Thus, the types of social experiences children have do factor into the development of autobiographical memories.

A final suggestion is that children must begin to develop a "theory of mind"—an awareness of the concept of mental states (feelings, desires, beliefs, and thoughts), their own and those of others—before they can talk about their own past memories. Once children become capable of answering such questions as "What does it mean to remember?" and "What does it mean to know something?" improvements in memory seem to occur.

It may be that the developments just described are intertwined with and influence one another. Talking with parents about the past may enhance the development of the self-concept, for example, as well as help the child understand what it means to "remember." No doubt the ability to talk about one's past represents memory of a different level of complexity than simple recognition or recall.

【Paragraph 1】Think back to your childhood and try to identify your earliest memory. How old were you? Most people are not able to recount memories for experiences prior to the age of three years, a phenomenon called infantile amnesia. The question of why infantile amnesia occurs has intrigued psychologists for decades, especially in light of ample evidence that infants and young children can display impressive memory capabilities. Many find that understanding the general nature of autobiographical memory, that is, memory for events that have occurred in one's own life, can provide some important clues to this mystery. Between ages three and four, children begin to give fairly lengthy and cohesive descriptions of events in their past. What factors are responsible for this developmental turning point?

1.The word "ample" in the passage is closest in meaning to

○surprising

○convincing

○plentiful

○questionable

2.According to paragraph 1, infantile amnesia has intrigued psychologists because

○the ability to recount memories prior to three years of age seems to be connected to intelligence in adulthood

○psychologists do not understand why some people are able to recount memories from before the age of three years, while others are not able do so

○psychologists do not understand the connection between infantile amnesia and autobiographical memory

○although psychologists have evidence that infants have memory abilities, most people cannot remember life events that happened before the age of three years

3.According to paragraph 1, what is the evidence that a child has developed autobiographical memory?

○The child is able to remember past events from before the age of three years.

○The child is able to describe past events in a sufficiently lengthy and cohesive manner.

○The child is aware that he or she does not remember experiences from before the age of three years.

○The child is able to give a basic description of the nature of autobiographical memory.

【Paragraph 2】Perhaps the explanation goes back to some ideas raised by influential Swiss psychologist Jean Piaget—namely, that children under age two years represent events in a qualitatively different form than older children do. According to this line of thought, the verbal abilities that blossom in the two year old allow events to be coded in a form radically different from the action-based codes of the infant. Verbal abilities of one year olds are, in fact, related to their memories for events one year later. When researchers had one year olds imitate an action sequence one year after they first saw it, there was correlation between the children's verbal skills at the time they first saw the event and their success on the later memory task. However, even children with low verbal skills showed evidence of remembering the event; thus, memories may be facilitated by but are not dependent on those verbal skills.

4.In paragraph 2, why does the author provide the information that children with low verbal skills showed evidence of remembering a past event?

○To provide evidence that memories do not depend only upon verbal skills

○To challenge the idea that one year olds are too young to form memories

○To argue that the memory of one year olds depends only on action-based codes

○To suggest that Piaget later revised his findings on the correlation between memory and verbal ability

【Paragraph 3】Another suggestion is that before children can talk about past events in their lives, they need to have a reasonable understanding of the self as a psychological entity. The development of an understanding of the self becomes evident between the first and second years of life and shows rapid elaboration in subsequent years. The realization that the physical self has continuity in time, according to this hypothesis, lays the foundation for the emergence of autobiographical memory.

5.The word "reasonable" in the passage is closest in meaning to

○consistent

○sufficient

○apparent

○deep

6.The word "elaboration" in the passage is closest in meaning to

○development

○specialization

○use

○transformation

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7.According to paragraph 3, what is the relationship between autobiographical memory and the development of an understanding of the self?

○Autobiographical memory aids in the development of an understanding of the self.

○Children possess an understanding of the self when they can talk about past events in their lives.

○The realization that the self continues through time may aid in the onset of autobiographical memory.

○The development of autobiographical memory helps children gain an understanding of their roles in their social relationships.

【Paragraph 4】A third possibility is that children will not be able to tell their own "life story" until they understand something about the general form stories take, that is, the structure of narratives. Knowledge about narratives arises from social interactions, particularly the storytelling that children experience from parents and the attempts parents make to talk with children about past events in their lives. When parents talk with children about "what we did today" or "last week" or "last year," they guide the children's formation of a framework for talking about the past. They also provide children with reminders about the memory and relay the message that memories are valued as part of the cultural experience. It is interesting to note that some studies show Caucasian American children have earlier childhood memories than Korean children do. Furthermore, other studies show that Caucasian American mother-child pairs talk about past events three times more often than do Korean mother-child pairs. Thus, the types of social experiences children have do factor into the development of autobiographical memories.

8.All of the following are mentioned in paragraph 4 as ways in which parents help their children understand the structure of narratives EXCEPT

○talking with their children about past events

○telling stories to their children

○having their children repeat stories back to them

○showing their children that they think memories are important

9.According to paragraph 4, the studies of Caucasian American and Korean children suggest which of the following?

○Autobiographical memories develop similarly across all cultures.

○Parents from different cultures tell their children different kinds of stories about the past.

○Children's pleasure in hearing stories varies from culture to culture.

○The kinds of interactions children have with their parents affect the development of autobiographical memories.

【Paragraph 5】A final suggestion is that children must begin to develop a "theory of mind"—an awareness of the concept of mental states (feelings, desires, beliefs, and thoughts), their own and those of others—before they can talk about their own past memories. Once children become capable of answering such questions as "What does it mean to remember?" and "What does it mean to know something?" improvements in memory seem to occur.

10.According to paragraph 5, what evidence is there that a "theory of mind" is a factor in the development of autobiographical memory?

○Even children who are not aware of their mental states are still able to talk about past events.

○Autobiographicat memory decreases when a chiId's feelings and mental state are upset.

○Older children who are unable to achieve awareness of mental states lack autobiographical memory.

○Children's memory of past events grows once children can answer questions about what it means to know and remember.

11.The organization of the passage can best be described as

○the presentation of an argument followed by the evidence for and against it

○a description of a phenomenon followed by several possible theories about how it develops

○the definition of a psychological term followed by a history of its usage

○an explanation of a process followed by a discussion of its practical applications

【Paragraph 6】It may be that the developments just described are intertwined with and influence one another. Talking with parents about the past may enhance the development of the self-concept, for example, as well as help the child understand what it means to "remember." No doubt the ability to talk about one's past represents memory of a different level of complexity than simple recognition or recall.

12.The passage supports which of the following statements about the development of autobiographical memory?

○It is unlikely that a single factor is responsible for the development of autobiographical memory.

○Jean Piaget was the first psychologist to understand the development of autobiographical memory.

○Understanding the development of autobiographical memory will help psychologists eliminate infant amnesia

○Understanding what it means to remember is the most important factor in the development of autobiographical memory.

Think back to your childhood and try to identify your earliest memory. How old were you? ■Most people are not able to recount memories for experiences prior to the age of three years, a phenomenon called infantile amnesia. ■The question of why infantile amnesia occurs has intrigued psychologists for decades, especially in light of ample evidence that infants and young children can display impressive memory capabilities. ■Many find that understanding the general nature of autobiographical memory, that is, memory for events that have occurred in one's own life, can provide some important clues to this mystery. ■Between ages three and four, children begin to give fairly lengthy and cohesive descriptions of events in their past. What factors are responsible for this developmental turning point?

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**It is unlikely that this memory will be from the first two years of life.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**The ability to construct autobiographical memories—coherent narratives about events from one's past—is probably the joint product of several social and intellectual developments.**

●

●

●

Answer Choices

○Although children are capable of simple recognition and recall very early in life, they do not develop the capacity for autobiographical memory until the age of three or four years.

○Verbal skills and familiarity with narrative structures probably aid in the construction of autobiographical memories.

○Children's earliest autobiographical memories are usually about social interactions with parents.

○Research suggests that infantile amnesia occurs in some cultures but not in others and may be linked to children's social experiences.

○The development of autobiographical memory allows children to appreciate the fact that memories are an important part of their cultural experience.

○Children who have acquired a concept of the self and of various mental states are generally able to talk about their own past memories.

**参考答案：**

1. 3

2. 4

3. 2

4. 1

5. 2

6. 1

7. 3

8. 3

9. 4

10. 4

11. 2

12. 1

13. 1

14. Although children are capable of

Verbal skills and familiarity with

Children who ...

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## **参考译文：自传式记忆**

回忆你的童年并尝试找出你最早的记忆。那时你多大？大多数人无法描述出有关三岁前经历的记忆，这种现象就叫做婴儿期遗忘。为什么会发生婴儿期遗忘这个问题已经引发了心理学家们数十年的兴趣，尤其是有大量的证据说明婴幼儿表现出具有令人惊讶的记忆能力。不少人发现理解自传式记忆，即对在某人自己的生活中发生的事件的记忆的一般特性可以为这个不解之谜提供一些重要的线索。3到4岁的儿童开始可以对自己过去经历过的事情给出相当长的具有连贯性的描述。是什么因素导致了这个发育的转折点。

也许对这个问题的解释可以追溯到具有影响力的瑞士心理学家让·皮亚杰，他认为两岁以下的儿童与大于两岁的儿童回忆事件的方式有质的不同。根据这个思路，两岁的儿童发展出的语言能力可以使他们对事件的组织方式与婴儿基于动作的组织方式有根本的差异。事实上，一岁儿童的语言能力与他们一年后对事件的记忆有关。当研究人员让一岁的儿童们在第一次见到一个动作顺序后的一年模仿这个动作顺序，他们能否成功完成这个记忆任务与他们第一次看到这个事件时的语言能力相关。但是，即使是语言能力很差的儿童也显示出了记得该事件的证据，因此，语言能力可以促进记忆，但是记忆并不依赖于语言能力。

另有人提出在儿童能够讲述他们过去经历的事情之前，儿童需要对把自我当做一个心理实体有合理的认识。对自我的认识的发展在1到2岁之前非常明显，并在随后的几年中显示出迅速地细致化。根据这个假说，身体自我在时间上的连续性是出现自传式记忆的基础。

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第三种可能是儿童在他们理解故事发生的一般形式，即叙述的结构以前无法描述他们自己的“生活故事”。有关叙述的知识来源于社会互动，尤其是父母给儿童讲故事以及父母尝试跟孩子聊聊孩子们过去经历的事情。当父母跟孩子们说起“昨天我们做了什么”或者“上周”或者“去年”时，他们就会引导儿童形成讲述往事的框架。他们还唤醒了孩子们的记忆，并且向孩子们传达了记忆是文化体验宝贵的一部分的信息。值得一提的是有些研究显示白种美国儿童比韩国儿童的童年记忆更早。此外，其它研究显示白种美国母亲与孩子交流过往的事情的次数是韩国母亲与孩子的三倍。因此，儿童具有的社会经验的类型是发展出自传式记忆的一个因素。

最后一种解释是儿童必须在他们能够讲述自己对过去的记忆前开始发展出一种“心理理论”——对他们自己或别人的心理状态（感觉、欲望、信仰和思想）概念的认识。一旦儿童能够回答诸如“记得是什么意思？”以及“知道某事或某物是什么意思？”等问题的时候，这就会促进他们可能发生的记忆。

可能上面描述的各种发育之间会相互交织并且相互影响。与父母聊聊往事可以加强自我认知的发展，举例来说，就像帮助儿童理解什么是“记得”一样。讲述自己的往事无疑代表了比简单的认出或回忆更为复杂的记忆。

TPO-22

## **Spartina**

Spartina alterniflora, known as cordgrass, is a deciduous, perennial flowering plant native to the Atlantic coast and the Gulf Coast of the United States. It is the dominant native species of the lower salt marshes along these coasts, where it grows in the intertidal zone (the area covered by water some parts of the day and exposed others).

These natural salt marshes are among the most productive habitats in the marine environment. Nutrient-rich water is brought to the wetlands during each high tide, making a high rate of food production possible. As the seaweed and marsh grass leaves die, bacteria break down the plant material, and insects, small shrimplike organisms, fiddler crabs, and marsh snails eat the decaying plant tissue, digest it, and excrete wastes high in nutrients. Numerous insects occupy the marsh, feeding on living or dead cordgrass tissue, and redwing blackbirds, sparrows, rodents, rabbits, and deer feed directly on the cordgrass. Each tidal cycle carries plant material into the offshore water to be used by the subtidal organisms.

Spartina is an exceedingly competitive plant. It spreads primarily by underground stems; colonies form when pieces of the root system or whole plants float into an area and take root or when seeds float into a suitable area and germinate. Spartina establishes itself on substrates ranging from sand and silt to gravel and cobble and is tolerant of salinities ranging from that of near freshwater (0.05 percent) to that of salt water (3.5 percent). Because they lack oxygen, marsh sediments are high in sulfides that are toxic to most plants. Spartina has the ability to take up sulfides and convert them to sulfate, a form of sulfur that the plant can use; this ability makes it easier for the grass to colonize marsh environments. Another adaptive advantage is Spartina’s ability to use carbon dioxide more efficiently than most other plants.

These characteristics make Spartina a valuable component of the estuaries where it occurs naturally. The plant functions as a stabilizer and a sediment trap and as a nursery area for estuarine fish and shellfish. Once established, a stand of Spartina begins to trap sediment, changing the substrate elevation, and eventually the stand evolves into a high marsh system where Spartina is gradually displaced by higher-elevation, brackish-water species. As elevation increases, narrow, deep channels of water form throughout the marsh. Along the east coast Spartina is considered valuable for its ability to prevent erosion and marshland deterioration; it is also used for coastal restoration projects and the creation of new wetland sites.

Spartina was transported to Washington State in packing materials for oysters transplanted from the east coast in 1894. Leaving its insect predators behind, the cordgrass has been spreading slowly and steadily along Washington’s tidal estuaries on the west coast, crowding out the native plants and drastically altering the landscape by trapping sediment. Spartina modifies tidal mudflats, turning them into high marshes inhospitable to the many fish and waterfowl that depend on the mudflats. It is already hampering the oyster harvest and the Dungeness crab fishery, and it interferes with the recreational use of beaches and waterfronts. Spartina has been transplanted to England and to New Zealand for land reclamation and shoreline stabilization. In New Zealand the plant has spread rapidly, changing mudflats with marshy fringes to extensive salt meadows and reducing the number and kinds of birds and animals that use the marsh.

Efforts to control Spartina outside its natural environment have included burning, flooding, shading plants with black canvas or plastic, smothering the plants with dredged materials or clay, applying herbicide, and mowing repeatedly. Little success has been reported in New Zealand and England; Washington State’s management program has tried many of these methods and is presently using the herbicide glyphosphate to control its spread. Work has begun to determine the feasibility of using insects as biological controls, but effective biological controls are considered years away. Even with a massive effort, it is doubtful that complete eradication of Spartina from nonnative habitats is possible, for it has become an integral part of these shorelines and estuaries during the last 100 to 200 years.

【Paragraph 1】Spartina alterniflora, known as cordgrass, is a deciduous, perennial flowering plant native to the Atlantic coast and the Gulf Coast of the United States. It is the dominant native species of the lower salt marshes along these coasts, where it grows in the intertidal zone (the area covered by water some parts of the day and exposed others).

1.According to paragraph 1, each of the following is true of Spartina alrerniflora EXCEPT:

○It rarely flowers in salt marshes.

○It grows well in intertidal zones.

○It is commonly referred to as cordgrass.

○It occurs naturally along the Gulf Coast and the Atlantic coast of the United States.

【Paragraph 2】These natural salt marshes are among the most productive habitats in the marine environment. Nutrient-rich water is brought to the wetlands during each high tide, making a high rate of food production possible. As the seaweed and marsh grass leaves die, bacteria break down the plant material, and insects, small shrimplike organisms, fiddler crabs, and marsh snails eat the decaying plant tissue, digest it, and excrete wastes high in nutrients. Numerous insects occupy the marsh, feeding on living or dead cordgrass tissue, and redwing blackbirds, sparrows, rodents, rabbits, and deer feed directly on the cordgrass.Each tidal cycle carries plant material into the offshore water to be used by the subtidal organisms.

2.According to paragraph 2, a major reason why natural salt marshes are so productive is that they are

○inhabited by long-lived seaweed and marsh grasses that reproduce gradually

○kept clear of excess plant material by the tides

○regularly supplied with high levels of nutrients

○home to a wide variety of different species of grasses

3.Which of the sentences below best express the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Insects feed only on dead cordgrass, while most other marsh inhabitants feed on live cordgrass.

○The marsh is a good habitat for insects, but a relatively poor one for birds and animals.

○Although cordgrass provides food for birds and animals, it gives insects both food and a place to live.

○Cordgrass provides food for numerous insects, birds, and other animals.

【Paragraph 3】Spartina is an exceedingly competitive plant. It spreads primarily by underground stems; colonies form when pieces of the root system or whole plants float into an area and take root or when seeds float into a suitable area and germinate. Spartina establishes itself on substrates ranging from sand and silt to gravel and cobble and is tolerant of salinities ranging from that of near freshwater (0.05 percent) to that of salt water (3.5 percent). Because they lack oxygen, marsh sediments are high in sulfides that are toxic to most plants. Spartina has the ability to take up sulfides and convert them to sulfate, a form of sulfur that the plant can use; this ability makes it easier for the grass to colonize marsh environments. Another adaptive advantage is Spartina’s ability to use carbon dioxide more efficiently than most other plants.

4.What is the organizational structure of paragraph 3?

○It makes a general claim about Spartina and then provides specific evidence to defend that claim against objections to the claim.

○It presents a general characterization of Spartina and then describes particular features on which this characterization is based.

○It reports a widely held view about Spartina and then considers evidence both for and against that view.

○It presents a general hypothesis about Spartina and then lists specific evidence that disputes that hypothesis.

5.The word "exceedingly" in the passage is closest in meaning to

○unusually

○dangerously

○surprisingly

○highly

6.According to paragraph 3, one reason that Spartina is able to compete in marsh environments so successfully is its ability to

○alter the substrate in which it grows

○convert sulfides into a usable form of sulfur

○grow and produce seeds while floating on the surface of the water

○produce carbon dioxide with great efficiency

【Paragraph 4】These characteristics make Spartina a valuable component of the estuaries where it occurs naturally. The plant functions as a stabilizer and a sediment trap and as a nursery area for estuarine fish and shellfish. Once established, a stand of Spartina begins to trap sediment, changing the substrate elevation, and eventually the stand evolves into a high marsh system where Spartina is gradually displaced by higher-elevation, brackish-water species. As elevation increases, narrow, deep channels of water form throughout the marsh. Along the east coast Spartina is considered valuable for its ability to prevent erosion and marshland deterioration; it is also used for coastal restoration projects and the creation of new wetland sites.

7.Paragraph 4 suggests that where Spartinaoccurs naturally, an established stand of it will eventually

○create conditions in which it can no longer survive

○get washed away by water flowing through the deep channels that form around it

○become adapted to brackish water

○take over other grass species growing in the area

8.According to paragraph 4, in its natural habitats, Spartina helps estuaries by

○controlling marshland decline

○decreasing the substrate elevation

○reducing the brackishness of the water

○increasing the flow of water into the estuary

【Paragraph 5】Spartina was transported to Washington State in packing materials for oysters transplanted from the east coast in 1894. Leaving its insect predators behind, the cordgrass has been spreading slowly and steadily along Washington’s tidal estuaries on the west coast, crowding out the native plants and drastically altering the landscape by trapping sediment. Spartina modifies tidal mudflats, turning them into high marshes inhospitable to the many fish and waterfowl that depend on the mudflats. It is already hampering the oyster harvest and the Dungeness crab fishery, and it interferes with the recreational use of beaches and waterfronts. Spartina has been transplanted to England and to New Zealand for land reclamation and shoreline stabilization. In New Zealand the plant has spread rapidly, changing mudflats with marshy fringes to extensive salt meadows and reducing the number and kinds of birds and animals that use the marsh.

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9.According to paragraph 5, Spartinanegatively affects wildlife in estuaries by

○trapping fish and waterfowl in sediment

○preventing oysters from transplanting successfully

○turning mudflats into high marshes and salt meadows

○expanding the marshy fringes of salt meadows

10.The word "modifies" in the passage is closest in meaning to

○creates

○changes

○grows on

○breaks down

【Paragraph 6】Efforts to control Spartina outside its natural environment have included burning, flooding, shading plants with black canvas or plastic, smothering the plants with dredged materials or clay, applying herbicide, and mowing repeatedly. Little success has been reported in New Zealand and England; Washington State’s management program has tried many of these methods and is presently using the herbicide glyphosphate to control its spread. Work has begun to determine the feasibility of using insects as biological controls, but effective biological controls are considered years away. Even with a massive effort, it is doubtful that complete eradication of Spartina from nonnative habitats is possible, for it has become an integral part of these shorelines and estuaries during the last 100 to 200 years.

11.According to paragraph 6, each of the following methods has been used in attempts to control SpartinaEXCEPT

○flooding plants

○cutting plants down repeatedly

○applying herbicides

○introducing predatory insects

12.The word "Efforts" in the passage is closest in meaning to

○Laws

○Suggestions

○Attempts

○Failures

Spartina is an exceedingly competitive plant. ■ It spreads primarily by underground stems; colonies form when pieces of the root system or whole plants float into an area and take root or when seeds float into a suitable area and germinate. ■ Spartina establishes itself on substrates ranging from sand and silt to gravel and cobble and is tolerant of salinities ranging from that of near freshwater (0.05 percent) to that of salt water (3.5 percent). ■Because they lack oxygen, marsh sediments are high in sulfides that are toxic to most plants. ■ Spartina has the ability to take up sulfides and convert them to sulfate, a form of sulfur that the plant can use; this ability makes it easier for the grass to colonize marsh environments. Another adaptive advantage is Spartina’s ability to use carbon dioxide more efficiently than most other plants.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Spartina is particularly able to tolerate high salinities because salt glands on the surface of the leaves remove the salt from the plant sap.**

Where would the sentence best fit?

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**Spartina alrerniflora, or cordgrass, is the dominant native species in salt marshes along the Atlantic coast and the Gulf Coast of the United States.**

●

●

●.

Answers

○Spartina is very well adapted to conditions in salt marshes, where it plays a valuable role in stabilizing them and making them highly productive marine habitats.

○Spartina expands by growing root systems that float on the water’s surface and descend underground, where it finds the nutrients that it needs to germinate.

○As a result of its spread in Washington State over the past hundred years,Spartina has now become a threat to native oysters by releasing sediments that contain sulfides into the waters.

○The dead leaves of Spartina become food for a wide variety of marine organisms.

○Outside its native regions, Spartina can pose serious problems by turning mudflats into high marshes that are inhospitable to many native fish and birds.

○Spartina has physiological adaptations that allow it to grow in environments where other plants cannot, making it a very strong competitor that is difficult to control once it is established.

**参考答案：**

1. 1

2. 3

3. 4

4. 2

5. 4

6. 2

7. 1

8. 1

9. 3

10. 2

11. 4

12. 3

13. 3

14. *Spartina* is very well ...

Outside its native regions ...

*Spartina* has physiological ...

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## **参考译文:米草属植物**

互花米草，俗称网茅，是一种落叶的多年生开花植物，原产自美国大西洋沿岸和墨西哥湾地区。它是这些海岸下游地区盐碱地的优势本地种，生长在潮间带（有时淹没在水中，有时暴露在空气中的区域）。

这些天然的盐碱地位于海洋环境下最肥沃的生境中。涨潮时会给沼泽带来营养丰富的海水，使得高产量成为可能。随着海草和沼泽禾草叶子的死亡，细菌将植物体分解，昆虫、小型虾状浮游生物、招潮蟹和沼泽蜗牛吃掉了腐烂的植物组织，消化后排出富含营养的排泄物。沼泽里生活着无数的昆虫，它们以活着或死去的网茅组织为食，红翼歌鸫、麻雀、啮齿动物、兔子以及鹿都直接以网茅为食。每一个潮汐周期都会将植物带到近海海水中，它们可以被潮水下的生物所利用。

米草属植物是极具竞争力的植物。它主要通过地下茎向四周扩展；当根系或整株植物漂到一个地方扎了根，或者当种子漂到一个适合的地方发芽时，群落就形成了。从泥沙地到卵砾石地，米草属植物都能生长，其耐盐度在接近淡水（0.05%）和盐水（3.5%）的范围内。由于缺乏氧气，沼泽沉积物里的硫化物含量很高，，这些硫化物对多数植物而言是有毒的。米草属植物具有能够吸收硫化物并将其转换成为硫酸盐（一种植物可以利用的硫形式）的能力；这种能力使得米草属植物更易在沼泽环境中生存。另一个适应性优势就是米草属植物拥有比其它植物更能有效利用二氧化碳的能力。

这些特征使得在河口处自然生长的米草属植物成为了该地重要的组成部分。植物起到了稳定器和沉积物收集器的作用，而且还充当了河口鱼类和贝类的温床。一旦落地生根，米草属植物就开始截留沉积物，改变基质的海拔高度，最终这片米草属植物会逐渐被更高海拔的微咸淡水植物所取代，发展成了一个高海拔的沼泽系统。随着海拔高度的增加，沼泽中会遍布狭窄深凹的水道。在东海岸，人们认为米属草非常有用，因为它有防止侵蚀和沼泽退化的能力，而且它还被用于海岸恢复计划和构筑新的湿地。

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1894年，为了将牡蛎从东海岸转移到华盛顿州，米草属植物被打包运往华盛顿州。由于将天敌甩在了身后，网茅沿着西海岸华盛顿州的潮汐河口缓慢而稳定地传播开来，挤走了本地植物，并通过截留沉积物极大地改变了当地的景观。米草属植物改造了沿海滩涂，将其转变成高海拔沼泽，这些沼泽对很多依赖滩涂生活的鱼类和水禽并不适合。米草属植物已经妨碍了牡蛎的打捞以及珍宝蟹的养殖，它干扰了海滩和海滨的娱乐用途。人们将米草属植物移栽到英国和新西兰，用于改良土地以及稳定海岸线。在新西兰，米草属植物迅速蔓延，它改变了沼泽，将沼泽地的边缘变成了广阔的盐渍草地，并减少了在沼泽生活的鸟类和动物的数量。

为了控制米草属植物在自然生境以外的扩散，人们尝试了焚烧、水淹、用黑色的帆布或塑料布遮挡阳光、用疏浚物料或者粘土使其窒息、喷撒除草剂以及反复割草的方法。在新西兰和英国却鲜有成效，华盛顿州的管理项目尝试了很多此类方法，目前正在使用除草剂草甘膦控制它的传播。相关工作开始确定用昆虫进行生物防止的可行性，但是有效的生物防治还需要很多年。即使是付出巨大的努力，我们仍然怀疑完全从非原生境中根除米草属植物的可能性，因为在过去的100到200年间，它已经成为这些海岸线地带和河口的主要组成部分了。

## **The Birth of Photography**

Perceptions of the visible world were greatly altered by the invention of photography in the middle of the nineteenth century. In particular, and quite logically, the art of painting was forever changed, though not always in the ways one might have expected. The realistic and naturalistic painters of the mid- and late-nineteenth century were all intently aware of photography—as a thing to use, to learn from, and react to.

Unlike most major inventions, photography had been long and impatiently awaited. The images produced by the camera obscura, a boxlike device that used a pinhole or lens to throw an image onto a ground-glass screen or a piece of white paper, were already familiar—the device had been much employed by topographical artists like the Italian painter Canaletto in his detailed views of the city of Venice. What was lacking was a way of giving such images permanent form. This was finally achieved by Louis Daguerre (1787-1851), who perfected a way of fixing them on a silvered copper plate. His discovery, the "daguerreotype," was announced in 1839.

A second and very different process was patented by the British inventor William Henry Talbot (1800-1877) in 1841. Talbot's "calotype" was the first negative-to-positive process and the direct ancestor of the modern photograph. The calotype was revolutionary in its use of chemically treated paper in which areas hit by light became dark in tone, producing a negative image. This "negative," as Talbot called it, could then be used to print multiple positive images on another piece of treated paper.

The two processes produced very different results. The daguerreotype was a unique image that reproduced what was in front of the camera lens in minute, unselective detail and could not be duplicated. The calotype could be made in series, and was thus the equivalent of an etching or an engraving. Its general effect was soft edged and tonal.

One of the things that most impressed the original audience for photography was the idea of authenticity. Nature now seemed able to speak for itself, with a minimum of interference. The title Talbot chose for his book, *The Pencil of Nature* (the first part of which was published in 1844), reflected this feeling. Artists were fascinated by photography because it offered a way of examining the world in much greater detail. They were also afraid of it, because it seemed likely to make their own efforts unnecessary.

Photography did indeed make certain kinds of painting obsolete—the daguerreotype virtually did away with the portrait miniature. It also made the whole business of making and owning images democratic. Portraiture, once a luxury for the privileged few, was suddenly well within the reach of many more people.

In the long term, photography's impact on the visual arts was far from simple. Because the medium was so prolific, in the sense that it was possible to produce a multitude of images very cheaply, it was soon treated as the poor relation of fine art, rather than its destined successor. Even those artists who were most dependent on photography became reluctant to admit that they made use of it, in case this compromised their professional standing.

The rapid technical development of photography—the introduction of lighter and simpler equipment, and of new emulsions that coated photographic plates, film, and paper and enabled images to be made at much faster speeds—had some unanticipated consequences. Scientific experiments made by photographers such as Eadweard Muybridge (1830-1904) and Etienne-Jules Marey (1830-1904) demonstrated that the movements of both humans and animals differed widely from the way they had been traditionally represented in art. Artists, often reluctantly, were forced to accept the evidence provided by the camera. The new candid photography—unposed pictures that were made when the subjects were unaware that their pictures were being taken—confirmed these scientific results, and at the same time, thanks to the radical cropping (trimming) of images that the camera often imposed, suggested new compositional formats. The accidental effects obtained by candid photographers were soon being copied by artists such as the French painter Degas.

【Paragraph 1】Perceptions of the visible world were greatly altered by the invention of photography in the middle of the nineteenth century. In particular, and quite logically, the art of painting was forever changed, though not always in the ways one might have expected. The realistic and naturalistic painters of the mid- and late-nineteenth century were all intently aware of photography—as a thing to use, to learn from, and react to.

【Paragraph 2】Unlike most major inventions, photography had been long and impatiently awaited. The images produced by the camera obscura, a boxlike device that used a pinhole or lens to throw an image onto a ground-glass screen or a piece of white paper, were already familiar—the device had been much employed by topographical artists like the Italian painter Canaletto in his detailed views of the city of Venice. What was lacking was a way of giving such images permanent form. This was finally achieved by Louis Daguerre (1787-1851), who perfected a way of fixing them on a silvered copper plate. His discovery, the "daguerreotype," was announced in 1839.

1.What can be inferred from paragraphs 1 and 2 about the effect of photography on nineteenth-century painting?

○Photography did not significantly change the way people looked at reality.

○Most painters used the images of the camera obscura in preference to those of the daguerreotype.

○Painters who were concerned with realistic or naturalistic representation were particularly influenced by photography.

○Artists used the long-awaited invention of photography in just the ways they had expected to.

【Paragraph 2】Unlike most major inventions, photography had been long and impatiently awaited. The images produced by the camera obscura, a boxlike device that used a pinhole or lens to throw an image onto a ground-glass screen or a piece of white paper, were already familiar—the device had been much employed by topographical artists like the Italian painter Canaletto in his detailed views of the city of Venice. What was lacking was a way of giving such images permanent form. This was finally achieved by Louis Daguerre (1787-1851), who perfected a way of fixing them on a silvered copper plate. His discovery, the "daguerreotype," was announced in 1839.

【Paragraph 3】A second and very different process was patented by the British inventor William Henry Talbot (1800-1877) in 1841. Talbot's "calotype" was the first negative-to-positive process and the direct ancestor of the modern photograph. The calotype was revolutionary in its use of chemically treated paper in which areas hit by light became dark in tone, producing a negative image. This "negative," as Talbot called it, could then be used to print multiple positive images on another piece of treated paper.

2.According to paragraphs 2 and 3 which of the following did the daguerreotype and the calotype have in common?

○They were equally useful for artists.

○They could be reproduced.

○They produced a permanent image

○They were produced on treated paper.

【Paragraph 4】The two processes produced very different results. The daguerreotype was a unique image that reproduced what was in front of the camera lens in minute, unselective detail and could not be duplicated. The calotype could be made in series, and was thus the equivalent of an etching or an engraving. Its general effect was soft edged and tonal.

3.The word "duplicated" in the passage is closest in meaning to

○copied

○replaced

○handled

○clarified

4.The phrase "Its general effect" in the passage refers to

○the camera lens

○the calotype

○the etching

○the engraving

【Paragraph 5】One of the things that most impressed the original audience for photography was the idea of authenticity. Nature now seemed able to speak for itself, with a minimum of interference. The title Talbot chose for his book, *The Pencil of Nature* (the first part of which was published in 1844), reflected this feeling. Artists were fascinated by photography because it offered a way of examining the world in much greater detail. They were also afraid of it, because it seemed likely to make their own efforts unnecessary.

5.The word "authenticity" in the passage is closest in meaning to

○improvement

○practicality

○genuineness

○repetition

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【Paragraph 6】Photography did indeed make certain kinds of painting obsolete—the daguerreotype virtually did away with the portrait miniature. It also made the whole business of making and owning images democratic. Portraiture, once a luxury for the privileged few, was suddenly well within the reach of many more people.

6.What point does the author make in paragraph 6?

○Paintings became less expensive because of competition with photography.

○Photography, unlike painting, was a type of portraiture that even ordinary people could afford.

○Every style of painting was influenced by the invention of photography.

○The daguerreotype was more popular than the calotype.

【Paragraph 7】In the long term, photography's impact on the visual arts was far from simple. Because the medium was so prolific, in the sense that it was possible to produce a multitude of images very cheaply, it was soon treated as the poor relation of fine art, rather than its destined successor. Even those artists who were most dependent on photography became reluctant to admit that they made use of it, in case this compromised their professional standing.

7.The word "reluctant" in the passage is closest in meaning to

○unable

○embarrassed

○unlikely

○unwilling

8.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Photography did not replace other fine arts because people felt the image looked cheap in relation to the other arts.

○Photography was not considered a true art because people could use it to create many images cheaply.

○Photography was so cheap and readily available that it could be purchased by people who were too poor to purchase fine art.

○Photography not only spread quickly but also was a cheap art form and so became true successor of fine arts rather than its poor relation.

【Paragraph 8】The rapid technical development of photography—the introduction of lighter and simpler equipment, and of new emulsions that coated photographic plates, film, and paper and enabled images to be made at much faster speeds—had some unanticipated consequences. Scientific experiments made by photographers such as Eadweard Muybridge (1830-1904) and Etienne-Jules Marey (1830-1904) demonstrated that the movements of both humans and animals differed widely from the way they had been traditionally represented in art. Artists, often reluctantly, were forced to accept the evidence provided by the camera. The new candid photography—unposed pictures that were made when the subjects were unaware that their pictures were being taken—confirmed these scientific results, and at the same time, thanks to the radical cropping (trimming) of images that the camera often imposed, suggested new compositional formats. The accidental effects obtained by candid photographers were soon being copied by artists such as the French painter Degas.

9.The word "unanticipated" in the passage is closest in meaning to

○indirect

○not expected

○unquestionable

○beneficial

10.The word "accidental" in the passage is closest in meaning to

○surprising

○unintentional

○realistic

○unusual

11.Which of the following is mentioned in paragraph 8 as a benefit that artists derived from photography?

○It inspired artists to use technological themes in their painting.

○It lent prestige to those artists who used photographs as models for paintings

○It provided artists with new types of equipment to speed up the painting process.

○It motivated artists to think about new ways to compose images in their paintings.

12.It can be inferred from paragraph 8 that one effect that photography had on painting was that it

○provided painters with new insights into how humans and animals actually move

○showed that representing movement could be as interesting as portrait art

○increased the appeal of painted portraiture among the wealthy

○influenced artists to improve techniques for painting faster

Unlike most major inventions, photography had been long and impatiently awaited. The images produced by the camera obscura, a boxlike device that used a pinhole or lens to throw an image onto a ground-glass screen or a piece of white paper, were already familiar—the device had been much employed by topographical artists like the Italian painter Canaletto in his detailed views of the city of Venice. What was lacking was a way of giving such images permanent form. This was finally achieved by Louis Daguerre (1787-1851), who perfected a way of fixing them on a silvered copper plate. His discovery, the "daguerreotype," was announced in 1839.■

A second and very different process was patented by the British inventor William Henry Talbot (1800-1877) in 1841.■ Talbot's "calotype" was the first negative-to-positive process and the direct ancestor of the modern photograph. The calotype was revolutionary in its use of chemically treated paper in which areas hit by light became dark in tone, producing a negative image.■This "negative," as Talbot called it, could then be used to print multiple positive images on another piece of treated paper.■

13.Look at the four squares HI that indicate where the following sentence could be added to the passage

**Although his process produced permanent images, each was unique and no reproduction of the picture was possible.**

Where would the sentence best fit?

Click on a square [■] to add the sentence to the passage.

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage This question is worth 2 points.

**The invention of photography had a significant impact on the art of painting in the nineteenth century.**

●

●

●

Answer Choices

○For a brief time, artists preferred not to paint natural or realistic images that would have to compete with photographs.

○Before photography, Canaletto had used the camera obscura to project scenes onto a paper or glass plate.

○The photographic processes of Louis Daguerre and William Henry Talbot both made permanent images, but only Talbot's process allowed making multiple copies.

○The work of Eadweard Muybridge and Etienne-Jules Marey established photography both as a science and as an art.

○Photography made accurate images widely and inexpensively available, but this popular success also had the effect of lowering its perceived value in relation to the fine arts.

○Photography eliminated the painted portrait miniature, led artists to accurately represent movement, and affected pictorial composition, but did not replace traditional visual arts.

**参考答案：**

1. 3

2. 3

3. 1

4. 2

5. 3

6. 2

7. 4

8. 2

9. 2

10. 2

11. 4

12. 1

13. 1

14. The photographic …

Photography made accurate ...

Photography eliminated ...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：摄影术的诞生**

十九世纪中叶，摄影术的发明极大地改变了人们对可视世界的认知。尤其是它自然而然地使绘画艺术发生了永久性的改变，虽然并不总是以我们预期的方式。十九世纪中期与后期的现实主义和自然主义画家都高度关注摄影术，将其当做一门可以使用、借鉴而且要适应的技术。

与其他重要的发明不同，摄影术姗姗来迟。其实当时针孔照相机已经为大家所熟识，它是一种使用小孔或透镜将影像投射到毛玻璃屏或一张白纸上的盒状设备，这种设备已经为很多地貌风景画家所用，像意大利画家卡纳莱托就用它详细记录了威尼斯城。真正缺少的是永久保存这些图像的方法。路易斯•达盖尔（1787-1851）最终做到了这点，他完善了将影像固定到镀银铜板上的方法。他发明的“达盖尔照相法”在1839年公诸于世。

英国发明家威廉姆•亨利•塔尔博特（1800-1877）于1841年申请了另一种截然不同的照相法的专利。塔尔博特的“卡罗式摄影法”是第一种用负片洗印正片的方法，这种方法是现代照片的直接鼻祖。卡罗式摄影法革命性地使用了化学处理的纸片，纸片上受到光照射的区域的色调会变暗于是产生了负像。这种被塔尔博特称之为“负片”的东西随后会被用于在另一张化学处理的纸片上洗印多张正像。

这两种方法产生了极为不同的结果。达盖尔照相法是复制照相机镜头前端微小的、非选择性的细节得到唯一一张影像，不可以加印。而卡罗式摄影法可以洗出多张照片，因此相当于蚀刻术或雕刻术。其整体的效果是轮廓和色调模糊。

摄影术给最初接触它的观众留下的最深刻的印象之一是想法的真实性。现在大自然可以受到最小的干扰自己表达自己了。塔尔博特为他的书所选的书名《自然的画笔》（该书的第一部分发表于1844年）就体现了这种感触。艺术家沉醉于摄影，因为摄影为他们提供了一种可以更加细致地审视这个世界的方法。他们也很害怕摄影，因为摄影仿佛让他们的努力变得没有必要了。

摄影术的确使某些绘画种类变得过时了，达盖尔照相法几乎把迷你肖像画逼到绝路。它还使得整个制造业和拥有图像的产业变得平民化。肖像这个一度只是少数权贵的奢侈品，突然就变得触手可及了。

从长远角度看，摄影术对视觉艺术的影响远远不是那么简单。因为媒介很多，从这种意义上来说就有可能很廉价地生产一堆影像，因此摄影术很快就被当成是艺术品廉价的替代物，而不是注定的继任者。即使是那些对摄影术最为依赖的艺术家也不愿意承认他们使用过摄影术，害怕这会影响到他们的专业地位。

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摄影技术上的迅速发展——包括使用更轻便简单的仪器，在照相底片、胶卷和相纸上涂以新型感光乳剂以及加快成像速度——产生了一些意想不到的结果。摄影师，例如爱德华德•麦布里奇（1830-1904）及艾蒂安•朱尔•马雷（1830-1904）进行的科学实验证明人类和动物的运动与我们通常在艺术品中表现的有巨大差异。艺术家往往是勉强地被强迫接受相机所提供的证据。新出现的堪的派摄影（即拍摄对象不知情时抓拍的照片）证实了这些科学成果，同时，由于相机对影像进行的彻底裁剪（修剪），这些图像暗示了新的创作版式。堪的派摄影师们获得的这种意外效果很快被一些艺术家比如法国画家德加给学去了。

## **The Allende Meteorite**

Sometime after midnight on February 8,1969, a large, bright meteor entered Earth's atmosphere and broke into thousands of pieces, plummeted to the ground, and scattered over an area 50 miles long and 10 miles wide in the state of Chihuahua in Mexico. The first meteorite from this fall was found in the village of Pueblito de Allende. Altogether, roughly two tons of meteorite fragments were recovered, all of which bear the name Allende for the location of the first discovery.

Individual specimens of Allende are covered with a black, glassy crust that formed when their exteriors melted as they were slowed by Earth's atmosphere. When broken open, Allende stones are revealed to contain an assortment of small, distinctive objects, spherical or irregular in shape and embedded in a dark gray matrix (binding material), which were once constituents of the solar nebula—the interstellar cloud of gas and dust out of which our solar system was formed.

The Allende meteorite is classified as a chondrite. Chondrites take their name from the Greek word *chondros*—meaning "seed"—an allusion to their appearance as rocks containing tiny seeds. These seeds are actually chondrules: millimeter-sized melted droplets of silicate material that were cooled into spheres of glass and crystal. A few chondrules contain grains that survived the melting event, so these enigmatic chondrules must have formed when compact masses of nebular dust were fused at high temperatures—approaching 1,700 degrees Celsius—and then cooled before these surviving grains could melt. Study of the textures of chondrules confirms that they cooled rather quickly, in times measured in minutes or hours, so the heating events that formed them must have been localized. It seems very unlikely that large portions of the nebula were heated to such extreme temperatures, and huge nebula areas could not possibly have lost heat so fast. Chondrules must have been melted in small pockets of the nebula that were able to lose heat rapidly. The origin of these peculiar glassy spheres remains an enigma.

Equally perplexing constituents of Allende are the refractory inclusions: irregular white masses that tend to be larger than chondrules. They are composed of minerals uncommon on Earth, all rich in calcium, aluminum, and titanium, the most refractory (resistant to melting) of the major elements in the nebula. The same minerals that occur in refractory inclusions are believed to be the earliest-formed substances to have condensed out of the solar nebula. However, studies of the textures of inclusions reveal that the order in which the minerals appeared in the inclusions varies from inclusion to inclusion, and often does not match the theoretical condensation sequence for those metals.

Chondrules and inclusions in Allende are held together by the chondrite matrix, a mixture of fine-grained, mostly silicate minerals that also includes grains of iron metal and iron sulfide. At one time it was thought that these matrix grains might be pristine nebular dust, the sort of stuff from which chondrules and inclusions were made. However, detailed studies of the chondrite matrix suggest that much of it, too, has been formed by condensation or melting in the nebula, although minute amounts of surviving interstellar dust are mixed with the processed materials.

All these diverse constituents are aggregated together to form chondritic meteorites, like Allende, that have chemical compositions much like that of the Sun. To compare the compositions of a meteorite and the Sun, it is necessary that we use ratios of elements rather than simply the abundances of atoms. After all, the Sun has many more atoms of any element, say iron, than does a meteorite specimen, but the ratios of iron to silicon in the two kinds of matter might be comparable. The compositional similarity is striking. The major difference is that Allende is depleted in the most volatile elements, like hydrogen, carbon, oxygen, nitrogen, and the noble gases, relative to the Sun. These are the elements that tend to form gases even at very low temperatures. We might think of chondrites as samples of distilled Sun, a sort of solar sludge from which only gases have been removed. Since practically all the solar system's mass resides in the Sun, this similarity in chemistry means that chondrites have average solar system composition, except for the most volatile elements; they are truly lumps of nebular matter, probably similar in composition to the matter from which planets were assembled.

【Paragraph 1】Sometime after midnight on February 8,1969, a large, bright meteor entered Earth's atmosphere and broke into thousands of pieces, plummeted to the ground, and scattered over an area 50 miles long and 10 miles wide in the state of Chihuahua in Mexico. The first meteorite from this fall was found in the village of Pueblito de Allende. Altogether, roughly two tons of meteorite fragments were recovered, all of which bear the name Allende for the location of the first discovery.

1.The word "location' in the passage is closest in meaning to

○sight

○sake

○success

○place

2.Which of the following can be inferred from paragraph 1 about the large meteor that entered Earths atmosphere on February 8, 1969?

○It was almost ten miles wide.

○It was the biggest meteor ever to hit Mexico.

○It weighed more than two tons.

○It broke into more pieces than most meteors do.

【Paragraph 2】Individual specimens of Allende are covered with a black, glassy crust that formed when their exteriors melted as they were slowed by Earth's atmosphere. When broken open, Allende stones are revealed to contain an assortment of small, distinctive objects, spherical or irregular in shape and embedded in a dark gray matrix (binding material), which were once constituents of the solar nebula—the interstellar cloud of gas and dust out of which our solar system was formed.

3.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Allende meteorites were formed when constituents of the interstellar cloud of gas and dust got trapped inside small, roughly spherical objects and these objects became bound together in a dark gray matrix.

○Inside Allende meteorites is a dark gray matrix that binds together small spherical or irregular objects formed from the interstellar cloud of gas and dust out of which the solar system was made.

○By breaking open Allende meteorites, scientists were able to find out what the solar nebula was made of.

○Allende meteorites were filled with material formed almost entirelyfrom interstellar gas and dust.

【Paragraph 3】The Allende meteorite is classified as a chondrite. Chondrites take their name from the Greek word *chondros*—meaning "seed"—an allusion to their appearance as rocks containing tiny seeds. These seeds are actually chondrules: millimeter-sized melted droplets of silicate material that were cooled into spheres of glass and crystal. A few chondrules contain grains that survived the melting event, so these enigmatic chondrules must have formed when compact masses of nebular dust were fused at high temperatures—approaching 1,700 degrees Celsius—and then cooled before these surviving grains could melt. Study of the textures of chondrules confirms that they cooled rather quickly, in times measured in minutes or hours, so the heating events that formed them must have been localized. It seems very unlikely that large portions of the nebula were heated to such extreme temperatures, and huge nebula areas could not possibly have lost heat so fast. Chondrules must have been melted in small pockets of the nebula that were able to lose heat rapidly. The origin of these peculiar glassy spheres remains an enigma.

4.The word "allusion" in the passage is closest in meaning to

○addition

○modification

○resemblance

○reference

5.The word "enigmatic" in the passage is closest in meaning to

○dangerous

○mysterious

○interesting

○surprising

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6.According to paragraph 3, what does the presence of grains inside some of the chondrules indicate?

○The chondrules were formed of silicate material.

○The chondrules were formed at high temperatures and then cooled rapidly.

○The grains were formed in huge areas of the solar nebula

○The grains were formed after the chondrules were fused together into chondrites.

【Paragraph 4】Equally perplexing constituents of Allende are the refractory inclusions: irregular white masses that tend to be larger than chondrules. They are composed of minerals uncommon on Earth, all rich in calcium, aluminum, and titanium, the most refractory (resistant to melting) of the major elements in the nebula. The same minerals that occur in refractory inclusions are believed to be the earliest-formed substances to have condensed out of the solar nebula. However, studies of the textures of inclusions reveal that the order in which the minerals appeared in the inclusions varies from inclusion to inclusion, and often does not match the theoretical condensation sequence for those metals.

7.According to paragraph 4, all of the following are true about the minerals found in the refractory inclusions EXCEPT:

○These minerals are among the most resistant to melting of all the major elements in the solar nebula.

○These minerals are believed to be some of the first elements to have condensed out of the solar nebula.

○These minerals are among the least commonly found elements on Earth.

○These elements occur in the order that scientists would have predicted.

【Paragraph 5】Chondrules and inclusions in Allende are held together by the chondrite matrix, a mixture of fine-grained, mostly silicate minerals that also includes grains of iron metal and iron sulfide. At one time it was thought that these matrix grains might be pristine nebular dust, the sort of stuff from which chondrules and inclusions were made. However, detailed studies of the chondrite matrix suggest that much of it, too, has been formed by condensation or melting in the nebula, although minute amounts of surviving interstellar dust are mixed with the processed materials.

8.The word "pristine" in the passage is closest in meaning to

○pure

○solid

○ordinary

○trapped

9.According to paragraph 5, which of the following is indicated by studies of the mixture holding the inclusions together?

○Large amounts of this material were formed by condensation or melting in the nebula.

○This material contains more iron and iron sulfide than had previously been thought.

○This material is very similar to the material from which the refractory inclusions are made

○The grains in this material are made from the same elements as chondrules are.

【Paragraph 6】All these diverse constituents are aggregated together to form chondritic meteorites, like Allende, that have chemical compositions much like that of the Sun. To compare the compositions of a meteorite and the Sun, it is necessary that we use ratios of elements rather than simply the abundances of atoms. After all,the Sun has many more atoms of any element, say iron, than does a meteorite specimen, but the ratios of iron to silicon in the two kinds of matter might be comparable. The compositional similarity is striking. The major difference is that Allende is depleted in the most volatile elements, like hydrogen, carbon, oxygen, nitrogen, and the noble gases, relative to the Sun. These are the elements that tend to form gases even at very low temperatures. We might think of chondrites as samples of distilled Sun, a sort of solar sludge from which only gases have been removed. Since practically all the solar system's mass resides in the Sun, this similarity in chemistry means that chondrites have average solar system composition, except for the most volatile elements; they are truly lumps of nebular matter, probably similar in composition to the matter from which planets were assembled.

10.In paragraph 6, why does the author mention that "the Sun has many more atoms of any element, say iron, than does a meteorite specimen"?

○To show how difficult it is to compare the composition of a meteorite with that of the Sun

○To explain why a comparison of the compositions of a meteorite and of the Sun has to be done in terms of ratios of elements

○To identify the most common element in both the Sun and meteorite specimens

○To emphasize how much largerthe Sun is than any meteorite specimen is

11.According to paragraph 6, the composition of chondritic meteorites differs from the composition of the Sun primarily in

○containing nebular matter

○containing many fewer atoms of iron

○the relative amount of volatile elements

○the ratio of iron to silicon

12.According to paragraph 6, what is the significance of the similarity in composition between chondrites and the Sun?

○It indicates what the matter from which planets were formed was probably like.

○It may explain howthe Sun originally developed.

○It helps scientists estimate the variations in the chemical composition of different meteors.

○It suggests that most meteorites may contain large quantities of volatile elements.

Equally perplexing constituents of Allende are the refractory inclusions: irregular white masses that tend to be larger than chondrules.■ They are composed of minerals uncommon on Earth, all rich in calcium, aluminum, and titanium, the most refractory (resistant to melting) of the major elements in the nebula.■ The same minerals that occur in refractory inclusions are believed to be the earliest-formed substances to have condensed out of the solar nebula.■ However, studies of the textures of inclusions reveal that the order in which the minerals appeared in the inclusions varies from inclusion to inclusion, and often does not match the theoretical condensation sequence for those metals.■

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage

**It is therefore still unclear if all inclusions were formed in the same way.**

Where would the sentence best fit?

**14.【Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Studies of the Allende meteorite provided information about the composition of chondritic meteorites and their possible origin.**

●

●

●

Answer Choices

○When Allende entered Earth's atmosphere, it broke into thousands of pieces called chondrites because they look like glassy, black seeds.

○The mineral content of chondrules suggests that they were probably formed in isolated regions of the nebula that remained much hotter than the rest.

○Chondrules are tiny, millimeter-sized drops of silicate materials that probably formed when lumps of nebular dust were fused at extremely high temperatures and then quickly cooled.

○Irregularly shaped inclusions in Allende are composed of minerals that are resistant to melting and are believed to be the earlest minerals to have condensed out of the nebula.

○The matrix that holds the chondrules and inclusions together in Allende consists mainly of grains of nebular dust that were trapped inside the meteor before they could be melted.

○Except for being depleted in volatile elements, chondritic meteorites are probably very similar in composition to the matter from which planets were assembled.

**参考答案：**

1. 4

2. 3

3. 2

4. 4

5. 2

6. 2

7. 4

8. 1

9. 1

10. 2

11. 3

12. 1

13. 4

14. Chondrules are tiny,...

Irregularly shaped inclusions ...

Except for being ...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：阿伦德陨星**

在1969年2月8日子夜后的某一时刻，一颗巨大明亮的流星进入地球大气层，碎成无数的碎块，坠落到地面，散布在墨西哥奇瓦瓦州境内50英里长10英里宽的区域内。在皮柏里托•德•阿伦德村发现了这次坠落的第一块陨石。总共大约找到了2吨的陨星碎片，所有的碎片都是以首次发现的所在地阿伦德命名。

每块阿伦德碎片样本都覆盖着一层黑色的、玻璃样的熔壳，这层熔壳是在它们的外表面与地球大气层摩擦减速中熔化形成的。把阿伦德陨石破开，发现里面含有各种各样细小的、独特的物体，这些物体呈球状或者不规则状，嵌在深灰色的基质（结合物质）中，它们曾是太阳星云——形成太阳系的由气体和尘埃组成的星际云团的一部分。

阿伦德陨星属于球粒陨石。球粒陨石的名字是源于希腊语中的单词“chondros”，意思是种子，这是指它们的外观看起来仿佛是镶嵌着细小的种子的岩石。这些种子实际上是陨石球粒：被冷却成玻璃球和水晶球的硅酸盐物质的毫米大小的熔融液滴。少数陨石球粒含有未遭熔化的颗粒，所以这些神秘的陨石球粒肯定是在接近1700摄氏度的高温下熔化的星云尘埃致密团块中形成的，随后这些团块在幸存的颗粒尚未熔化之前就冷却了。对陨石球粒质地的研究确认它们的确是以极快的速度冷却的，短则几分钟，长则数小时，所以形成陨石球粒的高温事件肯定是限于局部的。大块的星云升到极端高的温度是不大可能的，而且大块星云不可能散热这么快。陨石球粒肯定是在星云内部能够快速散热的小型袋状结构处被熔化的。这些奇特的玻璃球的来源目前仍是未解之谜。

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同样令人困惑的是阿伦德陨星的成分是耐高温的内含物：比陨石球粒要大些的不规则的白色团块。它们是由地球上罕见的矿物质组成的，富含钙、铝以及在星云中最耐高温的（耐熔化的）主要元素钛。这些出现在耐高温内含物中相同的矿物质被认为是在太阳星云中最早凝结而成的物质。然而，对内含物质地的研究发现不同的内含物中矿物质出现的顺序并不相同，往往与理论上这些金属的凝结序列不一致。

阿伦德陨星里的陨石球粒和内含物是由球粒陨石基质结合到一起的，这是一种细粒混合物，主要是包括铁颗粒和硫化铁的硅酸盐矿物。人们一度认为这些基质颗粒可能是原始的星云尘埃，也就是形成陨石球粒和内含物的物质。不过对球粒陨石基质的详细研究表明多数基质的确是由星云的凝结和熔融形成的，尽管在这些被处理过的物质中还混有小部分残留的星际尘埃。

所有这些各种各样的组分被凝聚到一起形成了球粒陨石，就像与太阳具有很多相似化学组分的阿伦德陨星。为了比较陨星和太阳的组分，我们需要比较元素的比率，而不是简单地比较原子的丰度。毕竟，太阳含有的任何一种元素的原子数都要比一块陨星样品含有的多，但是两者间的铁和硅的比率可能是具有可比性的。结果发现它们在组成上具有惊人的相似性。主要的差别是相比太阳，阿伦德陨星失去了大部分的挥发性元素，例如氢、碳、氧、氮以及惰性气体。这些元素即使是在很低的气温下都是气体状态。我们或许会认为球粒陨石是“蒸馏后的太阳”的样本，一种除去气体后的太阳沉淀物。由于太阳系的质量几乎都集中于太阳，这种相似的化学组成意味着除了大部分的挥发性元素外，球粒陨石具有正常的太阳系组成；它们是真正星云物质的团块，很可能与形成行星的物质具有相似的组成。

TPO-23

## **Urban Climates**

The city is an extraordinary processor of mass and energy and has its own metabolism. A daily input of water, food, and energy of various kinds is matched by an output of sewage, solid waste, air pollutants, energy, and materials that have been transformed in some way. The quantities involved are enormous. Many aspects of this energy use affect the atmosphere of a city, particularly in the production of heat.

In winter the heat produced by a city can equal or surpass the amount of heat available from the Sun. All the heat that warms a building eventually transfers to the surrounding air, a process that is quickest where houses are poorly insulated. But an automobile produces enough heat to warm an average house in winter, and if a house were perfectly insulated, one adult could also produce more than enough heat to warm it. Therefore, even without any industrial production of heat, an urban area tends to be warmer than the countryside that surrounds it.

The burning of fuel, such as by cars, is not the only source of this increased heat. Two other factors contribute to the higher overall temperature in cities. The first is the heat capacity of the materials that constitute the city, which is typically dominated by concrete and asphalt. During the day, heat from the Sun can be conducted into these materials and stored—to be released at night. But in the countryside materials have a significantly lower heat capacity because a vegetative blanket prevents heat from easily flowing into and out of the ground. The second factor is that radiant heat coming into the city from the Sun is trapped in two ways: (1) by a continuing series of reflection among the numerous vertical surfaces that buildings present and (2) by the dust dome, the cloudlike layer of polluted air that most cities produce. Shortwave radiation from the Sun passes through the pollution dome more easily than outgoing longwave radiation does; the latter is absorbed by the gaseous pollutants of the dome and reradiated back to the urban surface.

Cities, then, are warmer than the surrounding rural areas, and together they produce a phenomenon known as the urban heat island. Heat islands develop best under particular conditions associated with light winds, but they can form almost any time. The precise configuration of a heat island depends on several factors. For example, the wind can make a heat island stretch in the direction it blows. When a heat island is well developed, variations can be extreme; in winter, busy streets in cities can be 1.7℃warmer than the side streets. Areas near traffic lights can be similarly warmer than the areas between them because of the effect of cars standing in traffic instead of moving. The maximum differences in temperature between neighboring urban and rural environments is called the heat-island intensity for that region. In general, the larger the city, the greater its heat-island intensity. The actual level of intensity depends on such factors as the physical layout, population density, and productive activities of a metropolis.

The surface-atmosphere relationships inside metropolitan areas produce a number of climatic peculiarities. For one thing, the presence or absence of moisture is affected by the special qualities of the urban surface. With much of the built-up landscape impenetrable by water, even gentle rain runs off almost immediately from rooftops, streets, and parking lots. Thus, city surfaces, as well as the air above them, tend to be drier between episodes of rain; with little water available for the cooling process of evaporation, relative humidities are usually lower. Wind movements are also modified in cities because buildings increase the friction on air flowing around them. This friction tends to slow the speed of winds, making them far less efficient at dispersing pollutants. On the other hand, air turbulence increases because of the effect of skyscrapers on airflow. Rainfall is also increased in cities. The cause appears to be in part greater turbulence in the urban atmosphere as hot air rises from the built-up surface.

【Paragraph 1】The city is an extraordinary processor of mass and energy and has its own metabolism. A daily input of water, food, and energy of various kinds is matched by an output of sewage, solid waste, air pollutants, energy, and materials that have been transformed in some way. The quantities involved are enormous. Many aspects of this energy use affect the atmosphere of a city, particularly in the production of heat.

1. The word “enormous”in the passage is closest in meaning to

○growing

○frightening

○very large

○strictly controlled

【Paragraph 2】In winter the heat produced by a city can equal or surpass the amount of heat available from the Sun. All the heat that warms a building eventually transfers to the surrounding air, a process that is quickest where houses are poorly insulated. But an automobile produces enough heat to warm an average house in winter, and if a house were perfectly insulated, one adult could also produce more than enough heat to warm it. Therefore, even without any industrial production of heat, an urban area tends to be warmer than the countryside that surrounds it.

2. The word “surpass”in the passage is closest in meaning to

○remain below

○be higher than

○add to

○come close to

3. According to paragraph 2, how soon heat from a warmed house reaches the outside air is greatly affected by

○how well the house is heated

○how well the house is insulated

○how many adults live in the house

○how much sunshine the house receives

【Paragraph 3】The burning of fuel, such as by cars, is not the only source of this increased heat. Two other factors contribute to the higher overall temperature in cities. The first is the heat capacity of the materials that constitute the city, which is typically dominated by concrete and asphalt. During the day, heat from the Sun can be conducted into these materials and stored—to be released at night. But in the countryside materials have a significantly lower heat capacity because a vegetative blanket prevents heat from easily flowing into and out of the ground. The second factor is that radiant heat coming into the city from the Sun is trapped in two ways: (1) by a continuing series of reflection among the numerous vertical surfaces that buildings present and (2) by the dust dome, the cloudlike layer of polluted air that most cities produce. Shortwave radiation from the Sun passes through the pollution dome more easily than outgoing longwave radiation does; the latter is absorbed by the gaseous pollutants of the dome and reradiated back to the urban surface.

4. According to paragraph 3, each of the following contributes to making urban areas warmer than the surrounding countryside EXCEPT

○the fuel burned by motor vehicles

○the capacity to store heat of the materials used in building a city

○the easy flow of heat into the ground in city areas covered by vegetation

○the repeated reflection of solar radiation back and forth among buildings

5. According to paragraph 3, why do materials in the countryside have a lower heat capacity than materials in cities do?

○The countryside in the Sun is the only important source of heat.

○Construction materials in the city are not as good at keeping buildings warm as they are in the countryside.

○In the countryside the solar heat that flows into the ground flows out again quickly.

○ Countryside vegetation prevents heat from being trapped in the ground.

6. How is paragraph 3 organized?

○ It describes two factors that contribute to the increased heat of cities and then provides two causes for the second factor.

○ It describes two causes discovered in an early analysis of the increased heat of cities.

○ It describes two factors that contribute to the increased heat of cities and two other factors that work against it.

○ It describes two well-established causes of the increased heat of cities and other two whose roles are less well understood.

【Paragraph 4】Cities, then, are warmer than the surrounding rural areas, and together they produce a phenomenon known as the urban heat island. Heat islands develop best under particular conditions associated with light winds, but they can form almost any time. The precise configuration of a heat island depends on several factors. For example, the wind can make a heat island stretch in the direction it blows. When a heat island is well developed, variations can be extreme; in winter, busy streets in cities can be 1.7℃warmer than the side streets. Areas near traffic lights can be similarly warmer than the areas between them because of the effect of cars standing in traffic instead of moving. The maximum differences in temperature between neighboring urban and rural environments is called the heat-island intensity for that region. In general, the larger the city, the greater its heat-island intensity. The actual level of intensity depends on such factors as the physical layout, population density, and productive activities of a metropolis.

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7.The word “configuration”in the passage is closest in meaning to

○ location

○ history

○ temperature

○ shape

8. According to paragraph 4, what can explain the substantial differences in temperature between one area and other within a well-developed heat island?

○ The overall size of the heat island that includes the two reasons

○ The intensity of the heat island that includes the two areas

○ Differences between the two areas in the general level of activity, including traffic

○Differences between the two areas in the insulation materials used in construction

9. Paragraph 4 supports the idea that a city’s heat-island intensity would increase if

○the city went into an economic decline and lost population

○the city’s economy shifted from heavy industry to health care and education

○there was an upward trend in the average age of the city’s residents

○repair work on the streets slowed traffic throughout the city

【Paragraph 5】The surface-atmosphere relationships inside metropolitan areas produce a number of climatic peculiarities. For one thing, the presence or absence of moisture is affected by the special qualities of the urban surface. With much of the built-up landscape impenetrable by water, even gentle rain runs off almost immediately from rooftops, streets, and parking lots. Thus, city surfaces, as well as the air above them, tend to be drier between episodes of rain; with little water available for the cooling process of evaporation, relative humidities are usually lower. Wind movements are also modified in cities because buildings increase the friction on air flowing around them. This friction tends to slow the speed of winds, making them far less efficient at dispersing pollutants. On the other hand, air turbulence increases because of the effect of skyscrapers on airflow. Rainfall is also increased in cities. The cause appears to be in part greater turbulence in the urban atmosphere as hot air rises from the built-up surface.

10. According to paragraph 5, surfaces in the city are generally drier than surfaces in the countryside between periods of rainfall because

○in the city gentle rain is much more common than heavy rain

○high temperatures in the city speed up the process of evaporation

○in the city there are longer periods of dry weather between episodes of rain

○ rainwater in the city cannot soak into most surfaces and quickly runs off

11. The word “modified”in the passage is closest in meaning to

○changed

○blocked

○increased

○weakened

12. According to paragraph 5, which of the following is a factor responsible for the greater air turbulence in urban environments?

○The high speed of the winds travelling above cities

○The greater rainfall totals recorded in cities

○Attempts to reduce urban air pollution

○The effects of tall buildings on airflow

【Paragraph 4】Cities, then, are warmer than the surrounding rural areas, and together they produce a phenomenon known as the urban heat island. Heat islands develop best under particular conditions associated with light winds, but they can form almost any time. ■The precise configuration of a heat island depends on several factors. ■For example, the wind can make a heat island stretch in the direction it blows. ■When a heat island is well developed, variations can be extreme; in winter, busy streets in cities can be 1.7℃warmer than the side streets. ■Areas near traffic lights can be similarly warmer than the areas between them because of the effect of cars standing in traffic instead of moving.

The maximum differences in temperature between neighboring urban and rural environments is called the heat-island intensity for that region. In general, the larger the city, the greater its heat-island intensity. The actual level of intensity depends on such factors as the physical layout, population density, and productive activities of a metropolis.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Another possibility is for the heat island to be stretched along the course of major rivers, since large waterways typically have a warming effect on the air directly above them.**

Where would the sentence best fit?

14.【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

Cities create climatic conditions of their own through their physical structure and urban activities.

●

●

●

Answer Choices

○The amount of heat produced in a city will be reduced when cities use the heat from cars to warm homes.

○The built-up landscape of the city readily becomes a heat island, with greater water runoff and special climatic conditions such as low relative humidity and increased air turbulence.

○The materials from which cities are built and the effects of pollution domes help make urban areas warmer than rural areas.

○Cities tend to be warmer than their surrounding areas, in part because they produce heat by burning fuel for heating, powering vehicles, and industrial production.

○In most cities, the heating that results from solar radiation is intensified by carbon dioxide, a gas that is present at very high concentrations in cities’atmospheres.

○During periods without rainfall, the air in cities heats up and causes winds to slow down, with the result that pollutants are not dispersed.

**参考答案：**

1. ○3
2. ○2
3. ○2
4. ○3
5. ○4
6. ○1
7. ○4
8. ○3
9. ○4
10. ○4
11. ○1
12. ○4
13. ○3
14. The built-up landscape of…

The materials from which…

Cities tend to be warmer…

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## **参考译文：城市气候**

城市是一个物质和能量的巨大处理器，拥有自己的新陈代谢。每天输入水、食物和各种各样的能量，相应的输出废水、废气、固体垃圾、废能和某种程度上已经变形的材料。这个过程中的物质转移量异常的大。这种能源的消耗在很多方面影响城市的气候，尤其是产生热量方面。

冬天城市所产生的热量可以达到或超过其从太阳那里接收的热量。所有用来供暖的热量最后都扩散至周围的空气中，这个过程在那些隔热效果差的房屋里进行得最快。一辆汽车所产生的热量足以为一个普通的房屋供暖，如果房屋隔热效果好，一个成年人产生的热量就足以让其保暖了。因此，即使没有任何工业产热，城市地区也会比它周围的乡村地区更暖和。

燃料的燃烧，比如汽车燃料，并不是这种热量增加的唯一来源。另外两个因素导致了城市较高的整体温度。第一个是建造城市的材料的热容，主要典型材料是沥青和混凝土。白天，来自太阳的热量传入到这些物质当中并储存起来，在晚上被释放。但是在乡村储存能量的物质热容更低，因为植被会阻止热量轻易流入和流出地面。第二个因素是从太阳到城市的辐射热以两种形式被拦截了：（1）通过大量建筑的垂直表面的不断反射（2）通过尘埃，即大多数城市中受污染空气组成的云状物质。来自太阳的短波辐射比长波辐射要更容易穿过污染层；后者被这层物质中的气体污染物所吸收，然后重新辐射到城市的表层。

城市要比它周围的乡村地区热，同时它们产生了被称为城市热岛的现象。热岛效应在特殊条件下尤其是有微风时最明显，但是却几乎在任何时候都能形成。热岛的准确状态决定于好几个因素。比如风能在它出现的地方形成一个区域性的热岛。当一个热岛完全形成时，温度变化可能会非常极端；在冬天，繁忙的街道可能要比旁边的街道温度高1.7℃。那些红绿灯附近的地区同样要比红绿灯之间的地区要暖和，因为汽车停止时候的热效应要比运动时明显。城市周边和乡村环境的最大不同是地区热岛效应的程度。一般来讲，城市越大，热岛效应的程度就越强。实际上热岛效应的程度取决于实际布局、人口密度、和城市的生产活动等诸多因素。

在大都市里表面大气之间的关系产生了一系列特殊的气候特征。首先，湿气的存在与否受到了城市表层特殊性质的影响。由于水无法穿过大多数城市建筑，即使是很小的雨也会立即从屋顶、街道和停车场流到地下。这样城市表层包括其空气在雨季的间歇期就会比较干燥；由于蒸发的冷却过程缺少水分，相对湿度通常也很低。气流会因为城市建筑的摩擦而改变。这种摩擦会降低风速，使得气体扩散污染物的效率降低。另一方面，湍流也会因为摩天大楼的影响而增加。城市降雨也增加了。其原因部分在于从地表上升的热空气所造成的城市大气中的更大湍流。

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## **Seventeenth-Century Dutch Agriculture**

Agriculture and fishing formed the primary sector of the economy in the Netherlands in the seventeenth century. Dutch agriculture was modernized and commercialized new crops and agricultural techniques raised levels of production so that they were in line with market demands, and cheap grain was imported annually from the Baltic region in large quantities. According to estimates, about 120,000 tons of imported grain fed about 600,000 people: that is about a third of the Dutch population. Importing the grain, which would have been expensive and time consuming for the Dutch to have produced themselves, kept the price of grain low and thus stimulated individual demand for other foodstuffs and consumer goods.

Apart from this, being able to give up labor-intensive grain production freed both the land and the workforce for more productive agricultural divisions. The peasants specialized in livestock husbandry and dairy farming as well as in cultivating industrial crops and fodder crops: flax, madder, and rape were grown, as were tobacco, hops, and turnips. These products were bought mostly by urban businesses. There was also a demand among urban consumers for dairy products such as butter and cheese, which, in the sixteenth century, had become more expensive than grain. The high prices encouraged the peasants to improve their animal husbandry techniques; for example, they began feeding their animals indoors in order to raise the milk yield of their cows.

In addition to dairy farming and cultivating industrial crops, a third sector of the Dutch economy reflected the way in which agriculture was being modernized-horticulture. In the sixteenth century, fruit and vegetables were to be found only in gardens belonging to wealthy people. This changed in the early part of the seventeenth century when horticulture became accepted as an agricultural sector. Whole villages began to cultivate fruit and vegetables. The produce was then transported by water to markets in the cities, where the consumption of fruit and vegetables was no longer restricted to the wealthy.

As the demand for agricultural produce from both consumers and industry increased, agricultural land became more valuable and people tried to work the available land more intensively and to reclaim more land from wetlands and lakes. In order to increase production on existing land, the peasants made more use of crop rotation and, in particular, began to apply animal waste to the soil regularly, rather than leaving the fertilization process up to the grazing livestock. For the first time industrial waste, such as ash from the soap-boilers, was collected in the cities and sold in the country as artificial fertilizer. The increased yield and price of land justified reclaiming and draining even more land.

The Dutch battle against the sea is legendary. Noorderkwartier in Holland, with its numerous lakes and stretches of water, was particularly suitable for land reclamation and one of the biggest projects undertaken there was the draining of the Beemster lake which began in 1608. The richest merchants in Amsterdam contributed money to reclaim a good 7,100 hectares of land. Forty-three windmills powered the drainage pumps so that they were able to lease the reclamation to farmers as early as 1612, with the investors receiving annual leasing payments at an interest rate of 17 percent. Land reclamation continued, and between 1590 and 1665, almost 100,000 hectares were reclaimed from the wetland areas of Holland, Zeeland, and Friesland. However, land reclamation decreased significantly after the middle of the seventeenth century because the price of agricultural products began to fall, making land reclamation far less profitable in the second part of the century.

Dutch agriculture was finally affected by the general agricultural crisis in Europe during the last two decades of the seventeenth century. However, what is astonishing about this is not that Dutch agriculture was affected by critical phenomena such as a decrease in sales and production, but the fact that the crisis appeared only relatively late in Dutch agriculture. In Europe as a whole, the exceptional reduction in the population and the related fall in demand for grain since the beginning of the seventeenth century had caused the price of agricultural products to fall. Dutch peasants were able to remain unaffected by this crisis for a long time because they had specialized in dairy farming industrial crops, and horticulture. However, toward the end of the seventeenth century, they too were overtaken by the general agricultural crisis.

【Paragraph 1】Agriculture and fishing formed the primary sector of the economy in the Netherlands in the seventeenth century. Dutch agriculture was modernized and commercialized new crops and agricultural techniques raised levels of production so that they were in line with market demands, and cheap grain was imported annually from the Baltic region in large quantities. According to estimates, about 120,000 tons of imported grain fed about 600,000 people: that is about a third of the Dutch population. Importing the grain, which would have been expensive and time consuming for the Dutch to have produced themselves, kept the price of grain low and thus stimulated individual demand for other foodstuffs and consumer goods.

1. By indicating that production was in line with market demands the author means that Dutch farmerswere able to

○exceed other European countries in agricultural production

○produce crops mat were similar to those popular in other European countries

○supply sufficient quantities of the agricultural products that the Dutch population wanted to buy

○satisfy the demand for high quality agricultural products from the Baltic region

2. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Buying imported grain led to the Dutch demanding that other foodstuffs and consumer goods be imported.

○Because the Dutch were able to import inexpensive grain, they had money available to create a demand for other food products and consumer goods.

○Keeping the price of grain low was a primary goal of the Dutch at a time when they could not produce enough grain to provide for all their needs.

○The demand for other foodstuffs and consumer goods forced the Dutch to import grain and other products at a time when maintaining low prices was especially important.

【Paragraph 2】Apart from this, being able to give up labor-intensive grain production freed both the land and the workforce for more productive agricultural divisions. The peasants specialized in livestock husbandry and dairy farming as well as in cultivating industrial crops and fodder crops: flax, madder, and rape were grown, as were tobacco, hops, and turnips. These products were bought mostly by urban businesses. There was also a demand among urban consumers for dairy products such as butter and cheese, which, in the sixteenth century, had become more expensive than grain. The high prices encouraged the peasants to improve their animal husbandry techniques; for example, they began feeding their animals indoors in order to raise the milk yield of their cows.

3. The phrase “Apart from”in the passage is closest in meaning to

○Besides

○Despite

○As a result of

○Instead of

4. According to paragraph 2, the increases demands on Dutch agriculture made by urban consumers had which of the following results?

○Seasonal shortages of the products consumers most wanted

○Increased production of high-quality grain products

○Raised prices charged by peasants to urban consumers

○Different ways of caring for dairy-producing animals

【Paragraph 3】In addition to dairy farming and cultivating industrial crops, a third sector of the Dutch economy reflected the way in which agriculture was being modernized-horticulture. In the sixteenth century, fruit and vegetables were to be found only in gardens belonging to wealthy people. This changed in the early part of the seventeenth century when horticulture became accepted as an agricultural sector. Whole villages began to cultivate fruit and vegetables. The produce was then transported by water to markets in the cities, where the consumption of fruit and vegetables was no longer restricted to the wealthy.

5. The word “consumption”in the passage is closest in meaning to

○sale

○storage

○exportation

○utilization

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6. According to paragraph 3, the modernization of agriculture in the Netherlands was evident in all of the following ways EXCEPT:

○The production of fruits and vegetables became a commercial venture.

○The wealthy stopped growing fruits and vegetables in their gardens and grew flowers instead.

○Horticultural produce was transported to city markets by water.

○Many more people were able to afford to eat fresh fruits and vegetables.

【Paragraph 4】As the demand for agricultural produce from both consumers and industry increased, agricultural land became more valuable and people tried to work the available land more intensively and to reclaim more land from wetlands and lakes. In order to increase production on existing land, the peasants made more use of crop rotation and, in particular, began to apply animal waste to the soil regularly, rather than leaving the fertilization process up to the grazing livestock. For the first time industrial waste, such as ash from the soap-boilers, was collected in the cities and sold in the country as artificial fertilizer. The increased yield and price of land justified reclaiming and draining even more land.

7. Select the TWO answer choices that, according to paragraph 4, indicate two methods people used to increase the productivity of their land. To receive credit you must select TWO answers

○They planted different crops in different sections of the farm each year.

○They used improved irrigation methods to increase the yield of crops.

○They increased the use of fertilizers to supply more nutrients to plants.

○They used new horticultural practices to produce different varieties of plants in the same section of the farm.

【Paragraph 5】The Dutch battle against the sea is legendary. Noorderkwartier in Holland, with its numerous lakes and stretches of water, was particularly suitable for land reclamation and one of the biggest projects undertaken there was the draining of the Beemster lake which began in 1608. The richest merchants in Amsterdam contributed money to reclaim a good 7,100 hectares of land. Forty-three windmills powered the drainage pumps so that they were able to lease the reclamation to farmers as early as 1612, with the investors receiving annual leasing payments at an interest rate of 17 percent. Land reclamation continued, and between 1590 and 1665, almost 100,000 hectares were reclaimed from the wetland areas of Holland, Zeeland, and Friesland. However, land reclamation decreased significantly after the middle of the seventeenth century because the price of agricultural products began to fall, making land reclamation far less profitable in the second part of the century.

8. The word “they”in the passage refers to

○merchants

○hectares

○windmills

○drainage pumps

9. According to paragraph 5, which of the following was an important reason why land-reclamation projects in the first half of the seventeenth century proceeded rapidly?

○Windmills became powerful enough to run drainage pumps efficiently.

○Merchants invested large amounts of money in reclamation.

○High interest rates discouraged people from buying land already available.

○Reclaimed land was much more suitable for agriculture than the existing land.

10. The word “legendary”in the passage is closest in meaning to

○continuous

○well documented

○famous

○expensive

【Paragraph 6】Dutch agriculture was finally affected by the general agricultural crisis in Europe during the last two decades of the seventeenth century. However, what is astonishing about this is not that Dutch agriculture was affected by critical phenomena such as a decrease in sales and production, but the fact that the crisis appeared only relatively late in Dutch agriculture. In Europe as a whole, the exceptional reduction in the population and the related fall in demand for grain since the beginning of the seventeenth century had caused the price of agricultural products to fall. Dutch peasants were able to remain unaffected by this crisis for a long time because they had specialized in dairy farming industrial crops, and horticulture. However, toward the end of the seventeenth century, they too were overtaken by the general agricultural crisis.

11. The word “astonishing”in the passage is closest in meaning to

○incredible

○unfortunate

○predicted

○evident

12. Which of the following best describes the organization of the passage?

○A presentation of a theory and the evidence in favor of it

○A general statement followed by examples and relevant details

○ A analysis of a problem and its solution

○A series of statements leading to a conclusion

【Paragraph 3】In addition to dairy farming and cultivating industrial crops, a third sector of the Dutch economy reflected the way in which agriculture was being modernized-horticulture. ■In the sixteenth century, fruit and vegetables were to be found only in gardens belonging to wealthy people. ■This changed in the early part of the seventeenth century when horticulture became accepted as an agricultural sector. ■Whole villages began to cultivate fruit and vegetables. ■The produce was then transported by water to markets in the cities, where the consumption of fruit and vegetables was no longer restricted to the wealthy.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage

**Some villages specialized in growing cabbages and carrots; others grew onions, mustard, and coriander; and still others produced fruit and cultivated trees in nurseries.**

Where would the sentence best fit?

14. 【**Direction】**An introductory sentence for a brief summary of the passage is provides below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Agriculture formed one of the primary sectors of the economy in seventeenth-century Netherlands.

●

●

●

Answer Choices

○The Baltic region produced large quantities of grain for export to other regions, including the Netherlands.

○The richest people grew enough fruits and vegetables to supply the entire country with fresh produce.

○An agricultural crisis that began in Europe did not affect Dutch land-reclamation projects.

○Specialization in dairy farming, industrial crops, and horticulture allowed the Dutch to be more productive than some other regions in Europe.

○Land reclamation and improvement allowed the Dutch to meet demands for their agricultural products.

○Because the Dutch had specialized their agricultural output they were less susceptible to the crisis that Europe experienced from the beginning of the century.

**参考答案：**

1.○3

2.○2

3.○1

4.○4

5.○4

6.○2

7.○1,3

8.○1

9.○2

10.○3

11.○1

12.○2

13.○4

14. Specialization in dairy…

Land reclamation…

Because the Dutch…

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## **参考译文：十七世纪的荷兰农业**

农业和渔业是十七世纪荷兰经济的主要部分。荷兰农业实现了现代化，新型的商业化农作物和农业技术提高了农产量，以便满足市场的需求，而且每年都会从波罗的海地区进口大量便宜的粮食。据估计，进口的12万吨粮食养活着大约60万人：大概相当于荷兰人口的三分之一。荷兰人自己生产这些粮食昂贵又费时，进口粮食使得现在粮食的价格保持在低位，因而刺激了个人对其他食物和消费品的需求。

除了这些，放弃这种劳动密集型的粮食生产解放了土地和劳动力使之能够参与到更高效的农业生产中。农民在家畜养殖业、乳品业与栽培经济作物和饲料作物（亚麻，茜草，油菜和烟草，啤酒花，芜菁）方面已经专业化。这些产品大多是由城市企业购买。城镇消费者对黄油和奶酪一类的乳制品同样有需求，这些东西在十六世纪就比粮食要贵了。高价格促使农民提高他们的畜牧技术，比如他们开始圈养这些动物以提高奶牛的奶产量。

除了乳品业和工业作物的种植，园艺是荷兰农业经济现代化的第三个部分。在十六世纪，水果和蔬菜只属于有钱人的花园中。直到十七世纪早期,园艺成为农业的一部分这种情况才改变。整个村庄开始种植蔬菜和水果，产品通过水路运送到城市的市场中，在那里水果和蔬菜的消费也不再只是有钱人的专利。

随着消费者和工业对这种农产品的需求增加，耕地变得越来越珍贵，人们对可耕地的利用强度越来越大，并且从湿地和湖泊中开垦了更多的耕地。为了增加已有土地的产量，农民们利用农作物轮作，特别是用动物粪便来给土地定期施肥而不是随意让牧区的牲畜来进行施肥。城市首次收集工业废料, 比如煮皂的灰料和城市废料，并作为人工肥料售给乡下。产量的增加和土地价格的上涨使得开垦和灌溉更多的土地变得合理化。

荷兰与海的斗争是传奇式的。北荷兰有许多湖泊和临海区，特别适合开垦土地，其中完成的最大的一个工程是1608年贝母斯特湖的排水。阿姆斯特丹最富有的商人们花钱来开垦这片7 100公顷的土地。早在1612年，四十三台风车推动着水泵灌溉土地以便把开垦地租给农民，而投资者每年从租金中获得17%的利息。土地开垦一直在继续，在1590到1665年之间，将近十万公顷的土地从荷兰、泽兰和弗里斯兰的湿地中开垦出来。然而，土地开垦在十七世纪中叶大幅减少，因为农产品的价格开始回落，使得土地开垦的利润在十七世纪下半叶不是那么丰厚了。

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荷兰农业最后受到十七世纪最后的二十年欧洲主要农业危机的影响。不过，令人惊讶的不是荷兰农业受到这些危机现象的影响而导致产量和销售量的降低，而是这些危机在荷兰农业中发生得相对较晚。欧洲总体来讲，异常的人口减少和相应的对粮食需求的下降从十七世纪早期就开始了，导致农产品价格的下跌。荷兰农民能够在这种危机中长期不受影响是因为他们在乳制品、经济作物以及园艺上的专门化。然而，在十七世纪晚期，他们还是赶上了普遍的农业危机。

## **Rock Art of the Australia Aborigines**

Ever since European first explored Australia, people have been trying to understand the ancient rock drawings and cavings created by the Aborigines, the original inhabitants of the continent. Early in the nineteenth century, encounters with Aboriginal rock art tended to be infrequent and open to speculative interpretation, but since the late nineteenth century, awareness of the extent and variety of Australian rock art has been growing. In the latter decades of the twentieth century there were intensified efforts to understand and record the abundance of Australian rock art.

The systematic study of this art is a relatively new discipline in Australia. Over the past four decades new discoveries have steadily added to the body of knowledge. The most significant data have come from a concentration on three major questions. First, what is the age of Australian rock art? Second, what is its stylistic organization and is it possible to discern a sequence or a pattern of development between styles? Third, is it possible to interpret accurately the subject matter of ancient rock art, bring to bear all available archaeological techniques and the knowledge of present-day Aboriginal informants?

The age of Australia’s rock art is constantly being revised, and earlier datings have been proposed as the result of new discoveries. Currently, reliable scientific evidence dates the earliest creation of art on rock surfaces in Australia to somewhere between 30,000 and 50,000 years ago. This in itself is an almost incomprehensible span of generations, and one that makes Australia’s rock art the oldest continuous art tradition in the world.

Although the remarkable antiquity of Australia’s rock art is now established, the sequences and meanings of its images have been widely debated. Since the mid-1970s, a reasonably stable picture has formed of the organization of Australian rock art. In order to create a sense of structure to this picture, researchers have relied on a distinction that still underlies the forms of much indigenous visual culture—a distinction between geometric and figurative elements. Simple geometric repeated patterns—circles, concentric circles, and lines—constitute the iconography (characteristic images) of the earliest rock-art sites found across Australia. The frequency with which certain simple motifs appear in these oldest sites has led rock-art researchers to adopt a descriptive term—the Panaramitee style—a label which takes its name from the extensive rock pavements at Panaramitee North in desert South Australia, which are covered with motifs pecked into the surface. Certain features of these engravings lead to the conclusion that they are of great age—geological changes had clearly happened after the designs had been made and local Aboriginal informants, when first questioned about them, seemed to know nothing of their origins. Furthermore, the designs were covered with “desert varnish,”a glaze that develops on rock surfaces over thousands of years of exposure to the elements. The simple motifs found at Panaramitee are common to many rock-art sites across Australia. Indeed, sites with engravings of geometric shapes are also to be found on the island of Tasmania, which was separated from the mainland of the continent some 10,000 years ago.

In the 1970s when the study of Australian archaeology was in an exciting phase of development, with the great antiquity of rock art becoming clear. Lesley Maynard, the archaeologist who coined the phrase “Panaramitee style,”suggested that a sequence could be determined for Australian rock art, in which a geometric style gave way to a simple figurative style (outlines of figures and animals), followed by a range of complex figurative styles that, unlike the pan-Australian geometric tradition, tended to much greater regional diversity. While accepting that this sequence fits the archaeological profile of those sites, which were occupied continuously over many thousands of years a number of writers have warned that the underlying assumption of such a sequence—a development from the simple and the geometric to the complex and naturalistic—obscures the cultural continuities in Aboriginal Australia, in which geometric symbolism remains fundamentally important. In this context the simplicity of a geometric motif may be more apparent than real. Motifs of seeming simplicity can encode complex meanings in Aboriginal Australia. And has not twentieth-century art shown that naturalism does not necessarily follow abstraction in some kind of predetermine sequence?

【Paragraph 1】Ever since European first explored Australia, people have been trying to understand the ancient rock drawings and cavings created by the Aborigines, the original inhabitants of the continent. Early in the nineteenth century, encounters with Aboriginal rock art tended to be infrequent and open to speculative interpretation, but since the late nineteenth century, awareness of the extent and variety of Australian rock art has been growing. In the latter decades of the twentieth century there were intensified efforts to understand and record the abundance of Australian rock art.

1. The word “infrequent”in the passage is closest in meaning to

○puzzling

○uncommon

○questionable

○undocumented

2. According to paragraph 1, the twentieth-century approach to studying Australian rock art was different from earlier approaches because the twentieth-century approach

○recognized that many different groups of Aborigines created Australian rock art

○concentrated on a limited range of Aboriginal rock art

○examined Aboriginal art from an Aboriginal rather than from a European perspective

○focused more intensely on understanding and documenting rock art

【Paragraph 2】The systematic study of this art is a relatively new discipline in Australia. Over the past four decades new discoveries have steadily added to the body of knowledge. The most significant data have come from a concentration on three major questions. First, what is the age of Australian rock art? Second, what is its stylistic organization and is it possible to discern a sequence or a pattern of development between styles? Third, is it possible to interpret accurately the subject matter of ancient rock art, bring to bear all available archaeological techniques and the knowledge of present-day Aboriginal informants?

3. The word “relatively”in the passage is closest in meaning to

○completely

○comparatively

○apparently

○particularly

4. The word “discern”in the passage is closest in meaning to

○indicate

○apply

○identify

○repeat

【Paragraph 3】The age of Australia’s rock art is constantly being revised, and earlier datings have been proposed as the result of new discoveries. Currently, reliable scientific evidence dates the earliest creation of art on rock surfaces in Australia to somewhere between 30,000 and 50,000 years ago. This in itself is an almost incomprehensible span of generations, and one that makes Australia’s rock art the oldest continuous art tradition in the world.

5. The word “revised”in the passage is closest in meaning to

○discussed

○raised

○challenged

○changed

【Paragraph 4】Although the remarkable antiquity of Australia’s rock art is now established, the sequences and meanings of its images have been widely debated. Since the mid-1970s, a reasonably stable picture has formed of the organization of Australian rock art. In order to create a sense of structure to this picture, researchers have relied on a distinction that still underlies the forms of much indigenous visual culture—a distinction between geometric and figurative elements. Simple geometric repeated patterns—circles, concentric circles, and lines—constitute the iconography (characteristic images) of the earliest rock-art sites found across Australia. The frequency with which certain simple motifs appear in these oldest sites has led rock-art researchers to adopt a descriptive term—the Panaramitee style—a label which takes its name from the extensive rock pavements at Panaramitee North in desert South Australia, which are covered with motifs pecked into the surface. Certain features of these engravings lead to the conclusion that they are of great age—geological changes had clearly happened after the designs had been made and local Aboriginal informants, when first questioned about them, seemed to know nothing of their origins. Furthermore, the designs were covered with “desert varnish,”a glaze that develops on rock surfaces over thousands of years of exposure to the elements. The simple motifs found at Panaramitee are common to many rock-art sites across Australia. Indeed, sites with engravings of geometric shapes are also to be found on the island of Tasmania, which was separated from the mainland of the continent some 10,000 years ago.

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6. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave ways or leave out essential information

○The oldest rock art sites have simpler motifs than the best known sites of Panaramitee North.

○Because motifs primarily associated with the Panaramitee region are common in the oldest sites the term Panaramitee style has become the general term for rock art of this type.

○Because the Panaramitee style is so common in the older sites, researchers have described it most extensively.

○The motifs carved in the rocky surface of the Panaramitee region make up the oldest form of rock art discovered in Australia.

7. According to paragraph 4, researchers have organized and structured Australian rock art by distinguishing between which of the following?

○Images found at Panaramitee North and images found in other parts of Australia

○Images found in a particular type of rock layer and images found in other types of rock layers

○Images that have geometric elements and images that have figurative elements

○Images that are typically found and image that are rarely found

8. According to paragraph 4, all of the following are signs of the great age of the Panaramitee engravings EXCEPT:

○The engravings consisted of simple animal drawings.

○The engravings were covered with a layer of a substance known as “desert varnish”.

○Local Aborigines who were asked knew nothing about the origin of the engravings.

○Geologic changes had occurred after the engravings were made.

9. Why does the author include information about Tasmania in paragraph 4?

○To provide evidence that the Panaramitee style is widespread and of great age

○To prove that Aboriginal Australians could not have made the carvings in Tasmania

○To indicate how researchers have determined how long ago Tasmania separated from the mainland

○To illustrate the importance of geometric rock art to tourism in Tasmania

【Paragraph 5】In the 1970s when the study of Australian archaeology was in an exciting phase of development, with the great antiquity of rock art becoming clear. Lesley Maynard, the archaeologist who coined the phrase “Panaramitee style,”suggested that a sequence could be determined for Australian rock art, in which a geometric style gave way to a simple figurative style (outlines of figures and animals), followed by a range of complex figurative styles that, unlike the pan-Australian geometric tradition tended to much greater regional diversity. While accepting that this sequence fits the archaeological profile of those sites, which were occupied continuously over many thousands of years a number of writers have warned that the underlying assumption of such a sequence—a development from the simple and the geometric to the complex and naturalistic—obscures the cultural continuities in Aboriginal Australia, in which geometric symbolism remains fundamentally important. In this context the simplicity of a geometric motif may be more apparent than real. Motifs of seeming simplicity can encode complex meanings in Aboriginal Australia. And has not twentieth-century art shown that naturalism does not necessarily follow abstraction in some kind of predetermine sequence?

10. According to paragraph 5, the complex figurative style differs from the geometric style in that the complex figurative style

○varies significantly from region to region

○is more meaningful

○appears on only a few types of rocks

○has changed little overtime

11. According to paragraph 5, Lesley Maynard made which of the following suggestions about Australian rock art?

○There were a pattern of human figures being represented in a more complex style than animal figures.

○Australian archaeology should concentrate on determining the sequence of styles that led up to the Panaramitee style.

○The great antiquity of Australian rock art would probably make it impossible to determine the ages of the various styles found in rock art.

○The geometric style of Australian rock art was replaced by increasingly complex figurative styles.

12. In paragraph 5, the author indicates that twentieth century art has shown that naturalism does not necessarily follow abstraction in some kind of predetermined sequence in order to

○emphasize that it may not be possible to determine what the figures in ancient rock art represent

○suggest a reply to those who have questioned Maynard’s interpretation of the sequence of Australian rock art

○provide a counterexample to Maynard’s interpretation of the sequence of Australian rock art

○indicate that twentieth century art is more advanced than ancient rock art

【Paragraph 2】The systematic study of this art is a relatively new discipline in Australia. Over the past four decades new discoveries have steadily added to the body of knowledge. The most significant data have come from a concentration on three major questions. First, what is the age of Australian rock art? Second, what is its stylistic organization and is it possible to discern a sequence or a pattern of development between styles? Third, is it possible to interpret accurately the subject matter of ancient rock art, bring to bear all available archaeological techniques and the knowledge of present-day Aboriginal informants? ■

【Paragraph 3】The age of Australia’s rock art is constantly being revised, and earlier datings have been proposed as the result of new discoveries. ■Currently, reliable scientific evidence dates the earliest creation of art on rock surfaces in Australia to somewhere between 30,000 and 50,000 years ago. ■This in itself is an almost incomprehensible span of generations, and one that makes Australia’s rock art the oldest continuous art tradition in the world. ■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage

**While a great deal of information exists, the answers to these questions are not yet definitive.**

Where would the sentence best fit?

14. 【**Direction】**An introductory sentence for a brief summary of the passage is provides below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

Interest in the rock art of the original inhabitants of Australia has grown over the last two centuries.

●

●

●

Answer Choices

○Late nineteenth century studies of Aboriginal rock art failed to recognize that a variety of styles existed.

○The extreme age of the earliest Aboriginal rock art has been established but the interpretation of rock art images is still debated.

○A sequence from geometric to more representative art fits many sites but does not necessarily indicate a progression from simple to complex meaning.

○In determining the way in which Australian rock art was organized, archaeologists have made little distinction between geometric and figurative elements.

○Older examples of rock art consist of simple, repeated geometric patterns while later rock art includes figures and animals.

○Aboriginal informants were able to explain the meanings of ancient rock art symbols.

**参考答案:**

1.○2

2.○4

3.○2

4.○3

5.○4

6.○2

7.○3

8.○1

9.○1

10.○1

11.○4

12.○3

13.○1

14. The extreme age…

Older examples of…

A sequence from…

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：澳大利亚土著的岩石艺术**

自从欧洲人第一次探索澳大利亚，人们就一直试图了解那些远古的岩画和洞穴，它们由土著居民也就是这片大陆的原始居民创造。在十九世纪早期，遇到的岩石艺术品还比较少，大多是猜测性的解释，，但是到了十九世纪晚期，人们意识到这些岩石艺术的范围和多样性一直在增加。在随后二十世纪的几十年里，更多的努力放到了理解和记录澳大利亚岩画的丰富性上。

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系统地研究这门艺术是澳大利亚一门相当新的学科。在过去四十年里新的发现不断添加到这门知识体系中。最重要的数据集中在三个主要问题上。首先，澳大利亚岩石艺术处于哪个时代？第二，它的组织风格是什么样的以及有没有可能从风格中辨别出一个发展序列和模式？第三，有没有可能在利用所有可能的考古技术和对现有土著居民中博学者的了解，准确地了解这些岩石艺术所要表达的主题？

关于澳大利亚岩石艺术的时代一直在修正，早期的年代测定被提议为新发现的结果。现在，可靠的科学证据证明澳大利亚最早的岩石艺术创作大约在3万到5万年前。这本身是一个几乎不可思议的跨代，也使得澳大利亚的岩石艺术成为世界上传承最久的艺术。

尽管澳大利亚岩石艺术的非凡古迹现在已经被确立，它们的年代顺序和图案的意义却有着广泛的争论。1970年代中期以来，澳大利亚岩画艺术组织已经形成一个相当稳定的图像。为了给这幅画创造一种结构感，研究者们依赖仍然根基于本土视觉文化形式的不同——这种不同是几何元素和修饰元素的不同。最早在澳大利亚岩石艺术地区的发现的简单的几何重复图案——圆，同心圆，以及线条——组成了肖像学（人物图案）。一些简单图案在这些最古老的遗址上出现的频率使得岩石艺术研究人员采用了一种描述性的术语——Panaramitee风格——取名自澳大利亚南部沙漠Panaramitee North广袤的岩石丘，这些岩石丘表面都刻有这些图案。这些图案的特点让人们得出一个结论即它们是来自于一个久远的时代——地质变化明显发生在这些图案的设计之后，当那些土著中的信息提供者第一次被问到这个问题时，好像并不知道它们的来源。此外，这些设计被“沙漠漆”所覆盖，这种沙漠漆是岩石表面上的颜料经过数千年的暴露形成的。在Panaramitee发现的简单图案在澳大利亚境内很多岩石画中都很常见。确实，那些拥有几何形图案的遗址在塔斯马尼亚岛也发现了，这个岛在1万年前就从澳大利亚大陆分离了出去。

二十世纪七十年代，澳大利亚考古正处在蓬勃发展阶段，随之古老的岩石艺术画变得日益清晰。考古学家莱斯利•梅纳德杜撰了新词“Panaramitee 风格”，认为可以为澳大利亚岩石画确定一个顺序，在这个顺序中一种几何风格让步于简单图画风格（人物和动物的轮廓），之后是一系列的复杂象征风格，这种风格与泛澳大利亚的几何传统不一样，它们有更大的区域多样性。尽管赞同该顺序适合这些地区的考古图案，这些地区几千年来一直不断出现考古图案，然而许多作家警告说这种顺序的潜在结论——从简单图案到几何图案再到复杂和自然主义的图案，模糊了仍然非常重要的几何象征主义在澳大利亚土著的文化连续性。在这种背景下简单的几何图案可能比真实的东西更明显。对于澳大利亚土著来说简单图案也能包含复杂的含义。20世纪的艺术难道没有表明自然主义并不需要遵循某种抽象的预先设定的顺序吗？

TPO-24

## **Lake Water**

Where does the water in a lake come from, and how does water leave it? Water enters a lake from inflowing rivers, from underwater seeps and springs, from overland flow off the surrounding land, and from rain falling directly on the lake surface. Water leaves a lake via outflowing rivers, by soaking into the bed of the lake, and by evaporation. So much is obvious.

The questions become more complicated when actual volumes of water are considered: how much water enters and leaves by each route? Discovering the inputs and outputs of rivers is a matter of measuring the discharges of every inflowing and outflowing stream and river. Then exchanges with the atmosphere are calculated by finding the difference between the gains from rain, as measured (rather roughly) by rain gauges, and the losses by evaporation, measured with models that correct for the other sources of water loss. For the majority of lakes, certainly those surrounded by forests, input from overland flow is too small to have a noticeable effect. Changes in lake level not explained by river flows plus exchanges with the atmosphere must be due to the net difference between what seeps into the lake from the groundwater and what leaks into the groundwater. Note the word "net": measuring the actual amounts of groundwater seepage into the lake and out of the lake is a much more complicated matter than merely inferring their difference.

Once all this information has been gathered, it becomes possible to judge whether a lake’s flow is mainly due to its surface inputs and outputs or to its underground inputs and outputs. If the former are greater, the lake is a surface-water-dominated lake; if the latter, it is a seepage-dominated lake. Occasionally, common sense tells you which of these two possibilities applies. For example, a pond in hilly country that maintains a steady water level all through a dry summer in spite of having no streams flowing into it must obviously be seepage dominated. Conversely, a pond with a stream flowing in one end and out the other, which dries up when the stream dries up, is clearly surface water dominated.

By whatever means, a lake is constantly gaining water and losing water: its water does not just sit there, or, anyway, not for long. This raises the matter of a lake’s residence time. The residence time is the average length of time that any particular molecule of water remains in the lake, and it is calculated by dividing the volume of water in the lake by the rate at which water leaves the lake. The residence time is an average; the time spent in the lake by a given molecule (if we could follow its fate) would depend on the route it took: it might flow through as part of the fastest, most direct current, or it might circle in a backwater for an indefinitely long time.

Residence times vary enormously. They range from a few days for small lakes up to several hundred years for large ones; Lake Tahoe, in California, has a residence time of 700 years. The residence times for the Great Lakes of North America, namely, Lakes Superior, Michigan, Huron, Erie, and Ontario, are, respectively, 190,100,22,2.5, and 6 years. Lake Erie’s is the lowest: although its area is larger than Lake Ontario’s, its volume is less than one-third as great because it is so shallow-less than 20 meters on average.

A given lake’s residence time is by no means a fixed quantity. It depends on the rate at which water enters the lake, and that depends on the rainfall and the evaporation rate. Climatic change (the result of global warming?) is dramatically affecting the residence times of some lakes in northwestern Ontario, Canada. In the period 1970 to 1986, rainfall in the area decreased from 1,000 millimeters to 650 millimeters per annum, while above-average temperatures speeded up the evapotranspiration rate (the rate at which water is lost to the atmosphere through evaporation and the processes of plant life).

The result has been that the residence time of one of the lakes increased from 5 to 18 years during the study period. The slowing down of water renewal leads to a chain of further consequences; it causes dissolved chemicals to become increasingly concentrated, and this, in turn, has a marked effect on all living things in the lake.

【Paragraph 1】Where does the water in a lake come from, and how does water leave it? Water enters a lake from inflowing rivers, from underwater seeps and springs, from overland flow off the surrounding land, and from rain falling directly on the lake surface. Water leaves a lake via outflowing rivers, by soaking into the bed of the lake, and by evaporation. So much is obvious.

1.The phrase So much in the passage refers to

○the negative effects of overland flow, rain, and evaporation on river water levels

○water that a lake loses to outflowing rivers, to the lake bed, and to evaporation

○the importance of rivers to the maintenance of lake water levels

○the information given about ways that water can enter or exit a lake

【Paragraph 2】The questions become more complicated when actual volumes of water are considered: how much water enters and leaves by each route? Discovering the inputs and outputs of rivers is a matter of measuring the discharges of every inflowing and outflowing stream and river. Then exchanges with the atmosphere are calculated by finding the difference between the gains from rain, as measured (rather roughly) by rain gauges, and the losses by evaporation, measured with models that correct for the other sources of water loss. For the majority of lakes, certainly those surrounded by forests, input from overland flow is too small to have a noticeable effect. Changes in lake level not explained by river flows plus exchanges with the atmosphere must be due to the net difference between what seeps into the lake from the groundwater and what leaks into the groundwater. Note the word "net" measuring the actual amounts of groundwater seepage into the lake and out of the lake is a much more complicated matter than merely inferring their difference.

2.The word gains in the passage is closest in meaning to

○results

○increases

○resources

○savings

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3.Which of the following can be inferred from paragraph 2 about the movement of water into a lake?

○Heavy rain accounts for most of the water that enters into lakes.

○Rainfall replaces approximately the amount of water lost through evaporation.

○Overland flow into lakes is reduced by the presence of forests.

○Seepage has a smaller effect on water level than any other input.

4.Why does the author use the phrase Note the word "net" in the passage?

○To emphasize the impact of seepage on water levels

○To point out that seepage is calculated differently from river flows and atmospheric exchanges

○To compare the different methods of calculating seepage

○To emphasize the difficulty of obtaining specific values for seepage inputs and outputs

【Paragraph 3】Once all this information has been gathered, it becomes possible to judge whether a lake’s flow is mainly due to its surface inputs and outputs or to its underground inputs and outputs. If the former are greater, the lake is a surface-water-dominated lake; if the latter, it is a seepage-dominated lake. Occasionally, common sense tells you which of these two possibilities applies. For example, a pond in hilly country that maintains a steady water level all through a dry summer in spite of having no streams flowing into it must obviously be seepage dominated. Conversely, a pond with a stream flowing in one end and out the other, which dries up when the stream dries up, is clearly surface water dominated.

5.The word Conversely meaning to

○on the other hand

○in the same way

○in other words

○on average

6.According to paragraph 3, which of the following best describes a seepage-dominated lake?

○A lake that is fed by streams but still has fluctuating water levels

○A lake with a constant water level that has no streams or rivers as inputs

○A lake with a stream flowing into it and a stream flowing out of it

○A lake that has surface and underground inputs but loses water during dry seasons

【Paragraph 4】By whatever means, a lake is constantly gaining water and losing water: its water does not just sit there, or, anyway, not for long. This raises the matter of a lake’s residence time. The residence time is the average length of time that any particular molecule of water remains in the lake, and it is calculated by dividing the volume of water in the lake by the rate at which water leaves the lake. The residence time is an average; the time spent in the lake by a given molecule (if we could follow its fate) would depend on the route it took: it might flow through as part of the fastest, most direct current, or it might circle in a backwater for an indefinitely long time.

7.It can be inferred from paragraph 4 that the length of time a given molecule of water remains in a lake

○depends entirely upon the average speed of a lake' s currents

○can be measured by the volume of the lake alone

○can be greater or lesser than the residence time

○is similar to the length of time all other molecules remain in that lake

【Paragraph 5】Residence times vary enormously. They range from a few days for small lakes up to several hundred years for large ones; Lake Tahoe, in California, has a residence time of 700 years. The residence times for the Great Lakes of North America, namely, Lakes Superior, Michigan, Huron, Erie, and Ontario, are, respectively, 190,100,22,2.5, and 6 years. Lake Erie’s is the lowest: although its area is larger than Lake Ontario’s, its volume is less than one-third as great because it is so shallow-less than 20 meters on average.

8.According to paragraph 5, Lake Erie's residence time is lower than Lake Ontario's for which of the following reasons?

○Lake Erie has a larger area than Lake Ontario.

○Lake Ontario is shallower than Lake Erie.

○Lake Ontario has a greater volume than Lake Erie.

○Lake Erie receives less rainfall than Lake Ontario.

9.Why does the author discuss the Great Lakes in paragraph 5?

○To demonstrate the extent to which residence times vary from lake to lake

○To illustrate how residence times are calculated for specific lakes

○To argue that the residence time of a lake increases with area

○To emphasize that Lake Tahoe' s residence time is unusually long

【Paragraph 6】A given lake's residence time is by no means a fixed quantity. It depends on the rate at which water enters the lake, and that depends on the rainfall and the evaporation rate. Climatic change (the result of global warming?) is dramatically affecting the residence times of some lakes in northwestern Ontario. Canada. In the period 1970 to 1986, rainfall in the area decreased from 1,000 millimeters to 650 millimeters per annum, while above-average temperatures speeded up the evapotranspiration rate (the rate at which water is lost to the atmosphere through evaporation and the processes of plant life). The result has been that the residence time of one of the lakes increased from 5 to 18 years during the study period. The slowing down of water renewal leads to a chain of further consequences: it causes dissolved chemicals to become increasingly concentrated, and this, in turn, has a marked effect on all living things in the lake.

10. The word furtherin the passage is closest in meaning to

○expected

○additional

○serious

○unfortunate

11. According to paragraph 6, which of the following explains the increase in residence time of some lakes of northwestern Ontario?

○The amount of water flowing into the lakes has increased.

○The rate of evaporation has decreased more sharply than the amount of rainfall.

○The renewal of the lakes' water has slowed due to changes in climate.

○Plants have required less water from the lakes

12.According to paragraph 6, residence time is affected by all of the following EXCEPT   
○amount of rainfall

○rateofevaporation  
○temperature of surrounding air

○concentration of chemicals in lake water

【Paragraph 3】Once all this information has been gathered, it becomes possible to judge whether a lake’s flow is mainly due to its surface inputs and outputs or to its underground inputs and outputs. [■] If the former are greater, the lake is a surface-water-dominated lake; if the latter, it is a seepage-dominated lake. [■] Occasionally, common sense tells you which of these two possibilities applies. [■] For example, a pond in hilly country that maintains a steady water level all through a dry summer in spite of having no streams flowing into it must obviously be seepage dominated. Conversely, a pond with a stream flowing in one end and out the other, which dries up when the stream dries up, is clearly surface water dominated. [■]

13.Look at the four squares III that indicate where the following sentence could be added to the passage.

**Of course, a lake may be neither surface-water-nor seepage-dominated if, for example, its inputs are predominantly surface and its outputs are predominantly seepage.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage.

This question is worth 2 points.

Water enters, remains, and eventually leaves a lake in a variety of ways.

●

●

●

Answer Choices

○By measuring the water quantities at each of a lake's inputs and outputs, it can be determined whether water enters the lake mainly from surface or groundwater sources.

○Changes in lake level and volume are caused principally by the amount of evaporation of water into the atmosphere.

○It is sometimes possible to decide whether a lake is surface water dominated or seepage dominated by simple observation at different seasons.

○The average period of time that molecules of water spend in a lake—the residence time—varies from lake to lake and overtime within a particular lake.

○The residence times of surface-water-dominated lakes are usually longer than those of seepage-dominated lakes.

○The residence time of a lake frequently depends on the kinds of organisms to be found in the lake.

**参考答案:**

1.4

2.2

3.3

4.4

5.1

6. 2

7.3

8.3

9.1

10.2

11.3

12.4

13.4

14.By measuring the...

It is sometimes possible to decide...

The average period of time

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## **参考译文：湖中的水**

湖里的水从哪里来,又怎么流出的呢？湖中的水来自于河流的水,地下渗入的水和泉水，从四周地面流进来的水,还有直接降到湖面的雨水。湖中的水通过向外流的河流,渗透进河床以及蒸发离开湖泊。这些都是显而易见的。

当考虑到实际的水流量时就会变得更加复杂:水通过上述方式流进和流出的量是多少？了解河流的流进量和流出量是一件测量每一条流入和流出的河流其容量的事情。和大气的交换是通过发现雨水中得到的水(通过雨量器大致测得)和蒸发损失的水（通过准确测量其他的水损失来源的模式测得）的差别来计算的。对于大多数的湖来说,特别是那些被森林环绕的湖,地面流入的水太少了以至于几乎没有能够感觉到的影响。河水和大气水量变化不能解释湖中水平面的变化，是因为渗入湖中的地下水和渗出的地下水的净值不同。注意一下“净值”这个词:测量真正渗入和渗出湖中的地下水量比仅仅推断它们的不同要复杂的多。

一旦所有的这些信息都收集到了,那么判断一个湖的流量是由表面输入或输出决定的还是由地下水进出量决定的就变得可能了。如果主要是前者决定,那么湖泊就是一个表面水主导的湖,如果是后者,那么它就是一个渗透水主导的湖。有时候,常识会告诉你这两种可能性哪一种在起作用。比如说一个丘陵地区的池塘在整个干燥的夏天尽管没有溪水注入仍能保持稳定的水位，那么显然它是一个渗透水主导的池塘。相反,一个池塘有河流流进和流出,随河水的干枯而干枯,那么这就是一个表面水主导的池塘。

不管怎么说，湖泊是在不停地流进和流出水；它的水不会停留在湖里，或者说不会长久的停留。这个会增加湖泊的停留时间。停留时间指的是特定水分子在湖中停留的平均时间长度，是通过计算湖水流量流出湖泊的速度计算出来的。停留时间是一个平均数；湖中特定分子（如果我们可以追踪它的路线的话）花费的时间取决于它的路线：它可能是最快最直接的水流的那一部分流过，或者它可能在在逆流中无限长的时间里打圈。

停留时间变化非常的大，从小型湖的几天到大型湖泊的几百年。加利福尼亚州的塔霍湖的停留时间就长达700年。北美五大湖也就是苏必利尔湖、密歇根湖、休伦湖、伊利湖和安大略湖的停留时间分别是190年、100年、22年、2.5年和6年。伊利湖是最短的：尽管它的面积比安大略湖要大，它的容量不及后者的三分之一，因为它的平均深度还不到20米。

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给定的湖泊的停留时间绝不是一个确定的值。它取决于水流进湖的速度，而这个速度取决于降雨量和蒸发速度。气候变化(全球变暖的结果？)严重影响着加拿大安大略湖西北部一些湖泊的停留时间。在1970年到1986年间，这个地区的降雨量由每年1 000毫米降到了650毫米，而同时平均温度的上升加快了蒸散率（这个速率指的是水蒸发到大气的速率以及植物生命的过程）。结果是，在研究期间其中一个湖的停留时间从5年增加到18年。湖水的更新变慢导致了一系列后果；它使得溶解的化学物质不断变浓，这样反过来会对湖中的生物造成显著的影响。

## **Breathing During Sleep**

Of all the physiological differences in human sleep compared with wakefulness that have been discovered in the last decade, changes in respiratory control are most dramatic. Not only are there differences in the level of the functioning of respiratory systems, there are even changes in how they function. Movements of the rib cage for breathing are reduced during sleep, making the contractions of the diaphragm more important. Yet because of the physics of lying down, the stomach applies weight against the diaphragm and makes it more difficult for the diaphragm to do its job. However, there are many other changes that affect respiration when asleep.

During wakefulness, breathing is controlled by two interacting systems. The first is an automatic, metabolic system whose control is centered in the brain stem. It subconsciously adjusts breathing rate and depth in order to regulate the levels of carbon dioxide (CO2) and oxygen (O2), and the acid-base ratio in the blood. The second system is the voluntary, behavioral system. Its control center is based in the forebrain, and it regulates breathing for use in speech, singing, sighing, and so on. It is capable of ignoring or overriding the automatic, metabolic system and produces an irregular pattern of breathing.

During NREM (the phase of sleep in which there is no rapid eye movement) breathing becomes deeper and more regular, but there is also a decrease in the breathing rate, resulting in less air being exchanged overall. This occurs because during NREM sleep the automatic, metabolic system has exclusive control over breathing and the body uses less oxygen and produces less carbon dioxide. Also, during sleep the automatic metabolic system is less responsive to carbon dioxide levels and oxygen levels in the blood. Two things result from these changes in breathing control that occur during sleep. First, there may be a brief cessation or reduction of breathing when falling asleep as the sleeper waxes and wanes between sleep and wakefulness and their differing control mechanisms. Second, once sleep is fully obtained, there is an increase of carbon dioxide and a decrease of oxygen in the blood that persists during NREM.

But that is not all that changes. During all phases of sleep, several changes in the air passages have been observed. It takes twice as much effort to breathe during sleep because of greater resistance to airflow in the airways and changes in the efficiency of the muscles used for breathing. Some of the muscles that help keep the upper airway open when breathing tend to become more relaxed during sleep, especially during REM (the phase of sleep in which there is rapid eye movement). Without this muscular action, inhaling is like sucking air out of a balloon—the narrow passages tend to collapse. Also there is a regular cycle of change in resistance between the two sides of the nose. If something blocks the "good" side, such as congestion from allergies or a cold, then resistance increases dramatically. Coupled with these factors is the loss of the complex interactions among the muscles that can change the route of airflow from nose to mouth.

Other respiratory regulating mechanisms apparently cease functioning during sleep. For example, during wakefulness there is an immediate, automatic, adaptive increase in breathing effort when inhaling is made more difficult (such as breathing through a restrictive face mask). This reflexive adjustment is totally absent during NREM sleep. Only after several inadequate breaths under such conditions, resulting in the considerable elevation of carbon dioxide and reduction of oxygen in the blood, is breathing effort adjusted. Finally, the coughing reflex in reaction to irritants in the airway produces not a cough during sleep but a cessation of breathing. If the irritation is severe enough, a sleeping person will arouse, clear the airway, then resume breathing and likely return to sleep.

Additional breathing changes occur during REM sleep that are even more dramatic than the changes that occur during NREM. The amount of air exchanged is even lower in REM than NREM because, although breathing is more rapid in REM,it is also more irregular, with brief episodes of shallow breathing or absence of breathing. In addition, breathing during REM depends much more on the action of the diaphragm and much less on rib cage action.

【Paragraph 1】Of all the physiological differences in human sleep compared with wakefulness that have been discovered in the last decade, changes in respiratory control are most dramatic. Not only are there differences in the level of the functioning of respiratory systems, there are even changes in how they function. Movements of the rib cage for breathing are reduced during sleep, making the contractions of the diaphragm more important. Yet because of the physics of lying down, the stomach applies weight against the diaphragm and makes it more difficult for the diaphragm to do its job. However, there are many other changes that affect respiration when asleep.

1.According to paragraph 1, which of the following can be inferred about the diaphragm during sleep?  
○During sleep the diaphragm requires increased movement of the rib cage.

○The diaphragm helps with breathing as movements of the rib cage decrease during sleep.

○The diaphragm requires a great amount of pressure to function properly.

○The diaphragm contributes to the effective functioning of the rib cage.

【Paragraph 2】During wakefulness, breathing is controlled by two interacting systems. The first is an automatic, metabolic system whose control is centered in the brain stem. It subconsciously adjusts breathing rate and depth in order to regulate the levels of carbon dioxide (CO2) and oxygen (O2), and the acid-base ratio in the blood. The second system is the voluntary, behavioral system. Its control center is based in the forebrain, and it regulates breathing for use in speech, singing, sighing, and so on. It is capable of ignoring or overriding the automatic, metabolic system and produces an irregular pattern of breathing.

2.According to paragraph 2, all of the following are true of the voluntary breathing system EXCEPT:  
○It has its control center in the brain stem.

○It controls breathing for a number of activities during wakefulness.

○It is able to bypass the automatic system.

○It produces an irregular breathing pattern.

【Paragraph 3】During NREM (the phase of sleep in which there is no rapid eye movement) breathing becomes deeper and more regular, but there is also a decrease in the breathing rate, resulting in less air being exchanged overall. This occurs because during NREM sleep the automatic, metabolic system has exclusive control over breathing and the body uses less oxygen and produces less carbon dioxide. Also, during sleep the automatic metabolic system is less responsive to carbon dioxide levels and oxygen levels in the blood. Two things result from these changes in breathing control that occur during sleep. First, there may be a brief cessation or reduction of breathing when falling asleep as the sleeper waxes and wanes between sleep and wakefulness and their differing control mechanisms. Second, once sleep is fully obtained, there is an increase of carbon dioxide and a decrease of oxygen in the blood that persists during NREM.

3.The word exclusive in the passage is closest in meaning to  
○consistent

○perfect

○partial

○sole

4.According to paragraph 3, which of the following may occur just before NREM sleep begins?  
○The automatic, metabolic system may increase its dependence on air exchanges.

○Breathing can stop for a short time as a person falls asleep.

○An increase in the oxygen level in the blood can occur as sleep becomes fully obtained.

○The level of carbon dioxide in the blood may drop suddenly.

【Paragraph 4】But that is not all that changes. During all phases of sleep, several changes in the air passages have been observed. It takes twice as much effort to breathe during sleep because of greater resistance to airflow in the airways and changes in the efficiency of the muscles used for breathing. Some of the muscles that help keep the upper airway open when breathing tend to become more relaxed during sleep, especially during REM (the phase of sleep in which there is rapid eye movement). Without this muscular action, inhaling is like sucking air out of a balloon—the narrow passages tend to collapse. Also there is a regular cycle of change in resistance between the two sides of the nose. If something blocks the "good" side, such as congestion from allergies or a cold, then resistance increases dramatically. Coupled with these factors is the loss of the complex interactions among the muscles that can change the route of airflow from nose to mouth.

5.What is the author's purpose in stating that inhaling is like sucking air out of a balloon?  
○To refute the argument that additional effort is necessary for breathing during sleep

○To argue that REM sleep is more important than NREM sleep

○To illustrate the difficulty of breathing during sleep

○To illustrate how blockage of narrow passages can be prevented during sleep

6.All of the following are mentioned in paragraph 4 as being characteristic of breathing during sleep EXCEPT  
○relaxation of the muscles involved in the respiratory system

○changes in resistance between the two sides of the nose

○easier airflow in the passages of the upper airway

○absence of certain complex muscle interactions

【Paragraph 5】Other respiratory regulating mechanisms apparently cease functioning during sleep. For example, during wakefulness there is an immediate, automatic, adaptive increase in breathing effort when inhaling is made more difficult (such as breathing through a restrictive face mask). This reflexive adjustment is totally absent during NREM sleep. Only after several inadequate breaths under such conditions, resulting in the considerable elevation of carbon dioxide and reduction of oxygen in the blood, is breathing effort adjusted. Finally, the coughing reflex in reaction to irritants in the airway produces not a cough during sleep but a cessation of breathing. If the irritation is severe enough, a sleeping person will arouse, clear the airway, then resume breathing and likely return to sleep.

7.According to paragraph 5, what happens during NREM sleep when inhaling is difficult?  
○There is an immediate, automatic, adaptive increase in breathing effort.

○The sleeping person takes several inadequate breaths before the breathing effort is adjusted.

○The coughing reflex causes the breathing effort to adjust.

○The airways become cleared as the blood removes irritants.

8.It can be inferred from paragraph 5 that a very mild irritation during sleep will likely cause the sleeping person to

○increase the breathing effort

○wake up and remove the source of irritation

○cough while still sleeping

○stop breathing temporarily while still sleeping

9.The word considerable is closest in meaning to

○significant

○Steady

○Usual

○necessary

10.The word resume in the passage is closest in meaning to

○reduce

○stop

○Readjust

○restart

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【Paragraph 6】Additional breathing changes occur during REM sleep that are even more dramatic than the changes that occur during NREM. The amount of air exchanged is even lower in REM than NREM because, although breathing is more rapid in REM, it is also more irregular, with brief episodes of shallow breathing or absence of breathing. In addition, breathing during REM depends much more on the action of the diaphragm and much less on rib cage action.

11.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Because breathing is more shallow and irregular in REM than in NREM, less air is exchanged in REM.

○Breathing in NREM is less effective than breathing in REM because of irregular episodes of rapid breathing during NREM.

○Because breathing is more rapid in NREM sleep than in REM sleep, breathing often becomes shallow.

○Although REM has brief episodes of shallow breathing or lack of breathing, breathing is more rapid than in NREM.

【Paragraph 1】Of all the physiological differences in human sleep compared with wakefulness that have been discovered in the last decade, changes in respiratory control are most dramatic. Not only are there differences in the level of the functioning of respiratory systems, there are even changes in how they function. Movements of the rib cage for breathing are reduced during sleep, making the contractions of the diaphragm more important. [■] Yet because of the physics of lying down, the stomach applies weight against the diaphragm and makes it more difficult for the diaphragm to do its job. [■] However, there are many other changes that affect respiration when asleep.

【Paragraph 2】[■] During wakefulness, breathing is controlled by two interacting systems. [■]The first is an automatic, metabolic system whose control is centered in the brain stem. It subconsciously adjusts breathing rate and depth in order to regulate the levels of carbon dioxide (CO2) and oxygen (O2), and the acid-base ratio in the blood. The second system is the voluntary, behavioral system. Its control center is based in the forebrain, and it regulates breathing for use in speech, singing, sighing, and so on. It is capable of ignoring or overriding the automatic, metabolic system and produces an irregular pattern of breathing.

12.. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**To better understand breathing during sleep, it is, however, helpful to first understand how respiration works in general.**

Where would the sentence best fit? Click on a square to add the sentence to the passage

13.【Directions】From the seven statements below, select the statements that correctly characterize breathing during wakefulness and those statements that correctly characterize breathing during sleep. Drag each answer choice you select into the appropriate box of the table. Two of the answer choices will NOT be used. **This question is worth 3 points.**

|  |  |
| --- | --- |
| Wakefulness | Sleep |
|  |  |

Answer Choices

○The role of the rib cage increases and the role of the diaphragm decreases.

○Carbon dioxide in blood rises and oxygen drops.

○The coughing reflex is extremely complex.

○A great deal of effort is used for breathing.

○Upper airways are resistant to colds and allergies.

○There is a drop in the volume of air that is exchanged.

○Automatic and voluntary respiratory systems are both involved.

**参考答案:**

**1.**2

2.1

3.4

4.2

5.3

6.3

7.2

8.4

9.1

10.4

11.1

12.3

13-14.

W:

The role of the ...

Automatic and voluntary...

S:

Carbon dioxide in...

A great deal of ...

There is a drop in ...

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## **参考译文：睡眠中的呼吸**

关于人类睡觉和清醒时生理状态的差异在过去的十年里已被发现，在所有的这些差异中，呼吸系统控制方面的变化尤其引人注目。不仅是呼吸系统运作水平有差异，在如何运作方面也出现了变化。胸腔所做的呼吸运动在睡觉时会减少，使得横膈膜的收缩变得更为重要。然而由于躺下来的物理作用，胃部压迫横膈膜使得横膈膜难以工作。不管怎样，睡眠时还有很多其他的变化影响着呼吸。

清醒的时候，呼吸受到两个互相影响的系统的控制。第一个是自动的新陈代谢系统，它的控制中心在脑干。它会潜意识的调整呼吸频率和深度来控制二氧化碳和氧气的浓度以及血液中的酸碱比。第二套系统是自发行为系统。它的控制中心在前脑，调节说话、唱歌、叹息等行为时的呼吸。它能忽略或无视自动新陈代谢系统并且产生无规律的呼吸模式。

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在NMER（睡觉时没有快速眼部活动的阶段）这个阶段中，呼吸会变得更深更有规律，但是呼吸频率会降低，导致总体空气交换减少。发生这个是因为在NREM睡眠阶段中，自动的新陈代谢系统会独自控制呼吸，身体会利用更少的氧气产生更少的二氧化碳。同时，自动的新陈代谢系统对血液中二氧化碳和氧气的含量反应并不灵敏。在睡眠中呼吸控制的变化会导致两个结果。第一，睡着时呼吸可能会有短暂的停止或减少，因为睡眠者在睡眠和清醒之间徘徊，而这两种状态的控制系统不一样。第二，一旦得到了充足的睡眠，血液中二氧化碳含量升高而氧气含量降低，在NREM阶段也会持续这样。

但这并不是全部的变化。在睡眠的所有阶段中，气道的一些变化已经被观察到了。睡眠时需要付出两倍的努力去呼吸，因为呼吸道气流的阻力会比较强并且用来呼吸的肌肉的效率会有变化。一些在呼吸时帮助保持上呼吸道通畅的肌肉在睡觉的时候会变得松弛，特别是在REM阶段（就是有快速眼部运动的睡眠阶段）。没有这种肌肉运动，呼吸空气就像从气球里吸气一样，狭窄的通道会面临崩溃。而且鼻子两侧的阻力也会周期性改变。如果有时候堵塞了“好”的一边，比如过敏和感冒引起的堵塞，阻力就会大大增加。与这些因素一起的是那些能够改变从鼻子到嘴巴的气流路径的肌肉之间失去了复杂的交互。

其他呼吸调节机制在睡眠时显然要停止运作。比如说，在清醒时如果呼吸变得困难的话就会有一个立即自动适应性的呼吸增强（比如戴上面具呼吸）。但在NREM状态时完全不存在这样反射性的调节。在这种情况下，只有几次不充分的呼吸后使得血液中二氧化碳的含量显著提升以及氧气的含量降低，呼吸才会被调整过来。最后，咳嗽反应在应对呼吸道中刺激物时产生的不是睡觉时咳嗽而是呼吸停止。如果刺激物足够严重，睡着的人会醒来清理气道，然后继续呼吸很可能再度入睡。

发生在REM时期的多余的呼吸变化比发生在NREM时期的呼吸变化更显著。REM的空气交换量要比NREM低，因为尽管REM中呼吸更加急促，但也更加没有规律，包括一些简短的浅呼吸或呼吸暂停。另外，REM时期的呼吸更多取决于横膈膜而不是胸腔的作用。

## **Moving into Pueblos**

In the Mesa Verde area of the ancient North American Southwest, living patterns changed in the thirteenth century, with large numbers of people moving into large communal dwellings called pueblos, often constructed at the edges of canyons, especially on the sides of cliffs. Abandoning small extended-family households to move into these large pueblos with dozens if not hundreds of other people was probably traumatic. Few of the cultural traditions and rules that today allow us to deal with dense populations existed for these people accustomed to household autonomy and the ability to move around the landscape almost at will. And besides the awkwardness of having to share walls with neighbors, living in aggregated pueblos introduced other problems. For people in cliff dwellings, hauling water, wood, and food to their homes was a major chore. The stress on local resources, especially in the firewood needed for daily cooking and warmth, was particularly intense, and conditions in aggregated pueblos were not very hygienic.

Given all the disadvantages of living in aggregated towns, why did people in the thirteenth century move into these closely packed quarters? For transitions of such suddenness, archaeologists consider either pull factors (benefits that drew families together) or push factors (some external threat or crisis that forced people to aggregate). In this case, push explanations dominate.

Population growth is considered a particularly influential push. After several generations of population growth, people packed the landscape in densities so high that communal pueblos may have been a necessary outcome. Around Sand Canyon, for example, populations grew from 5 -12 people per square kilometer in the tenth century to as many as 30 - 50 by the 1200s. As densities increased, domestic architecture became larger, culminating in crowded pueblos. Some scholars expand on this idea by emphasizing a corresponding need for arable land to feed growing numbers of people: construction of small dams, reservoirs, terraces, and field houses indicates that farmers were intensifying their efforts during the 1200s. Competition for good farmland may also have prompted people to bond together to assert rights over the best fields.

Another important push was the onset of the Little Ice Age, a climatic phenomenon that led to cooler temperatures in the Northern Hemisphere. Although the height of the Little Ice Age was still around the corner, some evidence suggests that temperatures were falling during the thirteenth century. The environmental changes associated with this transition are not fully understood, but people living closest to the San Juan Mountains, to the northeast of Mesa Verde, were affected first. Growing food at these elevations is always difficult because of the short growing season. As the Little Ice Age progressed, farmers probably moved their fields to lower elevations, infringing on the lands of other farmers and pushing people together, thus contributing to the aggregations. Archaeologists identify a corresponding shift in populations toward the south and west toward Mesa Verde and away from higher elevations.

In the face of all these pushes, people in the Mesa Verde area had yet another reason to move into communal villages: the need for greater cooperation. Sharing and cooperation were almost certainly part of early Puebloan life, even for people living in largely independent single-household residences scattered across the landscape. Archaeologists find that even the most isolated residences during the eleventh and twelfth centuries obtained some pottery, and probably food, from some distance away, while major ceremonial events were opportunities for sharing food and crafts. Scholars believe that this cooperation allowed people to contend with a patchy environment in which precipitation and other resources varied across the landscape: if you produce a lot of food one year, you might trade it for pottery made by a distant ally who is having difficulty with crops—and the next year, the flow of goods might go in the opposite direction. But all of this appears to have changed thirteenth century. Although the climate remained as unpredictable as ever between one year and the next, it became much less locally diverse. In a bad year for farming, everyone was equally affected. No longer was it helpful to share widely. Instead, the most sensible thing would be for neighbors to combine efforts to produce as much food as possible, and thus aggregated towns were a sensible arrangement.

【Paragraph 1】In the Mesa Verde area of the ancient North American Southwest, living patterns changed in the thirteenth century, with large numbers of people moving into large communal dwellings called pueblos, often constructed at the edges of canyons, especially on the sides of cliffs. Abandoning small extended-family households to move into these large pueblos with dozens if not hundreds of other people was probably traumatic. Few of the cultural traditions and rules that today allow us to deal with dense populations existed for these people accustomed to household autonomy and the ability to move around the landscape almost at will. And besides the awkwardness of having to share walls with neighbors, living in aggregated pueblos introduced other problems. For people in cliff dwellings, hauling water, wood, and food to their homes was a major chore. The stress on local resources, especially in the firewood needed for daily cooking and warmth, was particularly intense, and conditions in aggregated pueblos were not very hygienic.

1.The word traumatic meaning to

○Essential

○highly stressful

○highly unusual

○unwise

2.The word intense in the passage is closest in meaning to

○strong

○questionable

○obvious

○deliberate

3.According to paragraph 1, before the thirteenth century the people of southwestern North America lived in households that

○shared daily chores with neighboring households

○occupied dwellings that were built into the sides of cliffs

○were largely free to conduct their lives as they pleased

○enforced common standards of behavior and cooperative conduct within their communities

4.Which of the following best indicates the organization of paragraph 1?

○It presents the conditions that caused a change in a population' s living patterns and then explains why those conditions got worse.

○It identifies certain present-day cultural traditions and rules and then traces them to their roots in the thirteenth century.

○It casts doubt on one explanation of the move to pueblos and then introduces an alternative explanation that the passage will defend.

○It describes a major change in a population' s living patterns and then presents a number of problems that resulted from that change.

【Paragraph 3】Population growth is considered a particularly influential push. After several generations of population growth, people packed the landscape in densities so high that communal pueblos may have been a necessary outcome. Around Sand Canyon, for example, populations grew from 5 -12 people per square kilometer in the tenth century to as many as 30 - 50 by the 1200s. As densities increased, domestic architecture became larger, culminating in crowded pueblos. Some scholars expand on this idea by emphasizing a corresponding need for arable land to feed growing numbers of people: construction of small dams, reservoirs, terraces, and field houses indicates that farmers were intensifying their efforts during the 1200s. Competition for good farmland may also have prompted people to bond together to assert rights over the best fields.

5. According to paragraph 3, which of the following was one of the consequences of increasing population densities?

○People were increasingly crowded into collections of large housing units.

○People stopped planting crops that have relatively low yields.

○Domestic buildings were pushed beyond the canyon limits.

○The natural landscape was destroyed.

6.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage?Incorrect choices change the meaning in important ways or leave out essential information.

○Some scholars even claim that the intensification of farmers' various efforts during the 1200s led to further population growth and the consequent need for more arable land.

○Evidence of intensifying agriculture in the 1200s indicates a need to feed a larger population and so extends the argument that a growing population was the cause of the move to pueblos.

○During the 1200s, farmers met the demand for more arable land, but they also succeeded in cultivating existing land more intensively with the help of agricultural construction projects.

○Some scholars feel strongly that the construction of small dams, reservoirs, terraces, and field houses in the thirteenth century is independent evidence for growth in the number of people.

【Paragraph 4】Another important push was the onset of the Little Ice Age, a climatic phenomenon that led to cooler temperatures in the Northern Hemisphere. Although the height of the Little Ice Age was still around the corner, some evidence suggests that temperatures were falling during the thirteenth century. The environmental changes associated with this transition are not fully understood, but people living closest to the San Juan Mountains, to the northeast of Mesa Verde, were affected first. Growing food at these elevations is always difficult because of the short growing season. As the Little Ice Age progressed, farmers probably moved their fields to lower elevations, infringing on the lands of other farmers and pushing people together, thus contributing to the aggregations. Archaeologists identify a corresponding shift in populations toward the south and west toward Mesa Verde and away from higher elevations.

7.The word transition in the passage is closest in meaning to

○change

○climate

○decline

○problem

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8.Why does the author state that "Growing food at these elevations is always difficult because of the short growing season"?

○To explain why the higher elevations were always relatively sparsely populated

○To suggest that any worsening of conditions would have significant consequences

○To emphasize how resourceful the people growing food at these elevations were

○To argue that farming was not the primary source of food at high elevations

9.According to paragraph 4, what did farmers do in response to falling temperatures during the Little Ice Age?  
○Moved to areas away from Mesa Verde

○Moved closer to the northeastern part of Mesa Verde

○Began to cultivate crops adapted to a short growing season

○Gave up the cultivation of the highest-lying lands

【Paragraph 5】In the face of all these pushes, people in the Mesa Verde area had yet another reason to move into communal villages: the need for greater cooperation. Sharing and cooperation were almost certainly part of early Puebloan life, even for people living in largely independent single-household residences scattered across the landscape. Archaeologists find that even the most isolated residences during the eleventh and twelfth centuries obtained some pottery, and probably food, from some distance away, while major ceremonial events were opportunities for sharing food and crafts. Scholars believe that this cooperation allowed people to contend with a patchy environment in which precipitation and other resources varied across the landscape: if you produce a lot of food one year, you might trade it for pottery made by a distant ally who is having difficulty with crops—and the next year, the flow of goods might go in the opposite direction. But all of this appears to have changed thirteenth century. Although the climate remained as unpredictable as ever between one year and the next, it became much less locally diverse. In a bad year for farming, everyone was equally affected. No longer was it helpful to share widely. Instead, the most sensible thing would be for neighbors to combine efforts to produce as much food as possible, and thus aggregated towns were a sensible arrangement.

10.Accordingtoparagraph 5, major ceremonial events were occasions for  
○leaders to persuade people from the countryside to move into a pueblo

○farmers to collect information about where crops could be reliably grown

○people to develop better techniques for producing pottery and crafts

○people in the early Puebloan era to share farm and craft products

11.According to paragraph 5, which of the following was a reason people in the Mesa Verde area formed communal villages in the thirteenth century?

○The climate in the Mesa Verde area became more locally diverse.

○Individuals were no longer interested in exchanging pottery and food.

○Cooperation between people became more important for survival.

○Bad years of farming began to occur more frequently.

12.Paragraph 5 supports which of the following statements about cooperation among the people in the Mesa Verde area from the eleventh through the thirteenth century?

○Cooperation allowed many households to give up farming and to specialize in making pottery and crafts.

○People went from exchanging food and crafts they individually produced to sharing in a cooperative effort to produce as much food as possible.

○Overtime there was less cooperation as farmers competed with each other for trade with distant areas.

Individuals stopped cooperating with each other because they did not have enough food for themselves.

【Paragraph 1】In the Mesa Verde area of the ancient North American Southwest, living patterns changed in the thirteenth century, with large numbers of people moving into large communal dwellings called pueblos, often constructed at the edges of canyons, especially on the sides of cliffs. Abandoning small extended-family households to move into these large pueblos with dozens if not hundreds of other people was probably traumatic. Few of the cultural traditions and rules that today allow us to deal with dense populations existed for these people accustomed to household autonomy and the ability to move around the landscape almost at will. [■] And besides the awkwardness of having to share walls with neighbors, living in aggregated pueblos introduced other problems. [■] For people in cliff dwellings, hauling water, wood, and food to their homes was a major chore. [■] The stress on local resources, especially in the firewood needed for daily cooking and warmth, was particularly intense, and conditions in aggregated pueblos were not very hygienic. [■]

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Performing everyday household tasks required more effort.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage.This question is worth 2 points.

In the thirteenth century, the people in the Mesa Verde area went from living in scattered independent households to living in large pueblos.

●

●

●

Answer Choices

○Because the thirteenth-century inhabitants of the Mesa Verde area did not have the cultural expectations of today's city dwellers, they easily adapted to communal life.

○Even though living in pueblos had disadvantages, the population of the area had grown so large that there may have been no other arrangement that would have met its needs.

○From the eleventh century onward, farmers began to increase food production on existing farmland and started bringing more land under cultivation.

○A development that contributed to increasing population densities was a cooling climate that led many people to leave the coldest areas and crowd into climatically more favorable areas.

○The primary reason for moving to pueblos was the social benefits associated with communal life.

○People were brought together by the need to produce food cooperatively, as the use of food surpluses in one place to relieve shortages in another ended due to a change in climate.

**参考答案:**

**1.**2

2.1

3.3

4.4

5.1

6.2

7.1

8.2

9.4

10.4

11.3

12.2

13.2

14.even though living…

A development that...

People were brought...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：迁入普韦布洛**

在古代北美西南部的梅萨维德地区，生活模式在十三世纪发生了变化，大量人群移居大型公社居住地，这种地方被称为普韦布洛，通常建造在峡谷边缘，尤其是在悬崖边。这些住户放弃小的扩展型家庭，进入到没有上百也有几十人的大的普韦布洛地区可能会感到不舒服。现在帮助我们处理密集人口的文化传统与规则几乎不存在于这些习惯了家庭自治和有能力随意搬迁的人。除了必须和邻居共用墙壁的尴尬外，住在人口聚集的普韦布洛地区产生了其他的问题。对于那些住在悬崖上的人，拉水、木头和食物到家里是主要的家务。本地资源的压力尤其是用于日常做饭和取暖的柴火特别紧张，在人口聚集的普韦布洛的环境也不是很卫生。

考虑到住在人口密集地区的种种不利条件，为什么人们会在十三世纪搬进这一如此密集的地区呢？对于这些突然的转变，考古学家考虑到了拉力因素（吸引家庭聚在一起的好处）和推力因素（迫使人们聚在一起的外部威胁或危机）。在这种情况下，推力的解释更加占上风。

人口增长被认为是一个特别有影响力的推力。在经历几代的人口增长之后，人们使得这一地区的人口密度达到了如此高的程度以至于普韦布洛社区成为一个必需的结果。比如在砂峡谷，十世纪时每平方公里5到12人，到十三世纪时增加到了每平方公里30到50人。随着人口密度的增加，民房建筑变得更大，在拥挤的普韦布洛地区达到顶峰。一些学者通过强调养活越来越多的人口需要相应的耕地扩展了这一看法：小型水坝、水库、梯田以及房屋的建设表明十三世纪的农民一直在加紧努力。对于良田的竞争也会促使人们团结起来争取最好土地的权利。

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另外一个推动力量是小冰河时代的到来，这种气候现象导致了北半球气温的降低。尽快尚未到达小冰河时代的巅峰时期，一些证据仍表明十三世纪当时温度正在降低。与这种转变相关的环境变化并未受到充分认识，但是住在圣胡安山脉和普韦布洛地区的人们首先受到了影响。由于生长季节短，在这些海拔种植食物总是很困难。随着小冰河时代的到来，农民们可能将他们的耕地迁到更低的海拔地区去，侵入其他农民的土地并使人口聚集在一起，因而促进了群居。考古学家确认了向梅萨维德地区南部和西部并逃离更高海拔造成的人口变化。

在所有这些推动力面前，梅萨维德地区的人们还有另外一个搬进公共村庄的理由：对更多合作的需求。分享和合作几乎可以肯定是早期普韦布洛人生活的一部分，即使是那些分散在这一地区独立性比较强的单一家庭住宅也是这样。考古学家发现在十一世纪和十二世纪期间，即使是最与世隔绝的居民也能从很远的地方获得陶器，可能还有食物，而重大的宗教活动为这种分享食物和手工艺品提供了机会。学者们相信这种合作让人们在这种拼凑的但不断变化的环境中能相互竞争：如果在某一年，你收获了很多粮食作物，你可能会与远方一个不太容易获得农作物的盟友交换陶器，下一年货物可能会流向相反的方向。但是所有这一切似乎已经改变了十三世纪。尽管气候在一到两年间仍无法预测，但是在局部不会有太大变化。在收成差的年份里，每个人都会受影响。广泛共享已经不再有益了。取而代之，最明智的是一个地区的人们齐心协力生产尽可能多的食物，这样人口聚集的城市就是一个合理的安排。

TPO-25

## **The Surface of Mars**

The surface of Mars shows a wide range of geologic features, including huge volcanoes-the largest known in the solar system-and extensive impact cratering. Three very large volcanoes are found on the Tharsis bulge, an enormous geologic area near Mars’s equator. Northwest of Tharsis is the largest volcano of all: Olympus Mons, with a height of 25 kilometers and measuring some 700 kilometers in diameter at its base. The three large volcanoes on the Tharsis bulge are a little smaller-a “mere”18 kilometers high.

None of these volcanoes was formed as a result of collisions between plates of the Martian crust-there is no plate motion on Mars. Instead, they are shield volcanoes — volcanoes with broad, sloping slides formed by molten rock. All four show distinctive lava channels and other flow features similar to those found on shield volcanoes on Earth. Images of the Martian surface reveal many hundreds of volcanoes. Most of the largest volcanoes are associated with the Tharsis bulge, but many smaller ones are found in the northern plains.

The great height of Martian volcanoes is a direct consequence of the planet’s low surface gravity. As lava flows and spreads to form a shield volcano, the volcano’s eventual height depends on the new mountain’s ability to support its own weight. The lower the gravity, the lesser the weight and the greater the height of the mountain. It is no accident that Maxwell Mons on Venus and the Hawaiian shield volcanoes on Earth rise to about the same height (about 10 kilometers) above their respective bases-Earth and Venus have similar surface gravity. Mars’s surface gravity is only 40 percent that of Earth, so volcanoes rise roughly2.5 times as high. Are the Martian shield volcanoes still active? Scientists have no direct evidence for recent or ongoing eruptions, but if these volcanoes were active as recently as 100 million years ago (an estimate of the time of last eruption based on the extent of impact cratering on their slopes), some of them may still be at least intermittently active. Millions of years, though, may pass between eruptions.

Another prominent feature of Mars’s surface is cratering. The Mariner spacecraft found that the surface of Mars, as well as that of its two moons, is pitted with impact craters formed by meteoroids falling in from space. As on our Moon, the smaller craters are often filled with surface matter-mostly dust-confirming that Mars is a dry desert world. However, Martian craters get filled in considerably faster than their lunar counterparts. On the Moon, ancient craters less than 100 meters across (corresponding to depths of about 20 meters) have been obliterated, primarily by meteoritic erosion. On Mars, there are relatively few craters less than 5 kilometers in diameter. The Martian atmosphere is an efficient erosive agent, with Martian winds transporting dust from place to place and erasing surface features much faster than meteoritic impacts alone can obliterate them.

As on the Moon, the extent of large impact cratering (i.e. craters too big to have been filled in by erosion since they were formed) serves as an age indicator for the Martian surface. Age estimates ranging from four billion years for Mars’s southern highlands to a few hundred million years in the youngest volcanic areas were obtained in this way.

The detailed appearance of Martian impact craters provides an important piece of information about conditions just below the planet’s surface. Martian craters are surrounded by ejecta (debris formed as a result of an impact) that looks quite different from its lunar counterparts. A comparison of the Copernicus crater on the Moon with the (fairly typical) crater Yuty on Mars demonstrates the differences. The ejecta surrounding the lunar crater is just what one would expect from an explosion ejecting a large volume of dust, soil, and boulders. However, the ejecta on Mars gives the distinct impression of a liquid that has splashed or flowed out of crater. Geologists think that this fluidized ejecta crater indicates that a layer of permafrost, or water ice, lies just a few meters under the surface. Explosive impacts heated and liquefied the ice, resulting in the fluid appearance of the ejecta.

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| --- |
| 【Paragraph 1】The surface of Mars shows a wide range of geologic features, including huge volcanoes-the largest known in the solar system-and extensive impact cratering. Three very large volcanoes are found on the Tharsis bulge, an enormous geologic area near Mars’s equator. Northwest of Tharsis is the largest volcano of all: Olympus Mons, with a height of 25 kilometers and measuring some 700 kilometers in diameter at its base. The three large volcanoes on the Tharsis bulge are a little smaller-a “mere”18 kilometers high.  1. The word “enormous”in the passage is closest in meaning to  ○ Important  ○ Extremely large  ○ Highly unusual  ○ Active  2. According to paragraph 1, Olympus Mons differs from volcanoes on the Tharsis bulge in that Olympus Mons  ○ Has more complex geologic features  ○ Shows less impact cratering  ○ Is taller  ○ Was formed at a later time |

|  |
| --- |
| 【Paragraph 2】None of these volcanoes was formed as a result of collisions between plates of the Martian crust-there is no plate motion on Mars. Instead, they are shield volcanoes-volcanoes with broad, sloping slides formed by molten rock. All four show distinctive lava channels and other flow features similar to those found on shield volcanoes on Earth. Images of the Martian surface reveal many hundreds of volcanoes. Most of the largest volcanoes are associated with the Tharsis bulge, but many smaller ones are found in the northern plains.  3. The word “distinctive”in the passage is closest in meaning to  ○ Deep  ○Complex  ○ Characteristic  ○ Ancient  You enjoy the convenience of having all vocabulary questions listed as a separate part in*《新托福TPO阅读词汇速查速记》.*Wechat: geeqi0805  4. According to paragraphs 1 and 2, which of the following is NOT true of the shield volcanoes on the Tharsis bulge?  ○ They have broad, sloping sides.  ○ They are smaller than the largest volcano on Mars.  ○ They have channels that resemble the lava channels of volcanoes on Earth.  ○ They are over 25 kilometers tall. |

【Paragraph 3】The great height of Martian volcanoes is a direct consequence of the planet’s low surface gravity. As lava flows and spreads to form a shield volcano, the volcano’s eventual height depends on the new mountain’s ability to support its own weight. The lower the gravity, the lesser the weight and the greater the height of the mountain. It is no accident that Maxwell Mons on Venus and the Hawaiian shield volcanoes on Earth rise to about the same height (about 10 kilometers) above their respective bases-Earth and Venus have similar surface gravity. Mars’s surface gravity is only 40 percent that of Earth, so volcanoes rise roughly 2.5 times as high. Are the Martian shield volcanoes still active? Scientists have no direct evidence for recent or ongoing eruptions, but if these volcanoes were active as recently as 100 million years ago (an estimate of the time of last eruption based on the extent of impact cratering on their slopes), some of them may still be at least intermittently active. Millions of years, though, may pass between eruptions.

|  |
| --- |
| 5. The word “roughly”in the passage is closest in meaning to  ○ Typically  ○ Frequently  ○ Actually  ○Approximately |

6. In paragraph 3, why does the author compare Maxwell Mons on Venus to the Hawaiian shield volcanoes on Earth?

○ To help explain the relationship between surface gravity and volcano height

○ To explain why Mars’s surface gravity is only 40 percent of Earth’s

○ To point out differences between the surface gravity of Earth and the surface gravity of Venus

○ To argue that there are more similarities than differences between volcanoes on different planets

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Although direct evidence of recent eruptions is lacking, scientists believe that these volcanoes were active as recently as 100 million years ago.

○ Scientists estimate that volcanoes active more recently than 100 years ago will still have extensive impact cratering on their slopes.

○ If, as some evidence suggests, these volcanoes erupted as recently as 100 million years ago, they may continue to be intermittently active.

○ Although these volcanoes were active as recently as 100 million years ago, there is no direct evidence of recent or ongoing eruptions.

【Paragraph 4】Another prominent feature of Mars’s surface is cratering. The Mariner spacecraft found that the surface of Mars, as well as that of its two moons, is pitted with impact craters formed by meteoroids falling in from space. As on our Moon, the smaller craters are often filled with surface matter-mostly dust-confirming that Mars is a dry desert world. However, Martian craters get filled in considerably faster than their lunar counterparts. On the Moon, ancient craters less than 100 meters across (corresponding to depths of about 20 meters) have been obliterated, primarily by meteoritic erosion. On Mars, there are relatively few craters less than 5 kilometers in diameter. The Martian atmosphere is an efficient erosive agent, with Martian winds transporting dust from place to place and erasing surface features much faster than meteoritic impacts alone can obliterate them.

8. The word “considerably”in the passage is closest in meaning to

○ Frequently

○ Significantly

○ Clearly

○ Surprisingly

9. According to paragraph 4, what is demonstrated by the fact that craters fill in much faster on Mars than on the Moon?

○ Erosion from meteoritic impacts takes place more quickly on Mars than on the Moon.

○ There is more dust on Mars than on the Moon.

○ The surface of Mars is a dry desert.

○ Wind is a powerful eroding force on Mars.

10. In paragraph 4, why does the author point out that Mars has few ancient craters that are less than 5 kilometers in diameter?

○ To explain why scientists believe that the surface matter filling Martian craters is mostly dust

○ To explain why scientists believe that the impact craters on Mars were created by meteoroids

○ To support the claim that the Martian atmosphere is an efficient erosive agent

○ To argue that Mars experienced fewer ancient impacts than the Moon did

【Paragraph 5】As on the Moon, the extent of large impact cratering (i.e. craters too big to have been filled in by erosion since they were formed) serves as an age indicator for the Martian surface. Age estimates ranging from four billion years for Mars’s southern highlands to a few hundred million years in the youngest volcanic areas were obtained in this way.

11. According to paragraph 5, what have scientists been able to determine from studies of large impact cratering on Mars?

○ Some Martian volcanoes are much older than was once thought.

○ The age of Mars’s surface can vary from area to area.

○ Large impact craters are not reliable indicators of age in areas with high volcanic activity.

○ Some areas of the Martian surface appear to be older than they actually are.

The detailed appearance of Martian impact craters provides an important piece of information about conditions just below the planet’s surface. Martian craters are surrounded by ejecta (debris formed as a result of an impact) that looks quite different from its lunar counterparts. A comparison of the Copernicus crater on the Moon with the (fairly typical) crater Yuty on Mars demonstrates the differences. The ejecta surrounding the lunar crater is just what one would expect from an explosion ejecting a large volume of dust, soil, and boulders. ■However, the ejecta on Mars gives the distinct impression of a liquid that has splashed or flowed out of crater. ■Geologists think that this fluidized ejecta crater indicates that a layer of permafrost, or water ice, lies just a few meters under the surface. ■Explosive impacts heated and liquefied the ice, resulting in the fluid appearance of the ejecta. ■

12. According to paragraph 6, the ejecta of Mars’s crater Yuty differs from the ejecta of the Moon’s Copernicus crater in that the ejecta of the Yuty crater

○ Has now become part of a permafrost layer

○ Contains a large volume of dust, soil and boulders

○ Suggests that liquid once came out of the surface at the crater site

○ Was thrown a comparatively long distance from the center of the crater

13. Look at the four squares【■】that indicate where the following sentence could be added to the passage.

**This surface feature has led to speculation about what may lie under Mars’s surface.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Drag your answer choices to the spaces where they belong. To remove an answer choice, click on it. To review the passage, click VIEW NEXT.

**Volcanoes and impact craters are major features of Martian geology.**

●

●

●

Answer Choices

○ Plate motion on Mars, once considered to have played no role in shaping the planet’s surface, is now seen as being directly associated with the planet’s earliest volcanoes.

○ Mars has shield volcanoes, some of which are extremely tall because of the planet’s low surface gravity.

○ Although the erosive power of the Martian atmosphere ensures that Mars has fewer craters than the Moon does, impact craters are prominent on Mars’s surface.

○ Scientists cannot yet reliably estimate the age of the Martian surface because there has been too much erosion of it.

○ Scientists have been surprised to discover that conditions just below the surface of Mars are very similar to conditions just below the surface of the Moon

○ Studies of crater ejecta have revealed the possibility of a layer of permafrost below the surface of Mars.

**参考答案：**

1. 2

2. 3

3. 3

4. 4

5. 4

6. 1

7. 3

8. 2

9. 4

10. 3

11. 2

12. 3

13. 2

14. Mars has shield volcanoes, ...

Although the erosive power...

Studies of crater ejecta have...

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：火星表面**

火星表面展示了很多种地理特征，包括巨大的火山——太阳系中已知的最大火山——以及覆盖范围很广的陨石坑。在塔尔西斯隆起——火星赤道附近的广阔地质区域——发现了三座非常大的火山。位于塔尔西斯西北的奥林帕斯山是其中最大的一座火山：25千米高，测得其基部直径大约有700千米。位于塔尔西斯隆起的三座大火山则略矮，高度“仅”达18千米。

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这些火山都不是因火星表面的板块碰撞而形成的——火星上并无板块运动。这些火山其实是盾状火山——一种由熔岩形成的斜面宽阔并且坡度平缓的火山。上述4座火山都具有非常明显的熔岩隧道以及其他流动特征，这与地球上的盾状火山相似。火星表面的图像显示那里存在成百上千的火山。那些最大的火山中的大部分都与塔尔西斯隆起有关，但是很多稍小的火山都分布在北部平原地区。

火星上火山的可观的高度是该行星（相对）较低的地表重力导致的直接结果。当熔岩流淌和蔓延以形成盾状火山时，这座火山的最终高度取决于这座新生的山承载自身重量的能力。重力越低，重量就越小，山的高度就越高。如金星上的麦克斯韦山与地球上的夏威夷盾状火山从它们各自的基部算起海拔高度相同（大约10千米高）就不是什么巧合——地球与金星的地表重力相当。火星表面重力只有地球的40%，因此火星上的火山高度大致是地球的2.5倍。火星上的盾状火山是否还处于活跃期？科学家们没有直接证据显示这些火山近期是否喷发过，或是否正处于喷发阶段，但是如果这些火山近期的活跃状态一如一千万年前那般（这一最近的爆发期是根据火山斜坡上陨石坑的范围估算出来的），它们当中的几个也许至少仍然会保持间歇性的活跃。然而，两次爆发之间也许间隔数百万年之久。

火星表面的另一个突出特征是陨石坑。水手计划中的宇宙飞船发现在火星表面布满来自太空的流星撞击表面形成的陨石坑，火星的两颗卫星也是如此。与我们的月球类似，那些较小的陨石坑经常被一些物质填满（主要是灰尘），这表明火星是一个干燥的沙漠世界。然而，与月球相比，火星上的陨石坑被填满的速度明显要快很多。在月球上，那些直径不足100米（对应深度大约在20米）的古老陨石坑主要因流星冲击而形成的尘埃的缘故而被填平了。而在火星上，只有相当少的一部分陨石坑直径小于5千米。火星大气是一种强效的腐蚀剂，加之火星上的风把灰尘从一个地方卷到另一个地方，较之仅仅是因流星冲击而形成的尘埃的作用，（火星上的）地表特征被消除得更快。

与在我们的月球上相同，那些巨大陨石坑的范围（例如，那些巨大到自形成后尚未被尘埃填满的陨石坑）充当着火星表面年龄指示器的角色。从火星南部高地的40亿年至最年轻的火山地区的几千万年都是用同样的方法估算的。

火星表面陨石坑的具体外貌为揭示该行星表面状况提供了非常重要的信息。火星陨石坑周边布满了喷出物（因撞击而形成的碎片），这与月球上的陨石坑看起来非常不同。对比月球上的哥白尼陨石坑与火星上（相当典型的）尤蒂陨石坑可以看出不同。月球上陨石坑周边的喷出物正如我们以为的那样，一场爆炸喷出的大量的灰尘、土壤和岩石。然而，火星（上的陨石坑周边的）喷出物则因飞溅而出或溢出的液体给人留下了深刻的印象。地质学家认为这种具有流体化喷出物的陨石坑指示了在火星地表下几米处存在永冻土层或水冰。爆炸性的撞击加热并液化了这些冰，结果导致这些喷出物呈现流体状的特征。

## **The Decline of Venetian Shipping**

In the late thirteenth century, northern Italian cities such as Genoa, Florence, and Venice began an economic resurgence that made them into the most important economic centers of Europe. By the seventeenth century, however, other European powers had taken over, as the Italian cities lost much of their economic might.

This decline can be seen clearly in the changes that affected Venetian shipping and trade. First, Venice’s intermediary functions in the Adriatic Sea, where it had dominated the business of shipping for other parties, were lost to direct trading. In the fifteenth century there was little problem recruiting sailors to row the galleys (large ships propelled by oars): guilds (business associations) were required to provide rowers, and through a draft system free citizens served compulsorily when called for. In the early sixteenth century the shortage of rowers was not serious because the demand for galleys was limited by a move to round ships (round-hulled ships with more cargo space), with required fewer rowers. But the shortage of crews proved to be a greater and greater problem, despite continuous appeal to Venic’s tradition of maritime greatness. Even though sailors’wages doubled among the northern Italian cities from 1550 to 1590, this did not elicit an increased supply.

The problem in shipping extended to the Arsenale, Venice’s huge and powerful shipyard. Timber ran short, and it was necessary to procure it from farther and farther away. In ancient Roman times, the Italian peninsula had great forest of fir preferred for warships, but scarcity was apparent as early as the early fourteenth century. Arsenale officers first brought timber from the foothills of the Alps, then from north toward Trieste, and finally from across the Adriatic. Private shipbuilders were required to buy their oak abroad. As the costs of shipbuilding rose, Venice clung to its outdated standard while the Dutch were innovation in the lighter and more easily handled ships.

The step from buying foreign timber to buying foreign ships was regarded as a short one, especially when complaints were heard in the latter sixteenth century that the standards and traditions of the Arsenale were running down. Work was stretched out and done poorly. Older workers had been allowed to stop work a half hour before the regular time, and in 1601 younger works left with them. Merchants complained that the privileges reserved for Venetian-built and owned ships were first extended to those Venetians who bought ships from abroad and then to foreign-built and owned vessels. Historian Frederic Lane observes that after the loss of ships in battle in the late sixteenth century, the shipbuilding industry no longer had the capacity to recover that it had displayed at the start of the century.

The conventional explanation for the loss of Venetian dominance in trade is establishment of the Portuguese direct sea route to the East, replacing the overland Silk Road from the Black sea and the highly profitable Indian Ocean-caravan-eastern Mediterranean route to Venice. The Portuguese Vasco da Gama’s Voyage around southern Africa to India took place at the end of the fifteenth century, and by 1502 the trans- Abrabian caravan route had been cut off by political unrest.

The Venetian Council finally allowed round ships to enter the trade that was previously reserved for merchant galleys, thus reducing transport cost by one third. Prices of spices delivered by ship from the eastern Mediterranean came to equal those of spices transported by Paortuguese vessels, but the increase in quantity with both routes in operation drove the price far down. Gradually, Venice’s role as a storage and distribution center for spices and silk, dyes cotton, and gold decayed, and by the early seventeenth century Venice had lost its monopoly in markets such as France and southern Germany.

Venetian shipping had started to decline from about 1530-before the entry into the Mediterranean of large volumes of Dutch and British shipping-and was clearly outclassed by the end of the century. A contemporary of Shakespeare (1564-1616) observed that the productivity of Italian shipping had declined, compared with that of the British, because of conservatism and loss of expertise. Moreover, Italian sailors were deserting and emigrating, and captains, no longer recruited from the ranks of nobles, were weak on navigations.

|  |
| --- |
| 【Paragraph 1】In the late thirteenth century, northern Italian cities such as Genoa, Florence, and Venice began an economic resurgence that made them into the most important economic centers of Europe. By the seventeenth century, however, other European powers had taken over, as the Italian cities lost much of their economic might.  1. The word “resurgence”in the passage is closest in meaning to  ○ transformation  ○ comeback  ○ program  ○ expansion  【Paragraph 2】This decline can be seen clearly in the changes that affected Venetian shipping and trade. First, Venic’s intermediary functions in the Adriatic Sea, where it had dominated the business of shipping for other parties, were lost to direct trading. In the fifteenth century there was little problem recruiting sailors to row the galleys (large ships propelled by oars): guilds (business associations) were required to provide rowers, and through a draft system free citizens served compulsorily when called for. In the early sixteenth century the shortage of rowers was not serious because the demand for galleys was limited by a move to round ships (round-hulled ships with more cargo space), with required fewer rowers. But the shortage of crews proved to be a greater and greater problem, despite continuous appeal to Venic’s tradition of maritime greatness. Even though sailors’wages doubled among the northern Italian cities from 1550 to 1590, this did not elicit an increased supply.  2. The word “compulsorily”in the passage is closest in meaning to  ○ for free  ○ for a time  ○ by requirement  ○ by design |

3. According to paragraph 2, which of the following contributed to the decline of Venetian shipping?

○The loss of trade in Adriatic Sea

○The move from galleys to round ships

○The decreased demand for galleys

○The doubling of sailor’s wages

4. All of the following are mentioned in paragraph 2 as ways that Venice provided rowers for its galley EXCEPT

○Requiring business associations to provide sailors

○Recruiting sailors from other cities in northern Italy

○Drafting Venetian citizens into services as rowers

○Appealing to the traditions of Venice as a sea power.

【Paragraph 3】The problem in shipping extended to the Arsenale, Venice’s huge and powerful shipyard. Timber ran short, and it was necessary to procure it from farther and farther away. In ancient Roman times, the Italian peninsula had great forest of fir preferred for warships, but scarcity was apparent as early as the early fourteenth century. Arsenale officers first brought timber from the foothills of the Alps, then from north toward Trieste, and finally from across the Adriatic**.** Private shipbuilders were required to buy their oak abroad. As the costs of shipbuilding rose, Venice clung to its outdated standard while the Dutch were innovation in the lighter and more easily handled ships.

5. The word “outdated”in the passage is closest in meaning to

○strict

○enforced

○improved

○old-fashioned

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6. According to paragraphs 3, why did the building of ships in Venetian shipyards become increasingly expensive?

○The wages of officers and workers in the Arsenale kept rising

○Roman shipyards were using all the available fir trees for the warships

○The timber used in the shipbuilding had to be brought from farther and farther away

○Venetian standards required that shipbuilders use top-quality materials.

【Paragraph 3】The problem in shipping extended to the Arsenale, Venice’s huge and powerful shipyard. Timber ran short, and it was necessary to procure it from father and father away. In ancient Roman times, the Italian peninsula had great forest of fir preferred for warships, but scarcity was apparent as early as the early fourteenth century. Arsenale officers first brought timber from the foothills of the Alps, then from north toward Trieste, and finally from across the Adriatic**.** Private shipbuilders were required to buy their oak abroad. As the costs of shipbuilding rose, Venice clung to its outdated standard while the Dutch were innovation in the lighter and more easily handled ships.

【Paragraph 4】The step from buying foreign timber to buying foreign ships was regarded as a short one, especially when complaints were heard in the latter sixteenth century that the standards and traditions of the Arsenale were running down. Work was stretched out and done poorly. Older workers had been allowed to stop work a half hour before the regular time, and in 1601 younger works left with them. Merchants complained that the privileges reserved for Venetian-built and owned ships were first extended to those Venetians who bought ships from abroad and then to foreign-built and owned vessels. Historian Frederic Lane observes that after the loss of ships in battle in the late sixteenth century, the shipbuilding industry no longer had the capacity to recover that it had displayed at the start of the century.

7.All of the following are mentioned in paragraph 3 and 4 as contributing to the problems of the Venetian shipbuilding industry at the end of the sixteenth century EXCEPT

○The quality of work performed in the Arsenale had declined

○Venetian–built ships were heavy and generally inefficient

○Arsenale shipbuilders worked more slowly

○Only a few merchants controlled the buying and selling of most of the Venetian-built ships

8.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage?Incorrect choices change the meaning in important ways or leave out essential information.

○The loss of ships in battle at the end of the sixteenth century showed that Venetian shipbuilders lacked the skills they had possessed at the beginning of the century.

○Venetian shipbuilding failed to quickly replace the ships lost in battle at the end of the sixteenth century as it would have done earlier in the century.

○Frederic Lane noted that Venice lost ships in battle at the end of the sixteenth century, showing that Venetian shipbuilding was not longer known for its reliability.

○Venetian shipbuilding had been known for its high quality of work at the beginning of the sixteenth century, but toward the end of the century Venetian ships were poorer in quality.

【Paragraph 5】The conventional explanation for the loss of Venetian dominance in trade is establishment of the Portuguese direct sea route to the East, replacing the overland Silk Road from the Black sea and the highly profitable Indian Ocean-caravan-eastern Mediterranean route to Venice. The Portuguese Vasco da Gama’s Voyage around southern Africa to India took place at the end of the fifteenth century, and by 1502 the trans- Abrabian caravan route had been cut off by political unrest.

9. The word “conventional”in the passage is closest in meaning to

○informal

○logical

○correct

○usual

10. Why does the author mention “Vasco da Gama’Voyage around southern Africa to India”in the passage?

○to indicate how the Portuguese came to challenge Venetian dominance of trade with the East

○to explain why political troubles resulted in the closing of the usual routes to India

○to prove that Venetians could not sail round ships as efficiently as sailors from other countries did

○to show that Venetian reliance on round ships rather than galleys proved to be weakness

【Paragraph 6】The Venetian Council finally allowed round ships to enter the trade that was previously reserved for merchant galleys, thus reducing transport cost by one third. Prices of spices delivered by ship from the eastern Mediterranean came to equal those of spices transported by Paortuguese vessels, but the increase in quantity with both routes in operation drove the price far down. Gradually, Venice’s role as a storage and distribution center for spices and silk, dyes cotton, and gold decayed, and by the early seventeenth century Venice had lost its monopoly in markets such as France and southern Germany.

11. Which of the following can be inferred from paragraph 6 about the Venetian Council’s decision concerning the use of round ships?

○It resulted in a return to profitable in luxury goods for Venetian merchants.

○Ultimately it did not restore the superiority in the spice trade that Venice had enjoyed earlier.

○It eventually enabled Venetian merchants to increase the quantity and price of the spices they sold in Europe.

○. It means a long-awaited improvement in the fortunes of the shipbuilding industry in Venice.

12. According to paragraphs 6, in the sixteenth century the price of spices declined because

○France and Germany established monopolies and dictated prices

○Venetian merchant galleys competed with Venetian round ships for the spice trade

○More spices were available because both the Venetians and the Portuguese were importing them

○Increased demand for silk, dyes, cotton and gold meant that people had less money to spend on spices.

【Paragraph 2】This decline can be seen clearly in the changes that affected Venetian shipping and trade. First, Venic’s intermediary functions in the Adriatic Sea, where it had dominated the business of shipping for other parties, were lost to direct trading. In the fifteenth century there was little problem recruiting sailors to row the galleys (large ships propelled by oars): guilds (business associations) were required to provide rowers, and through a draft system free citizens served compulsorily when called for. █In the early sixteenth century the shortage of rowers was not serious because the demand for galleys was limited by a move to round ships (round-hulled ships with more cargo space), with required fewer rowers. █But the shortage of crews proved to be a greater and greater problem, despite continuous appeal to Venic’s tradition of maritime greatness. █Even though sailors’wages doubled among the northern Italian cities from 1550 to 1590, this did not elicit an increased supply.█

13. Look at the four squares[■] that indicate where the following sentence could be added to the passage.

**The increase in reward still did not attract young people to this hard life, and convicted criminals and slaves were pressed into services.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

The loss of power and prestige of Italian cities by the sixteenth century is clearly seen in the decline of Venetian shipping.

●

●

●

Answer choices

○Venetian ships were famous for carrying large cargoes of spices and luxury goods around the world in fast, oar-driven galleys.

○A shortage of timber for building the traditional galleys and a lack of sailors to row them meant a loss of Venetian shipping business.

○The Venetian Council made sure that Venetian-built and –owned ships kept special privileges in transporting luxury goods in and out of Venice.

○Venetian round ships bringing spices and silk from the East helped drive prices down so that ordinary people could afford to buy them

○Venice failed to keep up with improvement in ship design, and the cost of shipbuilding rose while quality and efficiency declined.

○The Portuguese direct sea route to the East adversely affected Venetian trade, and Venice fell behind the Dutch and the British in the quality of their ships and sailing skills.

参考答案：

1.2

2.3

3.1

4.2

5.4

6.3

7.4

8.2

9.4

10.1

11.2

12.3

13.4

14. A shortage of…

Venice failed to…

The Portuguese direct sea…

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## **参考译文：威尼斯航运的衰落**

在13世纪后期，意大利北部城市，如热那亚、佛罗伦萨和威尼斯逐渐出现了经济复苏，这使得它们成为欧洲最重要的经济中心。然而，到了17世纪，其他欧洲势力崛起，同时这些意大利城市失去了它们曾经的经济影响力。

这一衰退很明显地体现在影响威尼斯的航运以及贸易的变化上。首先，威尼斯在亚得里亚海上的中介功能——它曾控制着亚得里亚海上其他团体的航运产业——败给了直接贸易。在15世纪时期，为单层甲板大帆船（一种靠划桨驱动的大船）征募水手不算一个问题：行会（商业协会）负责提供桨手，当有需要的时候，会通过征用系统强制征召一些没有工作的公民。在16世纪早期，桨手的短缺问题还不算严重，由于圆船（一种使用圆形船体以提供更多货舱空间的船只）的出现，限制了单层甲板大帆船的需求，而圆船只需要很少的桨手。然而，尽管一再强调威尼斯那海事之伟大的传统，但是船员的短缺被证明是一个日益严重的问题。甚至当意大利北部城市水手的工资在1550年到1590年间翻倍时，水手的数量依然没有增长。

航运的问题延伸到了威尼斯军械库，威尼斯那庞大且颇具实力的造船厂。木材短缺，必须从很远的地方运来。在古罗马时期，意大利半岛上有茂密的冷杉林，冷杉是建造军舰的好材料，但是不足的现象早在14世纪早期就出现了。军械库的长官最早从阿尔卑斯山脚下购买木材，而后则从北部到的里雅斯特地区（购买木材），最后则需跨过亚得里亚海（才能购得木材）。私人造船厂则不得不从国外购置橡木。当造船的成本增加时，威尼斯依旧固守着它那过时了的标准，而与此同时，荷兰则转向更轻更易操作的新型船只方面的创新。

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从国外购买木材进而购买船只这一步很快就完成了，特别是在16世纪后期传出对威尼斯军械库不良的标准和传统的抱怨时。工人消极怠工，成品质量低下。老员工被允许在正常工时结束前半个小时就收工，到了1601年，年轻的员工也如此效仿。商人们抱怨那些建造和拥有船只的威尼斯人所拥有的特权先是扩展到那些从国外购得船只的威尼斯人身上，而后又进一步扩展到建造并拥有船只的外国人身上。历史学家弗雷德里克•莱恩观察到，自从16世纪后期在战场上损失了船只之后，造船业再也没有能力恢复到16世纪初那样了。

对威尼斯人失去贸易主导权的传统解释是，葡萄牙人建立的直接通往东方的海上航线替代了起自黑海的陆上丝绸之路以及通往威尼斯的高利润的印度洋—东地中海陆上商路。在15世纪末期，葡萄牙的瓦斯科•达•伽马实现了环绕南非到达印度的航行；而在1502年，通往阿拉伯国家的商路因政治动荡被切断。

威尼斯委员会最终允许在贸易中使用圆船，之前只允许使用单层甲板大帆船，因此运输的成本下降了1/3。从地中海东部船运过来的香料价格与葡萄牙航线船运的香料价格相当，但是两条运营的商线使得香料的总供应量增加，从而导致香料的价格大幅度下降。逐渐地，威尼斯作为香料、丝绸、染料棉和黄金的储存与配销中心的作用衰退了，到17世纪早期，威尼斯彻底失去了它在诸如法国和德国南部市场上的垄断地位。

威尼斯航运业的衰退是从大约1530年开始的——在大量荷兰和英国船只进入地中海之前——并且在16世纪末期明显被超越了。在莎士比亚时代（1564～1616），相比较英国，意大利航运业生产力已经在下降了，这是因为意大利的航运业过于守旧并且缺乏专业技术所致。此外，意大利船员逐渐逃离并移居到他乡，而船长不再是从贵族阶级中征召而来，在航海方面也暴露出各种不足。

## **The Evolutionary Origin of Plants**

The evolutionary history of plants has been marked by a series of adaptations. The ancestors of plants were photosynthetic single-celled organisms that gave rise to plants presumably lacked true roots, stems, leaves, and complex reproductive structures such as flowers. All of these features appeared later in the evolutionary history of plants. Of today’s different groups of algae, green algae are probably the most similar to ancestral plants. This supposition stems from the close phylogenetic (natural evolutionary) relationship between the two groups. DNA comparisons have shown that green algae are plants’closest living relatives. In addition, other lines of evidence support the hypothesis that land plants evolved from ancestral green algae used the same type of chlorophyll and accessory pigments in photosynthesis as do land plants. This would not be true of red and brown algae. Green algae store food as starch, as do land plants and have cell walls made of cellulose, similar in composition to those of land plants. Again, the good storage and cell wall molecules of red and brown algae are different.

Today green algae live mainly in freshwater, suggesting that their early evolutionary history may have occurred in freshwater habitats. If so, the green algae would have been subjected to environmental pressures that resulted in adaptations that enhanced their potential to give rise to land-dwelling or organisms.

The environmental conditions of freshwater habitats, unlike those of ocean habitats, are highly variable. Water temperature can fluctuate seasonally or even daily and changing level of rainfall can lead to fluctuations in the concentration of chemical in the water or even to period in which the aquatic habitat dries up. Ancient fresh water green algae must have evolved features that enable them to withstand extremes of temperature and periods of dryness. These adaptations served their descendant well asthey invaded land.

The terrestrial world is green now, but it did not start out that way. When plants first made the transition ashore more than 400 million years ago, the land was barren and desolate, inhospitable to life. From a plant’s evolutionary view point, however, it was also a land of opportunity, free of competitors and predators and full of carbon dioxide and sunlight (the raw materials for photosynthesis, which are present in far higher concentrations in air than in water).So once natural selection had shaped the adaptations that helped plants overcome the obstacles to terrestrial living, plants prospered and diversified.

When plants pioneered the land, they faced a range of challenges posed by terrestrial environments. On land, the supportive buoyancy of water is missing, the plant is no longer bathed in a nutrient solution, and air tends to dry things out. These conditions favored the evolution of the structures that support the body, vessels that transport water and nutrients to all parts of plant, and structures that conserve water. The resulting adaptations to dry land include some structural features that arose early in plant evolution; now these features are common to virtually all land plant. They include roots or root like structures, a waxy cuticle that covers the surfaces of leaves and stems and limits the evaporation of water, and pores called stomata in leaves and stems that allow gas exchange but close when water is scarce, thus reducing water loss. Other adaptations occurred later in the transition to terrestrial life and now wide spread but not universal among plants. These include conducting vessels that transport water and minerals upward from the roots and that move the photosynthetic products from the leavesto the rest of the plant body and the stiffening substance lignin, which support the plant body, helping it expose maximum surface area to sunlight.

These adaptations allowed an increasing diversity of plant forms to exploit dry land. Life on land, however, also required new methods of transporting sperm to eggs. Unlike aquatic and marine forms, land plants cannot always rely on water currents to carry their sex cells and disperse their fertilized eggs. So the most successful groups of land plants are those that evolved methods of fertilized sex cell dispersal that are independent of water and structures that protest developing embryos from drying out. Protected embryos and waterless dispersal of sex cells were achieved with the origin of seed plants and the key evolutionary innovations that they introduced: pollen, seeds, and later, flowers and fruits.

【Paragraph 1】The evolutionary history of plants has been marked by a series of adaptations. The ancestors of plants were photosynthetic single-celled organisms that gave rise to plants presumably lacked true roots, stems, leaves, and complex reproductive structures such as flowers. All of these features appeared later in the evolutionary history of plants. Of today’s different groups of algae, green algae are probably the most similar to ancestral plants. This supposition stems from the close phylogenetic (natural evolutionary) relationship between the two groups. DNA comparisons have shown that green algae are plants’closest living relatives. In addition, other lines of evidence support the hypothesis that land plants evolved from ancestral green algae used the same type of chlorophyll and accessory pigments in photosynthesis as do land plants. This would not be true of red and brown algae. Green algae store food as starch, as do land plants and have cell walls made of cellulose, similar in composition to those of land plants. Again, the good storage and cell wall molecules of red and brown algae are different.

1. The word “presumably”in the passage is closest in meaning to

○originally

○supposedly

○obviously

○usually

2. According to paragraph 1, all of the following are true of ancestral plants EXCEPT

○They had cellulose-based cell walls.

○They were closely related to green algae

○They were able to store nutrients

* They had a sophisticated multicellular structure.

【Paragraph 2】Today green algae live mainly in freshwater, suggesting that their early evolutionary history may have occurred in freshwater habitats. If so, the green algae would have beensubjected to environmental pressures that resulted in adaptations that enhanced their potential to give rise to land-dwelling or organisms.

3. The phrase “subjected to”in the passage is closest in

○restricted by

○distant from

○exposed to

○combined with

【Paragraph 3】The environmental conditions of freshwater habitats, unlike those of ocean habitats, are highly variable. Water temperature can fluctuate seasonally or even daily and changing level of rainfall can lead to fluctuations in the concentration of chemical inthe water or even to period in which the aquatic habitat dries up. Ancient fresh water green algae must have evolved features that enable them to withstand extremes of temperature and periods of dryness. These adaptations served their descendant well asthey invaded land.

4. What can be inferred from paragraph 3 about ancient green algae?

○They lived in a generally wet environment that was sometimes dry

○They adapted better to changes in water temperature than did to other changes in the environment.

○They inhabited areas that were close to the ocean.

○They had lived primarily on land

【Paragraph 4】The terrestrial world is green now, but it did not start out that way. When plants first made the transition ashore more than 400 million years ago, the land was barren and desolate, inhospitable to life. From a plant’s evolutionary view point, however, it was also a land of opportunity, free of competitors and predators and full of carbon dioxide and sunlight (the raw materials for photosynthesis, which are present in far higher concentrations in air than in water).So once natural selection had shaped the adaptations that helped plants overcome the obstacles to terrestrial living, plants prospered and diversified.

5. The word “desolate”in the passage is closest in meaning to

○dusty

○hardened

○deserted

* dried out

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6. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Terrestrial plants had the advantages of not having rivals and having easy access to photosynthetic material

○The abundance of photosynthetic material made life on land easierfor pioneering plants

○Once plants had eliminated their competitors and their predators, their evolutionary process proceeded smoothly.

○Plant evolution eliminated competitors and made the process of photosynthesis more efficient.

7. According to paragraph 4, which of the following is true about the terrestrial world at the time it was colonized by plants?

○it was exposed to high levels of solar radiation

○it contained a limited supply of carbon dioxide

○it had developed 400million years earlier

○it lacked the presence of any organisms

【Paragraph 5】When plants pioneered the land, they faced a range of challenges posed by terrestrial environments. On land, the supportive buoyancy of water is missing, the plant is no longer bathed in a nutrient solution, and air tends to dry things out. These conditions favored the evolution of the structures that support the body, vessels that transport water and nutrients to all parts of plant, and structures that conserve water. The resulting adaptations to dry land include some structural features that arose early in plant evolution; now these features are common to virtually all land plant. They include roots or root like structures, a waxy cuticle that covers the surfaces of leaves and stems and limits the evaporation of water, and pores called stomata in leaves and stems that allow gas exchange but close when water is scarce, thus reducing water loss. Other adaptations occurred later in the transition to terrestrial life and now wide spread but not universal among plants. These include conducting vessels that transport water and minerals upward from the roots and that move the photosynthetic products from the leavesto the rest of the plant body and the stiffening substance lignin, which support the plant body, helping it expose maximum surface area to sunlight.

8. the word “posed”in the passage is closest in meaning to

○shared

○presented

○strengthened

○concealed

9. According to paragraph 5, all of the following are problems that early terrestrial plants had to overcome Except

○a tendency to become dry

○the inability to limit surface sunlight

○the absence of a structure to support the body of the plant

○the inability to transport water and minerals through the plant

10. What purpose does paragraph 5 serve in the larger discussion of the origins of terrestrial plants?

○To emphasize how long it took for ancestral plants to adjust to life on land

○To disprove the argument that land plants adapted easily to their new terrestrial environment

○To explain how plant colonization changed the physical environment of the terrestrial world

○To describe how ancestral plants solved the problems they confirmed in colonizing

【Paragraph 6】These adaptations allowed an increasing diversity of plant forms to exploit dry land. Life on land, however, also required new methods of transporting sperm to eggs. Unlike aquatic and marine forms, land plants cannot always rely on water currents to carry their sex cells and disperse their fertilized eggs. So the most successful groups of land plants are those that evolved methods of fertilized sex cell dispersal that are independent of water and structures that protest developing embryos from drying out. Protected embryos and waterless dispersal of sex cells were achieved with the origin of seed plants and the key evolutionary innovations that they introduced: pollen, seeds, and later, flowers and fruits.

11. According to Paragraph 6, The adaptation made by terrestrial plants had which of the following effect?’

○Plants developed reproductive strategies usable in both land and water environment

○the plant diversity achieved in water environments diminished on land

○seed plants became the dominant species among plants

○a greater range of plants was able to develop

12. Which of the following best describes the author’s presentation of the information about land plants？

○the author provided and overview of the evolutionary relationships between specific species of algae and land plants

○The author discusses the transformation plants underwent in the process of changing from an aquatic to a terrestrial environment

○the author establishes a pattern of similarity between major land and water pant groups

○The author presents evidence to support the hypothesis that plants first fully evolved in water before finding their way to land

【Paragraph 3】█The environmental conditions of freshwater habitats, unlike those of ocean habitats, are highly variable. █Water temperature can fluctuate seasonally or even daily and changing level of rainfall can lead to fluctuations in the concentration of chemical in the water or even to period in which the aquatic habitat dries up. █Ancient fresh water green algae must have evolved features that enable them to withstand extremes of temperature and periods of dryness. █These adaptations served their descendant well asthey invaded land.

13. Look at the four squares [█] that indicate where the following sentence could be added to the passage.

**Scientists believe that chemical changes and a thicker exterior, among other things, may have helped ancient algae overcome the conditions in their environment.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

In moving from water to land, ancestral plants overcame many obstacles in order to survive. Answer choices

●

●

●

Answer choices

○Neither brown nor red algae are likely to be ancestors of plants because of their difference in pigmentation

○The instability of freshwater habitats caused marine algae to develop adaptations to their harsh environment.

○The colonization of land by plants was a major revolution in the history of Earth.

○Terrestrial plants adjusted to life on land by undergoing structural changes that enabled them to support themselves, resist drying, and exchange gases.

○To colonize new terrestrial habitats, plants needed to create a way of reproducing without water.

○Once plants had overcome the challenges posed by terrestrial life, they prospered by becoming less diverse.

**参考答案：**

1.2

2. 4

3. 3

4. 1

5. 3

6. 1

7. 4

8. 2

9. 2

10. 4

11. 4

12. 2

13. 4

14. The instability of…

Terrestrial plants adjusted…

To colonize new terrestrial …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：植物的进化起源**

植物的进化史是以一系列对周遭环境的适应为标记的。植物的“祖先”是能够进行光合作用的单细胞生物，并由它们进化出那些可能缺少真正的根、茎、叶以及复杂生殖结构——如花朵——的植物。上述提到的这些特征出现于植物进化史的后期。在今天的众多藻类中，绿藻可能与植物的祖先最为相似。这个假说根植于两种物种很近的系统发育（自然进化论）的关系。通过对比两者的DNA，得知绿藻是目前还存活的与植物亲缘关系最近的“近亲”。此外，其他一系列证据支持了这种假说，即陆生植物由原始绿藻进化而成，两者在进行光合作用时使用了相同类型的叶绿素和辅助色素。而红藻和褐藻则并非如此。绿藻以淀粉的形式贮藏能量，这与陆生植物相同；绿藻具有由纤维素构成的细胞壁，这与那些陆生植物的组织结构相同。同样的，红藻和褐藻在能量贮藏形式和细胞壁分子构成方面与之不同。

如今的绿藻大多生活在淡水水域中，这一点说明它们的早期进化史起源于淡水生境。如果事实如此的话，绿藻可能曾经受到环境的压力，产生了适应机制，即提高进化出陆生植物或其他有机体的可能性。

与海洋生境不同的是，淡水生境的环境条件非常多样。水温会随季节变化，甚至在一天当中也不尽相同；降雨情况的变化也会导致水中所含的化学元素的变化，或因水域生境干涸而成周期性变化。古老的淡水绿藻必须进化出一些特征以保证它们能够对抗极端温度和干旱。这些适应机制在它们的后代进化成陆生生物时起了很好的协助作用。

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陆地世界现在充满绿色，但开始时并非如此。当植物在4千万年前第一次向岸上过渡时，陆地是贫瘠且荒芜的，并不适合生物生存。然而，从植物进化的角度来看，这同时是一片充满机会的土地，没有竞争者和捕食者，并且具有充足的二氧化碳和阳光（这些是光合作用的原材料，它们在空气中的含量要远远高于在水中的含量）。所以，一旦自然选择塑造了植物的适应机制，使之克服在陆地生活的障碍，植物物种就生机勃勃且丰富多样了。

当植物开拓陆地的时候，它们要面对一系列陆地环境带来的挑战。在陆地上，水中支撑植物的浮力消失，植物不能再漂浮在营养液里，空气会风干水分。这些条件有助于进化出那些用于支撑枝干的结构、运输水分和养分到植物各部分的导管以及储存水分的结构。对干旱陆地的适应结果包括一些在早期植物进化中所体现出的结构特征；现在，这些特征几乎在所有的陆生植物上都有所体现。其中包括根或者类似根的结构、覆盖茎叶表面能阻止水分蒸发的蜡质角质层以及茎叶上被称为气孔的小孔——气孔的存在可以保证气体的交换，并在水分缺失时关闭气孔从而防止水分的进一步流失。其他的适应机制在向陆地过渡过程中出现得较晚，现在体现在很多植物上，但并不是所有的植物。其中包括从根部向上运输水分和矿物质的导管，从叶片向植物其他部分输送光合作用产物的筛管以及用来支撑植物体、使得它以最大表面积接触阳光的硬化木质。

这些适应机制保证了不断增加的植物形态的多样性，以便于它们去开拓干旱的陆地。然而，陆地上的生物也需要新的方法来受精。与水中和海洋中的形式不同，陆生植物无法总是依赖水流来携带生殖细胞或传播受精卵。因此，陆生植物中最成功的那几组植物都进化出了不依靠水也可以传播受精生殖细胞的方式和防止发育中的胚胎变干的结构。进化到种子植物时，保护胚胎以及在无水环境下传播生殖细胞的方式才得以实现，它们带来的关键进化创新的产物是：花粉、种子以及后来的花朵和果实。

TPO-26

## **Energy and the Industrial Revolution**

For years historians have sought to identify crucial elements in the eighteenth-century rise in industry, technology, and economic power known as the Industrial Revolution, and many give prominence to the problem of energy. Until the eighteenth century, people relied on energy derived from plants as well as animal and human muscle to provide power. Increased efficiency in the use of water and wind helped with such tasks as pumping, milling, or sailing. However, by the eighteenth century, Great Britain in particular was experiencing an energy shortage. Wood, the primary source of heat for homes and industries and also used in the iron industry as processed charcoal, was diminishing in supply. Great Britain had large amounts of coal; however, there were not yet efficient means by which to produce mechanical energy or to power machinery. This was to occur with progress in the development of the steam engine.

In the late 1700s James Watt designed an efficient and commercially viable steam engine that was soon applied to a variety of industrial uses as it became cheaper to use. The engine helped solve the problem of draining coal mines of groundwater and increased the production of coal needed to power steam engines elsewhere. A rotary engine attached to the steam engine enabled shafts to be turned and machines to be driven, resulting in mills using steam power to spin and weave cotton. Since the steam engine was fired by coal, the large mills did not need to be located by rivers, as had mills that used water- driven machines. The shift to increased mechanization in cotton production is apparent in the import of raw cotton and the sale of cotton goods. Between 1760 and 1850, the amount of raw cotton imported increased 230 times. Production of British cotton goods increased sixtyfold, and cotton cloth became Great Britain’s most important product, accounting for one-half of all exports. The success of the steam engine resulted in increased demands for coal, and the consequent increase in coal production was made possible as the steam-powered pumps drained water from the ever-deeper coal seams found below the water table.

The availability of steam power and the demands for new machines facilitated the transformation of the iron industry. Charcoal, made from wood and thus in limited supply, was replaced with coal-derived coke (substance left after coal is heated) as steam-driven bellows came into use for producing of raw iron. Impurities were burnt away with the use of coke, producing a high-quality refined iron. Reduced cost was also instrumental in developing steam-powered rolling mills capable of producing finished iron of various shapes and sizes. The resulting boom in the iron industry expanded the annual iron output by more than 170 times between 1740 and 1840, and by the 1850s Great Britain was producing more tons of iron than the rest of the world combined. The developments in the iron industry were in part a response to the demand for more machines and the ever-widening use of higher-quality iron in other industries.

Steam power and iron combined to revolutionize transport, which in turn had further implications. Improvements in road construction and sailing had occurred, but shipping heavy freight over land remained expensive, even with the use of rivers and canals wherever possible. Parallel rails had long been used in mining operations to move bigger loads, but horses were still the primary source of power. However, the arrival of the steam engine initiated a complete transformation in rail transportation, entrenching and expanding the Industrial Revolution. As transportation improved, distant and larger markets within the nation could be reached, thereby encouraging the development of larger factories to keep pace with increasing sales. Greater productivity and rising demands provided entrepreneurs with profits that could be reinvested to take advantage of new technologies to further expand capacity, or to seek alternative investment opportunities. Also, the availability of jobs in railway construction attracted many rural laborers accustomed to seasonal and temporary employment. When the work was completed, many moved to other construction jobs or to factory work in cities and towns, where they became part of an expanding working class.

【Paragraph 1】For years historians have sought to identify crucial elements in the eighteenth-century rise in industry, technology, and economic power known as the Industrial Revolution, and many give prominence to the problem of energy. Until the eighteenth century, people relied on energy derived from plants as well as animal and human muscle to provide power. Increased efficiency in the use of water and wind helped with such tasks as pumping, milling, or sailing. However, by the eighteenth century, Great Britain in particular was experiencing an energy shortage. Wood, the primary source of heat for homes and industries and also used in the iron industry as processed charcoal, was diminishing in supply. Great Britain had large amounts of coal; however, there were not yet efficient means by which to produce mechanical energy or to power machinery. This was to occur with progress in the development of the steam engine.

1: Why does the author provide the information that “Great Britain had large amounts of coal”?

○ To reject the claim that Britain was facing an energy shortage in the eighteenth century

○ To explain why coal rather than other energy resources became the primary source of heat for homes and industries in eighteenth-century Britain

○To indicate that Britain’s energy shortage was not the result of a lack of fuel

○ To explain why coal mining became an important industry in nineteenth-century

2: What was “the problem of energy" that had to be solved to make the Industrial Revolution of the eighteenth century possible?

○ Water and wind could not be used efficiently.

○ There was no efficient way to power machinery.

○ Steam engines required large amounts of coal, which was in short supply.

○ Neither humans nor animals were strong enough to provide the power required for industrial application.

【Paragraph 2】In the late 1700s James Watt designed an efficient and commercially viable steam engine that was soon applied to a variety of industrial uses as it became cheaper to use. The engine helped solve the problem of draining coal mines of groundwater and increased the production of coal needed to power steam engines elsewhere. A rotary engine attached to the steam engine enabled shafts to be turned and machines to be driven, resulting in mills using steam power to spin and weave cotton. Since the steam engine was fired by coal, the large mills did not need to be located by rivers, as had mills that used water- driven machines. The shift to increased mechanization in cotton production is apparent in the import of raw cotton and the sale of cotton goods. Between 1760 and 1850, the amount of raw cotton imported increased 230 times. Production of British cotton goods increased sixtyfold, and cotton cloth became Great Britain’s most important product, accounting for one-half of all exports. The success of the steam engine resulted in increased demands for coal, and the consequentincrease in coal production was made possible as the steam-powered pumps drained water from the ever-deeper coal seams found below the water table.

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3: Which of the following is NOT mentioned in paragraph 2 as a development in cotton mills brought about by Watt’s steam engine?

○ The importing of huge quantities of raw cotton by Britain

○ Increased mechanization

○ More possibilities for mill location

○ Smaller mills

4: The phrase “apparent in”in the passage is closest in meaning to

○ clearly seen in

○ aided by

○ associated with

○ followed by

5: According to paragraph 2, what was Britain’s most important export by 1850?

○ Raw cotton

○ Cotton cloth

○ Steam-powered pumps

○ Coal

6: The word “consequent”in the passage is closest in meaning to

○ resulting

○ encouraging

○ well documented

○ immediate

7: What is the role of paragraph 2 in the passage as a whole?

○ It explains how by increasing the supply of raw materials from other countries, British industries were able to reduce costs and increase production.

○ It explains how the production of mechanical energy and its benefits spread quickly across countries that were linked commercially with Great Britain.

○ It demonstrates why developments in a single industry could not have caused the Industrial Revolution.

○ It illustrates why historians have assigned great importance to the issue of energy in the rise of the Industrial Revolution.

【Paragraph 3】The availability of steam power and the demands for new machines facilitated the transformation of the iron industry. Charcoal, made from wood and thus in limited supply, was replaced with coal-derived coke (substance left after coal is heated) as steam-driven bellows came into use for producing of raw iron. Impurities were burnt away with the use of coke, producing a high-quality refined iron. Reduced cost was also instrumental in developing steam-powered rolling mills capable of producing finished iron of various shapes and sizes. The resulting boom in the iron industry expanded the annual iron output by more than 170 times between 1740 and 1840, and by the 1850s Great Britain was producing more tons of iron than the rest of the world combined. The developments in the iron industry were in part a response to the demand for more machines and the ever-widening use of higher-quality iron in other industries.

8: According to paragraph 3, why was the use of coke important for the iron industry?

○ It helped make wood into charcoal.

○ It reduced the dependency on steam-powered machines used for the production of iron.

○ It replaced charcoal in the production of raw and refined iron.

○ It powered the machines used to extract coal in coal mines.

9: According to paragraph 3, all of the following were true of the iron industry in Great Britain during the 1800s EXCEPT:

○ Steam-driven bellows were used to produce raw iron.

○By the 1850s Britain was the world’s largest producer of iron.

○Steam-powered mills made it possible to produce iron of different shapes and sizes.

○ Greater demand for higher-quality iron increased its price.

【Paragraph 4】Steam power and iron combined to revolutionize transport, which in turn had further implications. Improvements in road construction and sailing had occurred, but shipping heavy freight over land remained expensive, even with the use of rivers and canals wherever possible. Parallel rails had long been used in mining operations to move bigger loads, but horses were still the primary source of power. However, the arrival of the steam engine initiated a complete transformation in rail transportation, entrenching and expanding the Industrial Revolution. As transportation improved, distant and larger markets within the nation could be reached, thereby encouraging the development of larger factories to keep pace with increasing sales. Greater productivity and rising demands provided entrepreneurs with profits that could be reinvested to take advantage of new technologies to further expand capacity, or to seek alternative investment opportunities. Also, the availability of jobs in railway construction attracted many rural laborers accustomed to seasonal and temporary employment. When the work was completed, many moved to other construction jobs or to factory work in cities and towns, where they became part of an expanding working class.

10: The word “initiated”in the passage is closest in meaning to

○anticipated

○accelerated

○spread

○ started

11: Paragraph 4 implies which of the following about the transformation in rail transportation?

○Because railway construction employed mostly rural laborers, unemployment increased among urban workers.

○ It resulted in more trade within the country, but less trade with markets that could be reached only by ocean shipping.

○ It made shipping freight overland to distant markets less expensive.

○ It resulted in higher wages for factory workers.

12: The phrase “accustomed to" in the passage is closest in meaning to

○ in need of

○ used to

○ tired of

○ encouraged by

【Paragraph 4】Steam power and iron combined to revolutionize transport, which in turn had further implications. Improvements in road construction and sailing had occurred, but shipping heavy freight over land remained expensive, even with the use of rivers and canals wherever possible. Parallel rails had long been used in mining operations to move bigger loads, but horses were still the primary source of power. ■However, the arrival of the steam engine initiated a complete transformation in rail transportation, entrenching and expanding the Industrial Revolution. ■As transportation improved, distant and larger markets within the nation could be reached, thereby encouraging the development of larger factories to keep pace with increasing sales. ■Greater productivity and rising demands provided entrepreneurs with profits that could be reinvested to take advantage of new technologies to further expand capacity, or to seek alternative investment opportunities. ■Also, the availability of jobs in railway construction attracted many rural laborers accustomed to seasonal and temporary employment. When the work was completed, many moved to other construction jobs or to factory work in cities and towns, where they became part of an expanding working class.

13: Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**The first steam-powered locomotives were slow but they rapidly improved in speed and carrying capacity.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14:【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

The coming of the Industrial Revolution in eighteenth-century Britain depended on the development of the steam engine to power machinery.

●

●

●

Answer Choices

○ For years, historians disregarded the issue of energy as a major element in the rise of the Industrial Revolution and focused instead on technological developments and increased production.

○ The introduction and growth of steam-powered rail transport was a major factor in Britain's economic expansion during the Industrial Revolution.

○ An expansion of the Industrial Revolution outside Great Britain occurred when British industries began to import raw cotton and high-quality iron.

○ By 1850, the use of steam power in Britain's mills, mines, and iron industry made Britain a world leader in the production of cotton cloth and iron.

○ Since the basic infrastructure was in place, the Industrial Revolution fueled itself with enlarging markets requiring ever more expansion of factories and workforce.

○ By the end of the 1800s, railway construction attracted so many laborers that factories could not find enough workers to keep up with increasing sales.

参考答案：

1.○3

2.○ 2

3.○4

4.○1

5.○ 2

6.○ 1

7.○ 4

8.○ 3

9.○4

10.○4

11.○ 3

12.○ 2

13.○ 2

14.○ The introduction and growth of steam-powered rail transport was a major factor in Britain's economic expansion during the Industrial Revolution.

○ By 1850, the use of steam power in Britain's mills, mines, and iron industry made Britain a world leader in the production of cotton cloth and iron.

○ Since the basic infrastructure was in place, the Industrial Revolution fueled itself with enlarging markets requiring ever more expansion of factories and workforce.

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## **参考译文：能源与工业革命**

多年来，历史学家试图找到18世纪工业革命在工业、技术和经济领域兴起的关键因素，许多人把能源问题放在突出位置。直到18世纪，人们依靠工厂、畜力以及人力来提供动力。高效地利用水能和风能有助于完成诸如抽泵、碾磨或航海等工作。然而，到了18世纪，尤其是大不列颠却经历了能源短缺。木材，这一为家庭和工业供暖供能,同时也以加工木炭的形式被使用在钢铁工业中的主要能源，其供应量日益减少。大不列颠有大量的煤矿；然而，还没有产生机械能或为机器提供动力的有效方法。这一切随着蒸汽机的改良而发生。

在18世纪末期，詹姆斯•瓦特设计了一款高效且具商业利益的蒸汽机，由于其价格低廉，很快就被运用到各项工业生产之中。这款蒸汽机帮助解决了煤矿中地下水的排水问题并且提高了煤的产量，这些煤用来为别处的蒸汽机提供动力。与蒸汽机相连的旋转式发动机带动轴承转动，从而驱动机器，运用蒸汽动力纺织棉布的纺织厂随之出现。因为蒸汽机靠燃煤而驱动，一些大型棉纺织厂就不再像那些使用水力驱动机器的工厂一样必须依河而建。这种棉纺织业日益机械化的转变在棉花原料的进口和棉纺产品的销售中得到突出的体现。在1760年到1850年间，原棉的进口量增长了230倍。英国棉纺产品的生产量增加了60倍，而棉布则成了英国最重要的产品，占出口总额的一半。蒸汽机的成功带来了对煤需求量的增加，而且随着蒸汽动力泵从位于地下水位下的更深的煤层中排出水来，随之而来的煤产量的增加成为可能。

蒸汽动力的可利用性以及对新机器的需求促进了钢铁工业的转型。当蒸汽驱动风箱投入到生铁生产中后，木炭这种用木材烧成因此供应量有限的物质就被焦炭（煤加热后残留的物质）替代了。随着焦炭的使用，生铁中的杂质被燃烧完，从而生产出更高质量的精炼铁。降低的成本也有助于那些能够生产不同形状和尺寸的成品铁制品的蒸汽动力轧钢厂的发展。因此导致的钢铁工业的繁荣使钢铁的年产量在1740年到1840年间增长了170多倍，到19世纪50年代，大不列颠生产的钢铁比世界其他地区生产的总和还要高。钢铁工业的发展从某种意义上说，是对更多机器的需求以及在其他工业中更广泛使用高质量铁的一种回应。

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蒸汽动力和钢铁带来了交通运输的革新，反过来也有着更加深远的影响。道路设施以及航海的改善已经初见成效，但是船运重型货物到陆地的费用仍然很高，即使在可以使用河流和运河的地方。平行铁轨长期以来被用于采矿作业来运输大型货物，但是马匹仍然是主要的动力来源。然而，蒸汽机的到来引发了铁路运输的彻底变革，巩固和扩大了工业革命的成果。随着交通运输的改善，全国范围内更远更大的市场可以到达，因此鼓励着大型工厂的生产与日益增长的销售量保持同步。更大规模的生产和日益增长的需求给企业家带来了利润，这种利润可用于再投资新技术，进一步扩大产能或寻求其他的投资机会。同时，铁道建设方面的更多就业机会也吸引了那些习惯于季节性工作或者短工制的农村劳动力。一旦工作完成，其中的很多人就会参与到其他的建筑工作中或是城镇中的工厂工作中，并成为其中的不断壮大的工人阶级。

## **Survival of Plants and Animals in Desert Conditions**

The harsh conditions in deserts are intolerable for most plants and animals. Despite these conditions, however, many varieties of plants and animals have adapted to deserts in a number of ways. Most plant tissues die if their water content falls too low: the nutrients that feed plants are transmitted by water; water is a raw material in the vital process of photosynthesis; and water regulates the temperature of a plant by its ability to absorb heat and because water vapor lost to the atmosphere through the leaves helps to lower plant temperatures. Water controls the volume of plant matter produced. The distribution of plants within different areas of desert is also controlled by water. Some areas, because of their soil texture, topographical position, or distance from rivers or groundwater, have virtually no water available to plants, whereas others do.

The nature of plant life in deserts is also highly dependent on the fact that they have to adapt to the prevailing aridity. There are two general classes of vegetation: long-lived perennials, which may be succulent (water-storing) and are often dwarfed and woody, and annuals or ephemerals, which have a short life cycle and may form a fairly dense stand immediately after rain.

The ephemeral plants evade drought. Given a year of favorable precipitation, such plants will develop vigorously and produce large numbers of flowers and fruit. This replenishes the seed content of the desert soil. The seeds then lie dormant until the next wet year, when the desert blooms again.

The perennial vegetation adjusts to the aridity by means of various avoidance mechanisms. Most desert plants are probably best classified as xerophytes. They possess drought-resisting adaptations: loss of water through the leaves is reduced by means of dense hairs covering waxy leaf surfaces, by the closure of pores during the hottest times to reduce water loss, and by the rolling up or shedding of leaves at the beginning of the dry season. Some xerophytes, the succulents (including cacti), store water in their structures. Another way of countering drought is to have a limited amount of mass above ground and to have extensive root networks below ground. It is not unusual for the roots of some desert perennials to extend downward more than ten meters. Some plants are woody in type —an adaptation designed to prevent collapse of the plant tissue when water stress produces wilting. Another class of desert plant is the phreatophyte. These have adapted to the environment by the development of long taproots that penetrate downward until they approach the assured water supply provided by groundwater. Among these plants are the date palm, tamarisk, and mesquite. They commonly grow near stream channels, springs, or on the margins of lakes.

Animals also have to adapt to desert conditions, and they may do it through two forms of behavioral adaptation: they either escape or retreat. Escape involves such actions as aestivation, a condition of prolonged dormancy, or torpor, during which animals reduce their metabolic rate and body temperature during the hot season or during very dry spells.

Seasonal migration is another form of escape, especially for large mammals or birds. The term retreat is applied to the short-term escape behavior of desert animals, and it usually assumes the pattern of a daily rhythm. Birds shelter in nests, rock overhangs, trees, and dense shrubs to avoid the hottest hours of the day, while mammals like the kangaroo rat burrow underground.

Some animals have behavioral, physiological, and morphological (structural) adaptations that enable them to withstand extreme conditions. For example, the ostrich has plumage that is so constructed that the feathers are long but not too dense. When conditions are hot, the ostrich erects them on its back, thus increasing the thickness of the barrier between solar radiation and the skin. The sparse distribution of the feathers, however, also allows considerable lateral air movement over the skin surface, thereby permitting further heat loss by convection. Furthermore, the birds orient themselves carefully with regard to the Sun and gently flap their wings to increase convection cooling.

【Paragraph 1】The harsh conditions in deserts are intolerable for most plants and animals. Despite these conditions, however, many varieties of plants and animals have adapted to deserts in a number of ways. Most plant tissues die if their water content falls too low: the nutrients that feed plants are transmitted by water; water is a raw material in the vital process of photosynthesis; and water regulates the temperature of a plant by its ability to absorb heat and because water vapor lost to the atmosphere through the leaves helps to lower plant temperatures. Water controls the volume of plant matter produced. The distribution of plants within different areas of desert is also controlled by water. Some areas, because of their soil texture, topographical position, or distance from rivers or groundwater, have virtually no water available to plants, whereas others do.

1: According to paragraph 1, water provides all of the following essential functions for plants EXCEPT

○ improving plants’ability to absorb sunlight

○ preventing plants from becoming overheated

○ transporting nutrients

○ serving as a raw material for photosynthesis

【Paragraph 2】The nature of plant life in deserts is also highly dependent on the fact that they have to adapt to the prevailing aridity. There are two general classes of vegetation: long-lived perennials, which may be succulent (water-storing) and are often dwarfed and woody, and annuals or ephemerals, which have a short life cycle and may form a fairly dense stand immediately after rain.

【Paragraph 3】The ephemeral plants evade drought. Given a year of favorable precipitation, such plants will developvigorously and produce large numbers of flowers and fruit. This replenishes the seed content of the desert soil. The seeds then lie dormant until the next wet year, when the desert blooms again.

2: Paragraph 3 suggests that during a dry year ephemerals

○ produce even more seeds than in a wet year

○ do not sprout from their seeds

○ bloom much later than in a wet year

○ are more plentiful than perennials

3: How is paragraph 2 related to paragraph 3?

○ Paragraph 2 provides a general description of desert plants, and paragraph 3 provides a scientific explanation for these observations.

○ Paragraph 2 divides desert plants into two categories, and paragraph 3 provides further information about one of these categories.

○ Paragraph 2 proposes one way of dividing desert plants into categories, and paragraph 3 explains one problem with this method of classification.

○ Paragraph 2 discusses two categories of desert plants, and paragraph 3 introduces a third category of plants.

4: In saying that ephemerals will develop “vigorously" when there is favorable precipitation, the author means that their development will be

○ sudden

○ early

○ gradual

○ strong and healthy

【Paragraph 4】The perennial vegetation adjusts to the aridity by means of various avoidance mechanisms. Most desert plants are probably best classified as xerophytes. They possess drought-resisting adaptations: loss of water through the leaves is reduced by means of dense hairs covering waxy leaf surfaces, by the closure of pores during the hottest times to reduce water loss, and by the rolling up or shedding of leaves at the beginning of the dry season. Some xerophytes, the succulents (including cacti), store water in their structures. Another way of countering drought is to have a limited amount of mass above ground and to have extensive root networks below ground. It is not unusual for the roots of some desert perennials to extend downward more than ten meters. Some plants are woody in type —an adaptation designed to prevent collapse of the plant tissue when water stress produces wilting. Another class of desert plant is the phreatophyte. These have adapted to the environment by the development of long taproots that penetrate downward until they approach the assured water supply provided by groundwater. Among these plants are the date palm, tamarisk, and mesquite. They commonly grow near stream channels, springs, or on the margins of lakes.

5: The word “countering” in the passage is closest in meaning to

○ eliminating

○ making use of

○ acting against

○ experiencing

6: According to paragraph 4, some desert plants with root systems that are extraordinarily well developed have

○ relatively little growth aboveground

○ very leafy aboveground structures

○ non woody plant tissue resistant to wilting

○ water stored within their roots

7: The word “assured”in the passage is closest in meaning to

○ pure

○ diminished

○ guaranteed

○ deep

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8: What do “the date palm, tamarisk, and mesquite" have in common?

○ They are always found together.

○ They depend on surface water provided by streams, springs, and lakes.

○ They are phreatophytes.

○ Their roots are capable of breaking through hard soils

【Paragraph 5】Animals also have to adapt to desert conditions, and they may do it through two forms of behavioral adaptation: they either escape or retreat. Escape involves such actions as aestivation, a condition of prolonged dormancy, or torpor, during which animals reduce their metabolic rate and body temperature during the hot season or during very dry spells.

9: Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ One way animals escape is by entering a state of extended dormancy, known as aestivation, during the hottest and driest times of year.

○ Animals can escape without using direct action, or aestivation, simply by reducing their metabolic rate and body temperature.

○ The actions that an animal uses to escape are known as aestivation, which sometimes involves a reduction in metabolic rate or body temperature.

○ When the weather is especially hot and dry, an animal may suffer from a condition known as aestivation, at which point the animal needs to escape.

【Paragraph 6】Seasonal migration is another form of escape, especially for large mammals or birds. The term retreat is applied to the short-term escape behavior of desert animals, and it usually assumes the pattern of a daily rhythm. Birds shelter in nests, rock overhangs, trees, and dense shrubs to avoid the hottest hours of the day, while mammals like the kangaroo rat burrow underground.

10: It can be inferred from paragraph 6 that all of the places desert animals retreat to

○ provide shade from the sun

○ sometimes become crowded

○ are places where supplies of food are plentiful

○ leave the animals vulnerable to predators

【Paragraph 7】Some animals have behavioral, physiological, and morphological (structural) adaptations that enable them to withstand extreme conditions. For example, the ostrich has plumage that is so constructed that the feathers are long but not too dense. When conditions are hot, the ostrich erects them on its back, thus increasing the thickness of the barrier between solar radiation and the skin. The sparse distribution of the feathers, however, also allows considerable lateral air movement over the skin surface, thereby permitting further heat loss by convection. Furthermore, the birds orient themselves carefully with regard to the Sun and gently flap their wings to increase convection cooling.

11: According to paragraph 7, what special adaptation helps the ostrich cope with hot desert conditions?

○ Each of its feathers is very short and dense.

○ Its wings produce only lateral air movement when flapping.

○Its feathers are very thickly set on both its back and its wings.

○ It can make its feathers stand up on its back.

【Paragraph 1】The harsh conditions in deserts are intolerable for most plants and animals. Despite these conditions, however, many varieties of plants and animals have adapted to deserts in a number of ways. Most plant tissues die if their water content falls too low: the nutrients that feed plants are transmitted by water; water is a raw material in the vital process of photosynthesis; and water regulates the temperature of a plant by its ability to absorb heat and because water vapor lost to the atmosphere through the leaves helps to lower plant temperatures. ■Water controls the volume of plant matter produced. ■The distribution of plants within different areas of desert is also controlled by water. ■Some areas, because of their soil texture, topographical position, or distance from rivers or groundwater, have virtually no water available to plants, whereas others do.■

12: Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**The increase in reward still did not attract young people to this hard life, and convicted criminals and slaves were pressed into services**

Where would the sentence best fit?

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13:【**Directions】**Select from the seven phrases below the two phrases that correctly characterize special adaptations found primarily in desert annuals and the three phrases that correctly characterize special adaptations found primarily in desert perennials. Select each phrase you select in the appropriate column of the table. **This question is worth 3 points.**

Adaptations of Annuals

●

Adaptations of Perennials

●

●

●

Four of the phrases will NOT be used.

Answer Choices

○ Woody structures

○ Explosive growth in wet years

○ Long, thin, shallow roots

○ Storage of water in plant tissue

○ Minimization of the amount of water used for photosynthesis

○ Short life cycle

○ Leaves designed to minimize water loss

参考答案：

1. ○ 1

2.○2

3.○2

4. ○4

5. ○ 3

6. ○1

7. ○3

8. ○ 3

9. ○ 1

10. ○ 1

11. ○4

12. ○ 2

13. ANNUALS:

○ Explosive growth in wet years

○ Short life cycle

PERENNIALS:

○ Woody structures

○ Storage of water in plant tissue

○ Leaves designed to minimize water loss

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## **参考译文：沙漠环境中动植物的求生策略**

沙漠中的严酷环境对于大部分动植物来说都是难以忍受的。然而，尽管如此，还是有多样的动植物通过各种方式最终适应了沙漠环境。如果水含量过低，大部分植物组织会死亡；植物所汲取的养分是通过水分来传输的；水分也是光合作用这个关键过程中的成分；同时，水分通过吸收热量来调节植物体的温度，因为水蒸气通过叶片蒸腾到空气中的过程可以帮助植物降低温度。水分控制着植物物质的产出量。沙漠中不同地区的植物的分布也受水分的控制。在有些地区，因为土质、地形位置或者与河流或地下水的距离等因素，几乎没有水分提供给植物，而其他一些地方则相反。

沙漠中植物的特征很大程度上取决于它们对这种普遍干旱条件的适应程度。沙漠地区的植物大致可以分为两类：寿命较长的多年生植物，这类植物一般都是多肉植物（可以储水），经常是比较矮小的木本植物；以及一年生或寿命更短的植物，这类植物生命周期短，可能在降雨后快速而密集地形成。

那些寿命短的植物“|躲避”干旱。在一个降雨比较充足的年份中，这类植物会迅速生长，并且会大量地开花结果。如此一来，这类植物的种子会遍布沙漠。这些种子会静静地休眠直到下一个雨量较充沛的年份，再次在沙漠中绽放。

多年生植物会采用各种躲避机制以适应干旱。大部分的沙漠植物可能最好都被归类为旱生植物。这类植物进化出了抗旱适应机制：覆盖在蜡质叶子层表面的浓密的绒毛,在温度最高的时候闭合气孔,在干旱季初期卷起或脱落叶片都可以减少经过叶片的水分的流失。有些旱生植物在植物组织中贮存水分，如多肉植物（包括仙人掌）。另一种抵抗干旱的方法是抑制植物地上部分的生长，转而发展广泛的地下根系网络。有些多年生沙漠植物的根系可以向下延伸10米多深，这种情况（在沙漠中）并不少见。有些植物是木本植物，这种适应机制可以防止因水压（下降）产生萎蔫而引起的植物细胞解体。另一类沙漠植物类别则是地下水湿生植物。这类植物通过繁衍长的主根来适应环境，这些主根可以向下穿透直达地下水提供的充足水源。这类植物包括枣椰树、柽柳以及牧豆树属的一些灌木。这类植物通常情况下沿溪流，河道或者是湖泊边缘分布。

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动物也必须要适应沙漠环境，它们通过两种行为模式来适应沙漠：逃离或撤退。逃离包括一些类似于夏眠这样的行为，这一行为可以使得动物们在酷暑难耐或炎热季节依靠长期的休眠或蛰伏来降低它们的新陈代谢速率和体温。

季节性迁徙是逃离行为的另一种表现方式，特别是对于大型哺乳类动物和鸟类而言。撤退一词是用于形容短期的沙漠动物逃离行为的，而且这通常被认为是一种日常性的节律模式。鸟类在巢穴、岩石悬垂处、树丛以及茂密的灌木丛中寻找庇护以躲避一天当中最热的那几个钟头，而像更格卢鼠这样的哺乳动物则选择藏身于地下的洞穴中。

有些动物还具有行为学、生理学以及形态学（结构）上的适应机制，以确保它们可以抵抗极端环境。例如，鸵鸟的羽毛具有这样的结构特征：毛很长但不太浓密。当气温变热时，鸵鸟便会竖起背上的羽毛，因此增加太阳辅射与娇嫩皮肤之间的屏障的厚度。然而，这些稀疏排列的羽毛同时也确保了皮肤表面横向空气流动的进行，因此通过对流达到散热的效果。此外，鸵鸟会根据太阳的位置谨慎调整自己的方向，轻轻拍打翅膀以增加对流的降温效果。

## **Sumer and the First Cities of the Ancient Near East**

The earliest of the city states of the ancient Near East appeared at the southern end of the Mesopotamian plain, the area between the Tigris and Euphrates rivers in what is now Iraq. It was here that the civilization known as Sumer emerged in its earliest form in the fifth millennium. At first sight, the plain did not appear to be a likely home for a civilization. There were few natural resources, no timber, stone, or metals. Rainfall was limited, and what water there was rushed across the plain in the annual flood of melted snow. As the plain fell only 20 meters in 500 kilometers, the beds of the rivers shifted constantly. It was this that made the organization of irrigation, particularly the building of canals to channel and preserve the water, essential. Once this was done and the silt carried down by the rivers was planted, the rewards were rich: four to five times what rain-fed earth would produce. It was these conditions that allowed an elite to emerge, probably as an organizing class, and to sustain itself through the control of surplus crops.

It is difficult to isolate the factors that led to the next development—the emergence of urban settlements. The earliest, that of Eridu, about 4500 B.C.E., and Uruk, a thousand years later, center on impressive temple complexes built of mud brick. In some way, the elite had associated themselves with the power of the gods. Uruk, for instance, had two patron gods—Anu, the god of the sky and sovereign of all other gods, and Inanna, a goddess of love and war—and there were others, patrons of different cities. Human beings were at their mercy. The biblical story of the Flood may originate in Sumer. In the earliest version, the gods destroy the human race because its clamor had been so disturbing to them.

It used to be believed that before 3000 B.C.E. the political and economic life of the cities was centered on their temples, but it now seems probable that the cities had secular rulers from earliest times. Within the city lived administrators, craftspeople, and merchants. (Trading was important, as so many raw materials, the semiprecious stones for the decoration of the temples, timbers for roofs, and all metals, had to be imported.) An increasingly sophisticated system of administration led in about 3300 B.C.E. to the appearance of writing. The earliest script was based on logograms, with a symbol being used to express a whole word. The logograms were incised on damp clay tablets with a stylus with a wedge shape at its end. (The Romans called the shape cuneus and this gives the script its name of cuneiform.) Two thousand logograms have been recorded from these early centuries of writing. A more economical approach was to use a sign to express not a whole word but a single syllable. (To take an example: the Sumerian word for " head”was “sag.”Whenever a word including a syllable in which the sound “sag”was to be written, the sign for “sag" could be used to express that syllable with the remaining syllables of the word expressed by other signs.) By 2300 B.C.E. the number of signs required had been reduced to 600, and the range of words that could be expressed had widened. Texts dealing with economic matters predominated, as they always had done; but at this point works of theology, literature, history, and law also appeared.

Other innovations of the late fourth millennium include the wheel, probably developed first as a more efficient way of making pottery and then transferred to transport. A tablet engraved about 3000 B.C.E. provides the earliest known example from Sumer, a roofed boxlike sledge mounted on four solid wheels. A major development was the discovery, again about 3000 B.C.E., that if copper, which had been known in Mesopotamia since about 3500 B.C.E., was mixed with tin, a much harder metal, bronze, would result. Although copper and stone tools continued to be used, bronze was far more successful in creating sharp edges that could be used as anything from saws and scythes to weapons. The period from 3000 to 1000 B.C.E., when the use of bronze became widespread, is normally referred to as the Bronze Age.

【Paragraph 1】The earliest of the city states of the ancient Near East appeared at the southern end of the Mesopotamian plain, the area between the Tigris and Euphrates rivers in what is now Iraq. It was here that the civilization known as Sumer emerged in its earliest form in the fifth millennium. At first sight, the plain did not appear to be a likely home for a civilization. There were few natural resources, no timber, stone, or metals. Rainfall was limited, and what water there was rushed across the plain in the annual flood of melted snow. As the plain fell only 20 meters in 500 kilometers, the beds of the rivers shifted constantly. It was this that made the organization of irrigation, particularly the building of canals to channel and preserve the water, essential. Once this was done and the silt carried down by the rivers was planted, the rewards were rich: four to five times what rain-fed earth would produce. It was these conditions that allowed an elite to emerge, probably as an organizing class, and to sustain itself through the control of surplus crops.

1: Which of the following is NOT mentioned in paragraph 1 as a disadvantage of the Mesopotamian plain?

○There was not very much rainfall for most of the year.

○ Melting snow caused flooding every year.

○ The silt deposited by rivers damaged crops.

○ Timber, stone and metals were not readily available.

2: According to paragraph 1, which of the following made it possible for an elite to emerge?

○ New crops were developed that were better suited to conditions on the Mesopotamian plain.

○ The richest individuals managed to gain control of the most valuable cropland.

○ Control over the few available natural resources made some people four to five times richer than everyone else.

○ The building of canals to increase agricultural output required organization.

3: The word “sustain" in the passage is closest in meaning to

○ defend

○ promote

○ maintain

○ transform

【Paragraph 2】It is difficult to isolate the factors that led to the next development—the emergence of urban settlements. The earliest, that of Eridu, about 4500 B.C.E., and Uruk, a thousand years later, center on impressive temple complexes built of mud brick. In some way, the elite had associated themselves with the power of the gods. Uruk, for instance, had two patron gods—Anu, the god of the sky and sovereign of all other gods, and Inanna, a goddess of love and war—and there were others, patrons of different cities. Human beings were at their mercy. The biblical story of the Flood may originate in Sumer. In the earliest version, the gods destroy the human race because its clamor had been so disturbing to them.

4: According to paragraph 2, Eridu and Uruk are examples of urban settlements that

○ lacked the features usually found in other early urban settlements

○ developed around religious buildings

○ grew much more rapidly than most of the urban settlements found in Sumer

○ were mysteriously destroyed and abandoned

5: The word “sovereign" in the passage is closest in meaning to

○ counselor

○ master

○ defender

○ creator

【Paragraph 3】It used to be believed that before 3000 B.C.E. the political and economic life of the cities was centered on their temples, but it now seems probable that the cities had secular rulers from earliest times. Within the city lived administrators, craftspeople, and merchants. (Trading was important, as so many raw materials, the semiprecious stones for the decoration of the temples, timbers for roofs, and all metals, had to be imported.) An increasingly sophisticated system of administration led in about 3300 B.C.E. to the appearance of writing. The earliest script was based on logograms, with a symbol being used to express a whole word. The logograms were incised on damp clay tablets with a stylus with a wedge shape at its end. (The Romans called the shape cuneus and this gives the script its name of cuneiform.) Two thousand logograms have been recorded from these early centuries of writing. A more economical approach was to use a sign to express not a whole word but a single syllable. (To take an example: the Sumerian word for " head”was “sag.”Whenever a word including a syllable in which the sound “sag”was to be written, the sign for “sag" could be used to express that syllable with the remaining syllables of the word expressed by other signs.) By 2300 B.C.E. the number of signs required had been reduced to 600, and the range of words that could be expressed had widened. Texts dealing with economic matters predominated, as they always had done; but at this point works of theology, literature, history, and law also appeared.

6: According to paragraph 3, which of the following led to the appearance of writing?

○ An increasingly sophisticated administrative system

○ Coordination between secular and religious leaders

○ The large volume of trade, particularly imports

○ A rapidly expanding and changing population

7: In paragraph 3, why does the author provide the information that the number of signs in use had dropped from 2,000 to 600 by 2300 B.C.E.?

○ To argue that the development of writing involved periods of growth followed by periods of decline

○ To demonstrate that earlier written texts used a larger vocabulary than later texts, which were aimed at a broader audience

○ To support the claim that the range of words expressed by logograms varied widely depending on time period and type of text

○ To provide evidence for the increased efficiency of using signs to express syllables rather than whole words

8: According to paragraph 3, ancient texts most commonly dealt with

○ theology

○ literature

○ economics

○ law

【Paragraph 4】Other innovations of the late fourth millennium include the wheel, probably developed first as a more efficient way of making pottery and then transferred to transport. A tablet engraved about 3000 B.C.E. provides the earliest known example from Sumer, a roofed boxlike sledge mounted on four solid wheels. A major development was the discovery, again about 3000 B.C.E., that if copper, which had been known in Mesopotamia since about 3500 B.C.E., was mixed with tin, a much harder metal, bronze, would result. Although copper and stone tools continued to be used, bronze was far more successful in creating sharp edges that could be used as anything from saws and scythes to weapons. The period from 3000 to 1000 B.C.E., when the use of bronze became widespread, is normally referred to as the Bronze Age.

9: According to paragraph 4, the earliest wheels probably

○were first developed in areas outside Mesopotamia

○were used to make pottery

○ appeared on boxlike sledges

○ were used to transport goods between cities

10: The word “engraved”in the passage is closest in meaning to

○ carved

○ produced

○dated

○ discovered

11: Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Also around 3000 B.C.E., it was discovered that mixing copper, known from about 3500 B.C.E., with tin would create a much harder metal known as bronze.

○ Although copper had been known since 3500 B.C.E in Mesopotamia, the discovery of bronze did not occur until around 3000 B.C.E.

○ Another major development around 3000 B.C.E. was the discovery that copper could be mixed with a much harder metal known as tin.

○ The development of bronze by mixing copper and tin probably occurred around 3000 B.C.E. but may have happened as early as 3500 B.C.E.

12: The word “widespread”in the passage is closest in meaning to

○ obvious

○ significant

○ necessary

○ common

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【Paragraph 3】It used to be believed that before 3000 B.C.E. the political and economic life of the cities was centered on their temples, but it now seems probable that the cities had secular rulers from earliest times. ■Within the city lived administrators, craftspeople, and merchants. (Trading was important, as so many raw materials, the semiprecious stones for the decoration of the temples, timbers for roofs, and all metals, had to be imported.) ■An increasingly sophisticated system of administration led in about 3300 B.C.E. to the appearance of writing. ■The earliest script was based on logograms, with a symbol being used to express a whole word. ■The logograms were incised on damp clay tablets with a stylus with a wedge shape at its end. (The Romans called the shape cuneus and this gives the script its name of cuneiform.) Two thousand logograms have been recorded from these early centuries of writing. A more economical approach was to use a sign to express not a whole word but a single syllable. (To take an example: the Sumerian word for " head”was “sag.”Whenever a word including a syllable in which the sound “sag”was to be written, the sign for “sag" could be used to express that syllable with the remaining syllables of the word expressed by other signs.) By 2300 B.C.E. the number of signs required had been reduced to 600, and the range of words that could be expressed had widened. Texts dealing with economic matters predominated, as they always had done; but at this point works of theology, literature, history, and law also appeared.

13: Look at the four squares [■]that indicate where the following sentence could be added to the passage.

**City life was diverse, and the population was engaged in a variety of occupations.**

Where would the sentence best fit?

14: 【**Directions】**An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minorideas in the passage. This question is worth 2 points.

Irrigation made it possible for the civilization known as Sumer to arise on the Mesopotamian plain in the fifth millennium B.C.E.

●

●

●

Answer Choices

○The scarcity of natural resources on the plain made it necessary for a powerful elite to emerge and take charge of trade and imports.

○ The economy of each city was based on a craft such as pottery or metal working, and the city of Eridu was known for its saws, scythes and weapons.

○ Writing appeared in the form of logograms and later developed into a system using signs to represent syllables rather than whole words.

○ Priests were powerful figures in the ancient civilization and controlled the political and economic life of the cities.

○ The earliest city states had one or more patron gods and were built around central temple complexes.

○ The development of the wheel and the creation of bronze were important innovations in Sumer

参考答案：

1. ○3

2. ○4

3. ○3

4. ○2

5.○ 2

6. ○1

7. ○4

8. ○3

9. ○2

10.○ 1

11. ○1

12. ○4

13. ○1

14. ○ Writing appeared in the form of logograms and later developed into a system using signs to represent syllables rather than whole words.

○ The earliest city states had one or more patron gods and were built around central temple complexes.

○ The development of the wheel and the creation of bronze were important innovations in Sumer

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：苏美尔与古代近东的第一个城邦**

古代西亚地区最早的城邦出现在美索不达米亚平原的最南边，这个位于底格里斯河和幼发拉底河之间如今被称为伊拉克的地区。5 000年前，正是在这里出现了苏美尔文明的早期形态。乍看之下，这个平原并不像是一个（古老）文明的发源地。这里自然资源稀缺，木材、石料以及金属都极其匮乏。降雨量有限，当地水资源的主要来源是每年冰雪融化导致的冲过平原的洪水。因为该平原在方圆500公里内的海拔落差只有20米，所以河床（的位置）不断地发生变化。这就使得灌溉系统的规划至关重要，特别是（如何）建造水渠以疏导和保存水资源。这些灌溉工程完成以及河流冲积下的淤泥就会沉积在此处，带来的回报相当可观：其产出量会比靠雨水滋润的土地高出4~5倍。正是这些环境条件使得在该地诞生了一个可能充当管理阶层的“精英”，这一阶层通过对余粮的控制来养活自己。

很难把导致苏美尔文明进一步发展，即城市聚居点的出现的诸多因素孤立起来看待。其中最早的，如公元前4500年的埃利都以及之后1000年出现的乌鲁克，都以用泥砖建造的令人惊叹的庙宇群为中心。通过某些方式，这些“精英”将自己与神灵之力联系在一起。以乌鲁克为例，这个城邦有两个守护神——天神以及众神之主安努和爱与战争女神伊南娜——不同的城市还有其他的守护神。人类受神灵庇佑且掌控。圣经中关于洪水的故事可能起源于苏美尔。在最早的版本中，神灵们意图毁灭人类，因为人类太过喧嚣吵闹令诸神厌烦不已。

曾经，人们认为公元前3000年之前，这些城邦的政治经济生活是以庙宇群为中心的，但是现在看来，这些城邦很可能早期就有世俗的统治者。城邦中生活着管理者们、手工艺人以及商人。（因为有如此多的原材料、装饰庙宇用的半宝石石料、建造屋顶用的木材以及所有的金属都必须进口，贸易就显得很重要了。）一个日益复杂的管理系统促使了书写在公元前3300年左右的诞生。最早的手写体以缩记符为基础，用符号来表达一个词。这些字符是用楔形状的铁笔，被雕刻在潮湿的陶土版上（因此字符末端也呈楔形）。（古罗马人把这种形状称之为楔形（cuneus）并把这种手写体称之为楔形文字（cuneiform）。）这些早期的书写文字记录了2000个这样的字符。后来出现一种更加方便的书写方法：使用一个符号去代表一个音节而非整个单词。（例如，在苏美尔语中表示“头”的词是“sag”。每当一个词中含有“sag”这个音节，书写时都会写上“sag”，“sag”被用于表达这一发音，而该词其他部分的发音则会用其他的符号来表达。）到公元前2300年，书写所需用到的符号数量下降到了600个。单词表达的范围却扩大了。有关经济方面的文本占主导地位，它们历来如此；但同时，关于神学、文学、历史和法律的作品也孕育而生了。

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4000年前的晚期的发明还包括轮子，这一发明最初可能是用于提高陶器的生产效率的，而后被应用到交通运输上。雕刻于约公元前3000年、来自苏美尔的一块陶土板上提供了已知最早的例证：一个带顶棚的箱状雪橇被安装在四个实心的轮子上。一个重大进展同样也发生在约公元前3000年，铜在约公元前3500年就为美索不达米亚人所熟知，如果将铜和锡混合在一起，就可以制造出一种更坚硬的金属——青铜。虽然铜制和石器还在继续被使用，但是青铜器更受欢迎，因为它可以被铸成锋利的边缘应用到锯、镰刀和武器等各方面。公元前3000年到公元前1000年青铜器被广泛使用的这一时期通常被称为青铜时代。

TPO-27

## **Crafts in the Ancient Near East**

Some of the earliest human civilizations arose in southern Mesopotamia, in what is now southern Iraq, in the fourth millennium B.C.E. In the second half of the millennium, in the south around the city of Uruk, there was an enormous escalation in the area occupied by permanent settlements. A large part of that increase took place in Uruk itself, which became a real urban center surrounded by a set of secondary settlements. While population estimates are notoriously unreliable, scholars assume that Uruk inhabitants were able to support themselves from the agricultural production of the field surrounding the city, which could be reached with a daily commute. But Uruk’s dominant size in the entire region, far surpassing that of other settlements, indicates that it was a regional center and a true city. Indeed, it was the first city in human history.

The vast majority of its population remained active in agriculture, even those people living within the city itself. But a small segment of the urban society started to specialize in nonagricultural tasks as a result of the city’s role as a regional center. Within the productive sector, there was a growth of a variety of specialist craftspeople. Early in the Uruk period, the use of undecorated utilitarian pottery was probably the result of specialized mass production. In an early fourth-millennium level of the Eanna archaeological site at Uruk, a pottery style appears that is most characteristic of this process, the so-called beveled-rim bowl. It is a rather shallow bowl that was crudely made in a mold; hence, in only a limited number of standard sizes. For some unknown reason, many were discarded, often still intact, and thousands have been found all over the Near East. The beveled-rim bowl is one of the most telling diagnostic finds for identifying an Uruk-period site. Of importance is the fact that it was produced rapidly in large amounts, most likely by specialists in a central location.

A variety of documentation indicates that certain goods, once made by a family member as one of many duties, were later made by skilled artisans. Certain images depict groups of people, most likely women, involved in weaving textiles, an activity we know from later third-millennium texts to have been vital in the economy and to have been centrally administered. Also, a specialized metal-producing workshop may have been excavated in a small area at Uruk. It contained a number of channels lined by a sequence of holes, about 50 centimeters deep, all showing burn marks and filled with ashes. This has been interpreted as the remains of a workshop where molten metal was scooped up from the channel and poured into molds in the holes. Some type of mass production by specialists were involved here.

Objects themselves suggest that they were the work of skilled professionals. In the late Uruk period(3500-3100 B.C.E.), there first appeared a type of object that remained characteristic for Mesopotamia throughout its entire history: the cylinder seal. This was a small cylinder, usually no more than 3 centimeters high and 2 centimeters in diameter, of shell, bone, faience (a glassy type of stoneware), or various types of stones, on which a scene was carved into the surface. When rolled over a soft material----primarily the clay of bullae (round seals), tablets, or clay lumps attached to boxes, jars, or door bolts----the scene would appear in relief, easily legible. The technological knowledge needed to carved it was far superior to that for stamp seals, which had happened in the early Neolithic period (approximately 10,000-5000 B.C.E.). From the first appearance of cylinder seals, the carved scenes could be highly elaborate and refined, indicating the work of specialist stone-cutters. Similarly, the late Uruk period shows the first monumental art, relief, and statuary in the round, made with a degree of mastery that only a professional could have produced.

【Paragraph 1】Some of the earliest human civilizations arose in southern Mesopotamia, in what is now southern Iraq, in the fourth millennium B.C.E. In the second half of the millennium, in the south around the city of Uruk, there was an enormous escalation in the area occupied by permanent settlements. A large part of that increase took place in Uruk itself, which became a real urban center surrounded by a set of secondary settlements. While population estimates are notoriously unreliable, scholars assume that Uruk inhabitants were able to support themselves from the agricultural production of the field surrounding the city, which could be reached with a daily commute. But Uruk’s dominant size in the entire region, far surpassing that of other settlements, indicates that it was a regional center and a true city. Indeed, it was the first city in human history.

1.which of the sentences below best express the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Although scholars cannot accurately determine the size of the Uruk population, they know the citizens were not dependent on agriculture.

○scholars do not have enough evidence to determine whether the agriculture areas just outside of Uruk were large enough to feed the city’s population.

○Because city populations cannot feed themselves, scholars think the surrounding farms provided food to the people in Uruk.

○Scholars believe that the inhabitants of Uruk were able to support themselves from product grown in field surrounding the city.

2.The word “surpassing”in the passage is closest in meaning to

○proceeding

○exceeding

○challenging

○outlasting

3.According to paragraph 1, all of the following are true of the ancient settlement at Uruk EXCEPT:

○It was a permanent settlement.

○It was self-sufficient.

○It was one of a group of other larger settlements.

○It had easy access to the land where its crops were grown.

【Paragraph 2】The vast majority of its population remained active in agriculture, even those people living within the city itself. But a small segment of the urban society started to specialize in nonagricultural tasks as a result of the city’s role as a regional center. Within the productive sector, there was a growth of a variety of specialist craftspeople. Early in the Uruk period, the use of undecorated utilitarian pottery was probably the result of specialized mass production. In an early fourth-millennium level of the Eanna archaeological site at Uruk, a pottery style appears that is most characteristic of this process, the so-called beveled-rim bowl. It is a rather shallow bowl that was crudely made in a mold; hence, in only a limited number of standard sizes. For some unknown reason, many were discarded, often still intact, and thousands have been found all over the Near East. The beveled-rim bowl is one of the most telling diagnostic finds for identifying an Uruk-period site. Of importance is the fact that it was produced rapidly in large amounts, most likely by specialists in a central location.

4. The word “intact”in the passage is closest in meaning to

○unsold

○unused

○undamaged

○unpainted

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5. According to paragraph 2, which of the following best describes the beveled-rim bowls from the Eanna Archaeological site at Uruk.

○They were discarded because they became unpopular.

○They varied greatly in shape and decoration.

○They were each individually styled.

○They were made in only a few sizes.

6.Which of the following can be inferred from paragraph 2 about craft production in the Uruk period?

○Specialists in nonagricultural tasks obtained a higher status than those engaged in agricultural production.

○People not needed for farming could perform other more specialized activities.

○Ancient crafts were beginning to be produced for both utilitarian and decorative purposes.

○Pottery making was the only known during the fourth millennium.

【Paragraph 3】A variety of documentation indicates that certain goods, once made by a family member as one of many duties, were later made by skilled artisans. Certain images depict groups of people, most likely women, involved in weaving textiles, an activity we know from later third-millennium texts to have been vital in the economy and to have been centrally administered. Also, a specialized metal-producing workshop may have been excavated in a small area at Uruk. It contained a number of channels lined by a sequence of holes, about 50 centimeters deep, all showing burn marks and filled with ashes. This has been interpreted as the remains of a workshop where molten metal was scooped up from the channel and poured into molds in the holes. Some type of mass production by specialists were involved here.

7.According to paragraph 3, which of the following is true of textile production after the fourth millennium?

It had an important commercial value.

○It existed but was not well organized.

○It is not documented in the archaeological record.

○It was carried on by individuals in their own homes.

8. The word “interpreted”in the passage is closest in meaning to

○documented

○debated

○displayed

○understood

9. What is the purpose of paragraph 3?

○To contrast the productivity of crafts workers in the third and fourth millennia

○To provide additional evidence of mass production by crafts workers

○To suggest that an early form of urban settlement may have exist before Uruk

○To contrast the development of weaving and pottery in Uruk

【Paragraph 4】Objects themselves suggest that they were the work of skilled professionals. In the late Uruk period(3500-3100 B.C.E.), there first appeared a type of object that remained characteristic for Mesopotamia throughout its entire history: the cylinder seal. ■This was a small cylinder, usually no more than 3 centimeters high and 2 centimeters in diameter, of shell, bone, faience (a glassy type of stoneware), or various types of stones, on which a scene was carved into the surface. ■When rolled over a soft material----primarily the clay of bullae (round seals), tablets, or clay lumps attached to boxes, jars, or door bolts----the scene would appear in relief, easily legible. ■The technological knowledge needed to carved it was far superior to that for stamp seals, which had happened in the early Neolithic period (approximately 10,000-5000 B.C.E.). ■From the first appearance of cylinder seals, the carved scenes could be highly elaborate and refined, indicating the work of specialist stone-cutters. Similarly, the late Uruk period shows the first monumental art, relief, and statuary in the round, made with a degree of mastery that only a professional could have produced.

10. The word “legible”in the passage is closest in meaning to

○printable

○enjoyable

○recognizable

○available

11. Paragraph 4 suggests which of the following about the significances of Mesopotamian cylinder seals?

○They were designed more for home than for legal use.

○They demonstrate that their creators were professionals.

○They were the first example of seals made from materials other than stone.

○They were the first example of carved seals.

12. According to paragraph 4, one of the artistic achievements of the late Uruk culture was

○Its sophisticated sculpture and relief carving

○Its architecturally complex monuments

○Its invention of stamp seals carved from stone

○Its use of highly refined glassy stoneware

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**When viewed on the curved surface of the cylinder, the image looked distorted, but the carved image served only as a mold.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Uruk, located in ancient Mesopotamia, flourished in the fourth millennium B.C.E. and was the first city in human history.

●

●

●

Answer Choices

○A variety of evidence indicates that Uruk, while it supported itself primarily by agriculture, also had specialized craft workers.

○The monumental sculptures of Uruk were made by the specialist stone cutters who also produced small-scale relief scenes on shell, bone and faience.

○The large number, standardized sizes, and simple molded construction of a type of pottery produced in Uruk demonstrate specialized, centrally organized mass production.

○Cylinder seals from the late Uruk period are far superior to the stamp earlier Neolithic period.

○Archaeological evidence from across the Near East indicates that Uruk was a center for the production and export of highly decorated pottery made by craft specialists in private homes.

○The carved designs on cylinder seals produced in Uruk are of such technical and artistic excellence that they could only have been produced by professional artisans.

参考答案

1.○4

2.○2

3.○3

4.○3

5.○4

6.○2

7.○1

8.○4

9.○2

10.○3

11.○2

12.○1

13.○2

14. A variety of evidence indicates…

Archaeological evidence from across…

The carved designs on cylinder…

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## **参考译文：古代近东的工匠**

一些最早的人类文明是在公元前四千年前的南美索不达米亚出现的，现在这片区域处于南伊拉克。在后五百年，在乌鲁克城南方附近，被永久居留民占用的地域在大幅度增长。大部分的增长都发生在乌鲁克城内，使其成为了一个真正的中心诚区，并被一些后续的定居点环绕着。虽然人口估计数通常是不可靠的，但学者们认为乌鲁克居民可以通过日常与周围地区的通勤，得到周围地区产的农业产品以自给自足。但乌鲁克在整个地区最大，远远超过了其它居民点，这说明它是这个地区的中心，是一个真正的城市。事实上，它是人类历史上的第一个城市。

绝大部分人依然从事农业活动，甚至包括城市居民。但由于该城市是区域的中心，其中的一小部分人开始全心从事非农业工作。生产方面，专业工匠的多样性有了增长。在乌鲁克时期早期，对未装饰的实用陶器的使用可能就是专业化大量生产的结果。在乌鲁克的发现的四千年前早期的Eanna考古遗址中，有一种陶器刻画了这种专业化生产过程的特征，即所谓的斜面边碗。这种碗相当的浅，是利用模具简单制作的；因此，只有有限的几种大小。由于一些未知原因，很多被丢弃的碗还是完整的保存下来了，而在近东的各地有上千件出土。这种碗是最好的判断乌鲁克时期遗址的发现之一。最重要的是这种碗被大量快速生产，最可能由中心位置的专业工匠制作。

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多种文件记录说明，曾经作为义务被家庭制作的商品，在后来由熟练技工制作。一些图画描述了成群的人们，大部分是女人，正在编制纺织品。这种活动，从其后三千年前出土的文献可知，是当时经济的重要部分，并且已被中央管理。并且一个专门从事金属制造的工厂可能也已经小区域的在乌鲁克地区开挖。它包括了一定数量隧道连接着一系列约50厘米深的洞，它们都有燃烧的痕迹，也盛满了灰烬。这被认定是工厂的遗址，在这里融化的金属从隧道中聚集，然后倒入洞里的模具中。这里包括一些由专业人士进行的大量生产活动。

产品的本身就说明了它们是由专业技工制作的。在乌鲁克时期末期首次出现了一种在其整个历史中象征美索不达米亚的物品：圆柱章。它是一个小的圆柱体，一般不高于3厘米，直径2厘米，材料为贝壳，骨头，陶器或是各种石头，在其表面刻着一个场景。当它滚过柔软的材料的时候---主要是被连接在箱子，罐子或是门栓上的粘土圆章，纪念碑，泥土块--- 这个场景就会清晰简单的出现在上面了。相对于新石器时期（大约是公元前10000-5000年前）的封章，这种雕刻技术依然是很先进的。从圆柱章的出现开始，被雕刻的图像就非常精致精美，这表现了石头切割者的专业技术。同样的，在乌鲁克时期晚期出现了第一个大师级别制作的永存的艺术和雕刻，这是只有非常专业的人才能做出的。

## **The Formation of Volcanic Islands**

Earth’s surface is not made up of a single sheet of rock that forms a crust but rather a number of “tectonic plates”that fit closely, like the pieces of a giant jigsaw puzzle. Some plates carry islands or continents others form the seafloor. All are slowly moving because the plates float on a denser semi-liquid mantle, the layer between the crust and Earth’s core. The plates have edges that are spreading ridges (where two plates are moving apart and new seafloor is being created), subduction zones (where two plates collide and one plunges beneath the other), or transform faults (where two plates neither converge nor diverge but merely move past one another). It is at the boundaries between plates that most of Earth’s volcanism and earthquake activity occur.

Generally speaking, the interiors of plates are geologically uneventful. However, there are exceptions. A glance at a map of the Pacific Ocean reveals that there are many islands far out at sea that are actually volcanoes----many no longer active, some overgrown with coral----that originated from activity at points in the interior of the Pacific Plate that forms the Pacific seafloor.

How can volcanic activity occur so far from a plate boundary? The Hawaiian Islands provide a very instructive answer. Like many other island groups, they form a chain. The Hawaiian Islands Chain extends northwest from the island of Hawaii. In the 1840s American geologist James Daly observed that the different Hawaii islands seem to share a similar geologic evolution but are progressively more eroded, and therefore probable older, toward the northwest. Then in 1963, in the early days of the development of the theory of plate tectonics. Canadian geophysicist Tuzo Wilson realized that this age progression could result if the islands were formed on a surface plate moving over a fixed volcanic source in the interior. Wilson suggested that the long chain of volcanoes stretching northwest from Hawaii is simply the surface expression of a long-lived volcanic source located beneath the tectonic plate in the mantle. Today’s most northwest island would have been the first to form. Then as the plate moved slowly northwest, new volcanic islands would have forms as the plate moved over the volcanic source. The most recent island, Hawaii, would be at the end of the chain and is now over the volcanic source.

Although this idea was not immediately accepted, the dating of lavas in the Hawaii (and other) chains showed that their ages increase away from the presently active volcano, just as Daly had suggested. Wilson’s analysis of these data is now a central part of plate tectonics. Most volcanoes that occur in the interiors of plates are believed to be produced by mantle plumes, columns of molten rock that rise from deep within the mantle. A volcano remains an active “hot spot”as long as it is over the plume. The plumes apparently originate at great depths, perhaps as deep as the boundary between the core and the mantle, and many have been active for a very long time. The oldest volcanoes in the Hawaii hot-spot trail have ages close to 80 million years. Other islands, including Tahiti and Easter Islands in the pacific, Reunion and Mauritius in the India Ocean, and indeed most of the large islands in the world’s oceans, owe their existence to mantle plumes.

The oceanic volcanic islands and their hot-spot trails are thus especially useful for geologist because they record the past locations of the plate over a fixed source. They therefore permit the reconstruction of the process of seafloor spreading, and consequently of the geography of continents and of ocean basins in the past. For example, given the current position of the Pacific Plate, Hawaii is above the Pacific Ocean hot spot. So the position of The Pacific Plate 50 million years ago can be determined by moving it such that a 50-million-year-old volcano in the hot-spot trail sits at the location of Hawaii today. However because the ocean basins really are short-lived features on geologic times scale, reconstruction the world’s geography by backtracking along the hot-spot trail works only for the last 5 percent or so of geologic time.

【Paragraph 1】Earth’s surface is not made up of a single sheet of rock that forms a crust but rather a number of “tectonic plates”that fit closely, like the pieces of a gain jigsaw puzzle. Some plates carry islands or continents, others form the seafloor. All are slowly moving because the plates float on a denser sem-liquid mantle, the layer between the crust and Earth’s core. The plates have edges that are spreading ridges (where two plates are moving apart and new seafloor is being created), subduction zones (where two plates collide and one plunges beneath the other), or transform faults (where two plates neither converge nor diverge but merely move past one another). It is at the boundaries between plates that most of Earth’s volcanism and earthquake activity occur.

1.The author mentions “spreading ridges”, “subduction zones”, and “transform faults”in order to

○illustrate that the boundaries of tectonic plates are neat, thin lines

○explain why some tectonic plates carry islands or continents while others form the seafloor

○explain the complex nature of the edges of tectonic plates

○provide examples of areas of tectonic plates where little geologic action occurs

2. The word “converge”in the passage is closest in meaning to

○expand

○form

○rise

○move closer

【Paragraph 2】Generally speaking, the interiors of plates are geologically uneventful. However, there are exceptions. A glance at a map of the Pacific Ocean reveals that there are many islands far out at sea that are actually volcanoes----many no longer active, some overgrown with coral----that originated from activity at points in the interior of the Pacific Plate that forms the Pacific seafloor.

3.which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information

○Volcanic activity is responsible for the formation of the Pacific seafloor in the interior of the Pacific Plate.

○Many volcanoes in the Pacific Ocean are no longer active and have become islands that support coral.

○There are many islands in the Pacific Ocean that originated as volcanoes in the interior of the Pacific Plate.

○The map of the Pacific Ocean reveals fewer volcanic islands than there truly are because many are no longer active and some are completely overgrown with coral.

【Paragraph 3】How can volcanic activity occur so far from a plate boundary? The Hawaiian islands provide a very instructive answer. Like many other island groups, they form a chain. The Hawaiian Islands Chain extends northwest from the island of Hawaii. In the 1840s American geologist James Daly observed that the different Hawaii islands seem to share a similar geologic evolution but are progressively more eroded, and therefore probable older, toward the northwest. Then in 1963, in the early days of the development of the theory of plate tectonics. Canadian geophysicist Tuzo Wilson realized that this age progression could result if the islands were formed on a surface plate moving over a fixed volcanic source in the interior. Wilson suggested that the long chain of volcanoes stretching northwest from Hawaii is simply the surface expression of a long-lived volcanic source located beneath the tectonic plate in the mantle. Today’s most northwest island would have been the first to form. They as the plate moved slowly northwest, new volcanic islands would have forms as the plate moved over the volcanic source. The most recent island, Hawaii, would be at the end of the chain and is now over the volcanic source.

4. The word “instructive”in the passage is closest in meaning to

○clear

○detailed

○informative

○familiar

5. The word “eroded”in the passage is closest in meaning to

○worm down

○scattered

○developed

○deserted

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6.In paragraph 3, what is the relationship between the scientific contribution of James Daly and Tuzo Wilson?

○Wilson provided an explanation for the observations made by Daly.

○Wilson challenged the theory proposed by Daly.

○Wilson found numerous examples of island chains that supported Daly’s theory.

○Wilson popularized the explanation of volcanic island formation formulated by Daly.

【Paragraph 4】Although this idea was not immediately accepted, the dating of lavas in the Hawaii (and other) chains showed that their ages increase away from the presently active volcano, just as Daly had suggested. Wilson’s analysis of these data is now a central part of plate tectonics. Most volcanoes that occur in the interiors of plates are believed to be produced by mantle plumes, columns of molten rock that rise from deep within the mantle. A volcano remains an active “hot spot”as long as it is over the plume. The plumes apparently originate at great depths, perhaps as deep as the boundary between the core and the mantle, and many have been active for a very long time. The oldest volcanoes in the Hawaii hot-spot trail have ages close to 80 million years. Other islands, including Tahiti and Easter Islands in the pacific, Reunion and Mauritius in the India Ocean, and indeed most of the large islands in the world’s oceans, owe their existence to mantle plumes.

7.Why does the author provide the information that “the dating of lavas in the Hawaii (and other) chains showed that their ages increase away from the presently active volcano”?

○To point out differences between the Hawaii island chain and other volcanic island chains

○To question the idea that all the islands in an island chain have been formed by volcanic activity

○To explain why Wilson hypothesis was initially difficult to accept

○To provide evidence in support of Daly’s and Wilson’s ideas about how the Hawaii islands were formed

8.According to paragraph 4, which of the following is true of mantle plumes

○They exist close to the surface of tectonic plates.

○They cause most of the volcanic activity that occurs in the interiors of plates.

○They are rarely active for long period of time.

○They get increasingly older away from the present hot spots.

【Paragraph 5】The oceanic volcanic islands and their hot-spot trails are thus especially useful for geologist because they record the past locations of the plate over a fixed source. They therefore permit the reconstruction of the process of seafloor spreading, and consequently of the geography of continents and of ocean basins in the past. For example, given the current position of the Pacific Plate, Hawaii is above the Pacific Ocean hot spot. So the position of The Pacific Plate 50 million years ago can be determined by moving it such that a 50-million-year-old volcano in the hot-spot trail sits at the location of Hawaii today. However because the ocean basins really are short-lived features on geologic times scale, reconstruction the world’s geography by backtracking along the hot-spot trail works only for the last 5 percent or so of geologic time.

9.According to paragraph 5, volcanic islands help geologists to

○reconstruct past geography

○detect changes in mantle plumes

○measure the rigidity of tectonic plates

○explain why the seafloor spreads

10.What can be inferred about the Pacific Plate from paragraph 5?

○The hot spots on the Pacific Plate are much older than the ones located on the other tectonic plates.

○Most of the volcanic sources beneath the Pacific Plate have become extinct.

○The Pacific Plate has moved a distance equal to the length of the Hawaiian Island chain in the past 80 million years.

○The Pacific Plate is located above fewer mantle plumes than other plates are.

11. The word “current”in the passage is closest in meaning to

○original

○ideal

○relative

○present

12.According to paragraph 5, why are geologists unable to trace back the entire geologic of continents from hot-spot trails?

○Hot spots have existed for only about 5 percent of geologic time.

○Hawaii did not exist 50 millions years ago.

○Oceanic basins that contained old hot-spot trails disappeared a long time ago.

○Hot-spot trails can be reconstructed only for island chains.

【Paragraph 3】How can volcanic activity occur so far from a plate boundary? The Hawaiian islands provide a very instructive answer. ■Like many other island groups, they form a chain. ■The Hawaiian Islands Chain extends northwest from the island of Hawaii. ■In the 1840s American geologist James Daly observed that the different Hawaii islands seem to share a similar geologic evolution but are progressively more eroded, and therefore probable older, toward the northwest. ■Then in 1963, in the early days of the development of the theory of plate tectonics. Canadian geophysicist Tuzo Wilson realized that this age progression could result if the islands were formed on a surface plate moving over a fixed volcanic source in the interior. Wilson suggested that the long chain of volcanoes stretching northwest from Hawaii is simply the surface expression of a long-lived volcanic source located beneath the tectonic plate in the mantle. Today’s most northwest island would have been the first to form. They as the plate moved slowly northwest, new volcanic islands would have forms as the plate moved over the volcanic source. The most recent island, Hawaii, would be at the end of the chain and is now over the volcanic source.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This pattern remained unexplained for a long time.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Although volcanic activity is concentrated on the edge of tectonic plates, such activity can occur in the interiors of plates as well.

●

●

●

Answer Choices

○Our understanding of islands comes from Daly’s and Wilson’s observations of the Hawaiian Islands, which was later confirmed by plate-tectonic theory.

○The hot-spot trails formed by volcanic island chains indicate the positions of tectonic plates as for back as the present ocean basins have existed.

○Whereas volcanic islands formed by mantle plumes are typically small, most of the world’s largest islands are formed at the edges of tectonic plates.

○It has only recently been discovered that tectonic plates are closely fitting rather than loosely constructed, as geologist previously believed.

○Volcanic island chains such as the Hawaiian Islands form in the interior of a tectonic plate as the plate moves over a fixed volcanic source in the mantle.

○The Pacific Plate has existed for as long as the Hawaiian Islands have existed, namely for more than 80 million years.

参考答案

1.○3

2.○4

3.○3

4.○3

5.○1

6.○1

7.○4

8.○2

9.○1

10.○3

11.○4

12.○3

13.○4

14. Our understanding of islands comes…

Whereas volcanic islands…

It has only recently been…

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## **参考译文：火山岛的形成**

地球的外壳并不是由单块岩石形成的，而是许多的“构造板块”严密的组合在一起的，就像是一个巨大的拼图。一些板块承载着岛屿或是大陆，其它的则形成海底。所有板块都在缓慢移动，因为它们都漂浮在密度更大的半液态的介于地壳和地核之间的地幔上。板块的边缘是扩张脊（两个板块分离，新的海底形成的地方），俯冲带（两板块碰撞，一个倾入到另一个下面），或者是形成断层（两板块既不聚集也不分散，但只是互相错位）。板块边界是地球上的火山和地震的高发地。

一般地，板块内部在地质上是平静的，但也有例外。扫一眼太平洋的地图就知道那里有许多在大海深处的岛屿，它们其实都是火山，其中有许多已经不活动了，一些长满了珊瑚。这些火山都起源于当时太平洋板块内部一些部位在形成太平洋海底时的地质活动。

为什么火山活动发生在离板块边缘这么远的地方呢？夏威夷群岛提供了一个非常有启发性的答案。就像其它的群岛一样，它们形成了一个岛链。夏威夷群岛链从夏威夷岛向西北扩张。在十八世纪40年代，地质学家James Daly观察到不同的夏威夷岛屿看起来经历了相似的演变过程，但它们所受腐蚀一个比一个严重，所以越往西北方向的岛屿形成时间可能越早。1963年，在大陆板块理论的早期，加拿大的地质学家Tuzo Wilson意识到岛屿年龄的增加可能是因为这些岛屿是板块表面从一个板块内部的固定火山源上方移动的结果。Wilson解释说，夏威夷向西北延伸的火山长链只是一个长期存于板块下、地幔中的火山源在板块表面的表现。现今最靠西北的岛屿可能是最先形成的。它们随着板块向西北移动。新的火山会随着板块的移动在火山源处形成。最年轻的岛屿，夏威夷岛，应该是在岛链的末端，现在应该在火山源上。

虽然这个理论并没有被很快接受，夏威夷和其它群岛岩浆的年龄测试表明了它们的年龄都从活跃的火山开始依次增加，正如Daly所说。Wilson对数据的分析已经成为了板块构造论的核心部分。大多的发生在板块内部的火山爆发都是由地幔柱造成的；地幔柱是从地幔深处涌出的熔岩柱体。只要火山在一个地幔柱上面，它就是一个活动的“热点”。地幔柱很显然是起源于很深的地方，很可能位于地核和地幔的交界处，并且已经活跃了很久。由夏威夷热点形成的最老的火山已经有近8千万年的时间了。其它的岛屿，包括太平洋的塔希提岛和东部群岛，印度洋留尼汪岛和毛里求斯群岛，实际上，多数世界上大洋中大岛都是由地幔柱的扩展形成的。

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海洋火山岛和它们的热点轨迹对于地质学家尤其有用，因为它们记录了过去的板块在固定火山源上方的位置。他们因此可以重现海底扩张的过程，以及大陆和大洋盆地过去的地理位置发展过程。比如，根据太平洋板块现在的位置，夏威夷岛在太平洋热点上面。所以太平洋板块5千万年前的位置可以通过移动太平洋板块使得一座有5五千万年历史的岛屿位于夏威夷岛现在所在的热点上以获得。但是，由于海洋盆地在地质年代上是相对短命的，用热点追踪的方法重建世界的地形只适用于最近的百分之五左右的地质时间。

## **Predator-Prey Cycles**

How do predators affect populations of the prey animals? The answer is not as simple as might be thought. Moose reached Isle Royale in Lake Superior by crossing over winter ice and multiplied freely there in isolation without predators. When wolves later reached the island, naturalists widely assumed that the wolves would play a key role in controlling the moose population. Careful studies have demonstrated, however, that this is not the case. The wolves eat mostly old or diseased animals that would not survive long anyway. In general, the moose population is controlled by food availability, disease and other factors rather than by wolves.

When experimental populations are set up under simple laboratory conditions, the predator often exterminates its pre and then becomes extinct itself, having nothing left to eat. However, if safe areas like those prey animals have in the wild are provided, the prey population drops to low level but not extinction. Low prey population levels then provide inadequate food for the predators, causing the predator population to decrease. When this occurs, the prey population can rebound. In this situation the predator and prey population may continue in this cyclical pattern for some time.

Population cycles are characteristic of small mammals, and they sometimes appear to be brought about by predators. Ecologists studying hare populations have found that the North American snow shoe hare follows a roughly ten-year cycle. Its numbers fall tenfold to thirty in a typical cycle, and a hundredfold change can occur. Two factors appear to be generating the cycle: food plants and predators.

The preferred foods of snowshoe hares are willow and birch twigs. As hare density increases, the quantity of these twigs decreases, forcing the hares to feed on low-quality high-fiber food. Lower birth rates, low juvenile survivorship, and low growth rates follow, so there is a corresponding decline in hare abundance. Once the hare population has declined, it takes two to three year for the quantity of twigs to recover.

A key predator of the snowshoe hare is the Canada lynx. The Canada lynx shows a ten-year cycle of abundance that parallels the abundance cycle of hares. As hare numbers fall, so do lynx numbers, as their food supply depleted.

What causes the predator-prey oscillations? Do increasing number of hares lead to overharvesting of plants, which in turn results in reduced hare populations, or do increasing numbers of lynx lead to overharvesting hares? Field experiments carried out by Charles Krebs and coworkers in 1992 provide an answer. Krebs investigated experimental plots in Canada’s Yukon territory that contained hare populations. When food was added to those plots (no food effect) and predators were excluded (no predator effect) from an experimental area, hare numbers increased tenfold and stayed there—the cycle was lost. However, the cycle was retained if either of the factors was allowed to operate alone: if predators were excluded but food was not added (food effect alone), or if food was added in the presence of predators (predator effect alone). Thus both factors can affect the cycle, which, in practice, seems to be generated by conjunction of the two factors.

Predators are an essential factor in maintaining communities that are rich and diverse in species. Without predators, the species that is the best competitor for food, shelter, nesting sites, and other environmental resources tends to dominate and exclude the species with which it competes. This phenomenon is known as “competitor exclusion”. However, if the community contains a predator of the strongest competitor species, then the population of that competitor is controlled. Thus even the less competitive species are able to survive. For example, sea stars prey on a variety of bivalve mollusks and prevent these bivalves from monopolizing habitats on the sea floor. This opens up space for many other organisms. When sea stars are removed, species diversity falls sharply. Therefore, from the stand point of diversity, it is usually a mistake to eliminate a major predator from a community.

【Paragraph 1】How do predators affect populations of the prey animals? The answer is not as simple as might be thought. Moose reached Isle Royal in Lake Superior by crossing over winter ice and multiplied freely there in isolation without predators. When wolves later reached the island, naturalists widely assumed that the wolves would play a key role in controlling the moose population. Careful studies have demonstrated, however, that this is not the case. The wolves eat mostly old or diseased animals that would not survive long anyway. In general, the moose population is controlled by food availability, disease and other factors rather than by wolves.

1.In paragraph 1, why does the author discuss the moose and wolves on Isle Royal?

○To provide an example of predators moving to new habitats by following migrating prey

○To show that the interactions between predator populations and prey populations are not always might be expected

○To suggest that prey populations are more influenced by predation than food availability and disease

○To argue that studies of geographically isolated populations tend not to be useful to naturalists

【Paragraph 2】When experimental populations are set up under simple laboratory conditions, the predator often exterminates its pre and then becomes extinct itself, having nothing left to eat. However, if safe areas like those prey animals have in the wild are provided, the prey population drops to low level but not extinction. Low prey population levels then provide inadequate food for the predators, causing the predator population to decrease. When this occurs, the prey population can rebound. In this situation the predator and prey population may continue in this cyclical pattern for some time.

【Paragraph 3】 Population cycles are characteristic of small mammals, and they sometimes appear to be brought about by predators. Ecologists studying hare populations have found that the North American snow shoe hare follows a roughly ten-year cycle. Its numbers fall tenfold to thirty in a typical cycle, and a hundredfold change can occur. Two factors appear to be generating the cycle: food plants and predators.

2. The word “rebound”in the passage is closest in meaning to

○ escape

○ recover

○ survive

○ resist

3.Paragraph 2 implies which of the following about experimental environments in which predators become extinct?

○ They may yield results that do not accurate predict changes of populations in the wild.

○ In these environments, the prey species is better adapted than the predator species.

○ These environments are appropriate only for studying small populations of predators and prey.

○ They are unrealistic because some predators are also the prey of other predators.

4.Which of the following can be inferred from paragraphs 2 and 3 about the small mammals that experience population cycles?

○ Their population cycles are not affected by predators.

○ Their predators’populations periodically disappear.

○ They typically undergo ten-year cycles.

○ They have access to places safe from predators.

5. The word “roughly”in the passage is closest in meaning to

○ usually

○ repeating

○ approximately

○ observable

6. The word “generating”in the passage is closest in meaning to

○ producing

○ changing

○ speeding up

○ smoothing out

【Paragraph 4】The preferred foods of snowshoe hares are willow and birch twigs. As hare density increases, the quantity of these twigs decreases, forcing the hares to feed on low-quality high-fiber food. Lower birth rates, low juvenile survivorship, and low growth rates follow, so there is a corresponding decline in hare abundance. Once the hare population has declined, it takes two to three year for the quantity of twigs to recover.

7.According to paragraph 4, all of the following are true of the food of snowshoe hares EXCEPT

○ The preferred food fore hares consists of willow and birch twigs.

○ High fiber food is the most nutritious for hares.

○ Depletion of the supply of willow and birch twigs cause low birth and growth rates.

○ The food supply takes two or three years to recover after a peak in hare population density.

8. The word “conjunction”in the passage is closest in meaning to

○ determination

○ combination

○ alternation

○ transformation

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【Paragraph 5】A key predator of the snowshoe hare is the Canada lynx. The Canada lynx shows a ten-year cycle of abundance that parallels the abundance cycle of hares. As hare numbers fall, so do lynx numbers, as their food supply depleted.

9.According to paragraph 5, which of the following statements best characterizes the abundance cycle of the Canada lynx?

○ It closely follows the cycle the snowshoe hare.

○ When the numbers of lynx fall, the numbers of snowshoe hares soon decrease.

○ When hare numbers decrease, lynx numbers increase.

○ It is not clearly related to the availability of lynx food.

【Paragraph 6】What causes the predator-prey oscillations? Do increasing number of hares lead to overharvesting of plants, which in turn results in reduced hare populations, or do increasing numbers of lynx lead to overharvesting hares? Field experiments carried out by Charles Krebs and coworkers in 1992 provide an answer. Krebs investigated experimental plots in Canada’s Yukon territory that contained hare populations. When food was added to those plots (no food effect) and predators were excluded (no predator effect) from an experimental area, hare numbers increased tenfold and stayed there—the cycle was lost. However, the cycle was retained if either of the factors was allowed to operate alone: if predators were excluded but food was not added (food effect alone), or if food was added in the presence of predators (predator effect alone). Thus both factors can affect the cycle, which, in practice, seems to be generated by conjunction of the two factors.

10.According to paragraph 6, which of the following was true of the hare population cycle in Krebs’s experiment?

○ The effects of providing food while at the same time introducing predators cancelled each other, so there was no cycle.

○ The cycle existed when either the food supply was limited or there were predators.

○ There was a cycle when there were no predators and food was supplied.

○ If the hares had places to hide from the lynx, the hare population increased tenfold and then remained at that level.

【Paragraph 7】Predators are an essential factor in maintaining communities that are rich and diverse in species. Without predators, the species that is the best competitor for food, shelter, nesting sites, and other environmental resources tends to dominate and exclude the species with which it competes. ■This phenomenon is known as “competitor exclusion”. ■However, if the community contains a predator of the strongest competitor species, then the population of that competitor is controlled. ■Thus even the less competitive species are able to survive. ■For example, sea stars prey on a variety of bivalve mollusks and prevent these bivalves from monopolizing habitats on the sea floor. This opens up space for many other organisms. When sea stars are removed, species diversity falls sharply. Therefore, from the stand point of diversity, it is usually a mistake to eliminate a major predator from a community.

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11.According to paragraph 7, which of the following statements correctly characterizes the effect of sea stars on the ecosystem in which they are predators of bivalves?

○ Bivalve population are kept low, allowing species that compete with bivalves to survive.

○ The numbers of most species of bivalves are greatly reduced, leaving the bivalve species that is the strongest competitor to dominate among the survivors.

○ Biological diversity begins to decrease because many bivalve species disappear.

○ Sea stars dominate at first but then die off because of the depleted food supply.

12.According to paragraph 7, which of the following is true of the phenomenon of competitor exclusion?

○ It results in more diverse communities.

○ It requires the presence of predators.

○ It affects all competitions equally.

○ It happens only when there is a dominant competitor.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**As a result, there are not enough of the strong competitions to monopolize the environment’s resources.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

The relationships between predators and prey are complex.

●

●

●

Answer Choices

○ Studies of the interactions between wolves and moose on Isle Royale in Lake Superior reveal that wolf predation is not the primary factor controlling the moose population.

○ Predators help maintain biological diversity by limiting populations of a dominant competitor species, thereby preventing that species from excluding others.

○ A species’population tends to rise and falls in a cycle pattern if the food supply for the population is limited, or if the population has a major predator.

○ Ecologists are interested in studying predator-prey population cycles because understanding how predators and prey interact will allow better wildlife management programs.

○ In predator-prey population cycles, predator populations increase or decrease following similar population changes in the species they prey on.

○ The removal of sea stars reduces the diversity of the community in which they are predators, and is therefore a bad idea.

参考答案

1.○2

2.○2

3.○1

4.○4

5.○3

6.○1

7.○2

8.○1

9.○2

10.○2

11.○1

12.○4

13.○3

14. A species’population tends…

Ecologists are interested in…

In predator-prey population cycles…

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：捕食者-被捕食者循环**

捕食者是怎样影响被捕食者的数量呢？答案并不是想象中那么简单。麋鹿通过穿越冬天的冰层到达了在苏必略湖的罗亚尔岛，并由于没有捕食者而自由繁殖。当狼在晚一点的时候到达那座岛时，自然学家都认为，狼对控制麋鹿的数量将起到关键作用。但是，严密的研究说明并不是这样。狼吃掉的大部分是年老的，或生病的动物，他们本身就不会存活很久。一般地，麋鹿的数量是由食物、疾病、和其它的一些条件，而不是狼控制的。

在简单的实验条件下，捕食者经常吃掉了所有的实验设定的被捕食者，然后因为食物缺乏而自己灭绝了。但是，如果能给被捕食动物提供如同在野外的安全的区域，被捕食动物的数量会降低到很低的数值，但不会灭绝。被捕食者的数量的降低造成了捕食者的食物不足，使捕食者的数量下降。此时，被捕食者的数量又会反弹。这样，一定时间内捕食者和被捕食者的数量会持续地循环。

这种数量的循环是小型哺乳动物的特性，有时候这种循环是由捕食者带来的。生态学家对野兔数量的研究发现，北美白靴兔一直遵守着大约以十年为周期的循环。在一个典型的循环中，其数量会以十倍到三十倍的减少，甚至会出现一百倍的改变。有两种因素会导致这种循环：食物和捕食者。

白靴兔比较喜欢的食物是柳木和桦树树枝。野兔的密度增加时，这些树枝的数量就减少，迫使野兔去吃一些低质量的，高纤维食物。随之而来的是低生育率，低成活率，低生长率，所以野兔数量随之减少。一旦野兔数量减少，树枝的数量需要两到三年恢复。

白靴兔的主要捕食者是加拿大山猫。加拿大山猫的数量呈现了平行于野兔的十年为周期的循环。野兔数量下降时，山猫的食物供给减少，数量也随之减少。

什么造成了捕食者和被捕食者的周期振动呢？是野兔数量的增长使得植物被过度采食，随之导致了野兔的减少还是山猫的增加导致了野兔被过度捕食？在1992年，Charles Krebs和其合作者的野外试验提供了答案。Krebs研究了在加拿大Yuhon地区有野兔种群的试验田。当食物被加到这片试验田（没有食品因素影响）并且将捕食者移去（也没有捕食者因素影响）。野兔的数量增加了十倍并且保持稳定----不再循环。但是，在任意一个因素单独存在时，循环都会出现：不管是捕食者被移除，食物不添加（也就是只有食物影响）；还是食物在捕食者存在的情况下被添加（也就是只有捕食者影响）。因此，两个因素都可以影响这个循环，即在现实中，循环是两个因素同时作用的结果。

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捕食者是保持群体多样性和数量的必要条件。没有捕食者时，那种在对食物、庇护所、筑巢点和其它环境资源的争夺中胜出的竞争者，趋向于统治，并且灭绝与其竞争的其它物种。这种现象被称作“驱逐竞争者”。但是，如果种群中的具有最强竞争力的物种存在天敌，那这一物种数量就被控制。因此，竞争力比较弱的物种都会得以生存。比如，海星捕食各种双壳的软体动物，防止这些双壳动物垄断海底。这使得其它的很多生物有了生存空间。海星被移除后，物种多样性大幅度降低。因此，从多样性的角度说，从一个种群中消除一个主要捕食者通常是错误的决定。

TPO-28

## **Groundwater**

Most of the world’s potable water----freshwater suitable for drinking----is accounted for by groundwater, which is stored in the pores and fractures in rocks. There is more than 50 times as much freshwater stored underground than in all the freshwater rivers and lakes at the surface. Nearly 50 percent of all groundwater is stored in the upper 1,000 meters of Earth. At greater depths within Earth, the pressure of the overlying rock causes pores and cracks to close, reducing the space that pore water can occupy, and almost complete closure occurs at a depth of about 10 kilometers. The greatest water storage, therefore, lies near the surface.

Aquifers, Porosity and Permeability

Groundwater is stored in a variety of rock types. A groundwater reservoir from which water can be extracted is called an aquifer. We can effectively think of an aquifer as a deposit of water. Extraction of water depends on two properties of the aquifer: porosity and permeability. Between sediment grains are spaces that can be filled with water. This pore space is known as porosity and is expressed as a percentage of the total rock volume. Porosity is important for water-storage capacity, but for water to flow through rocks, the pore spaces must be connected. The ability of water, or other fluids, to flow through the interconnected pore spaces in rocks is termed permeability. In the intergranular spaces of rocks, however, fluid must flow around and between grains in a tortuous path; this winding path causes a resistance to flow. The rate at which the flowing water overcomes this resistance is related to the permeability of rock.

Sediment sorting and compaction influence permeability and porosity. The more poorly sorted or the more tightly compacted a sediment is ,the lower its porosity and permeability. Sedimentary rocks----the most common rock type near the surface----are also the most common reservoirs for water because they contain the most space that can be filled with water. Sandstones generally make good aquifers, while finer-grained mudstones are typically impermeable. Impermeable rocks are referred to as aquicludes. Igneous and metamorphic rocks are more compact, commonly crystalline, and rarely contain spaces between grains. However, even igneous and metamorphic rocks may act as groundwater reservoirs if extensive fracturing occurs in such rocks and if the fracture system is interconnected.

The Water Table

The water table is the underground boundary below which all the cracks and pores are filled with water. In some cases, the water table reaches Earth’s surface, where it is expressed as rivers, lakes and marshes. Typically, though, the water table may be tens or hundreds of meters below the surface. The water table is not flat but usually follows the contours of the topography. Above the water table is the vadose zone, through which rainwater percolates. Water in the vadose zone drains down to the water table, leaving behind a thin coating of water on mineral grains. The vadose zone supplies plant roots near the surface with water.

Because the surface of the water table is not flat but instead rises and falls with topography, groundwater is affected by gravity in the same fashion as surface water. Groundwater flows downhill to topographic lows. If the water table intersect the land surface, groundwater will flow out onto the surface at springs, whether to be collected there or to subsequently flow farther along a drainage. Groundwater commonly collects in stream drainages but may remain entirely beneath the surface of dry stream-beds in arid regions. In particularly wet years, short stretches of an otherwise dry stream-bed may have flowing water because the water table rises to intersect the land surface.

[Glossary]

Sediment: materials (such as sand or small rocks) that are deposited by water, wind, or glacial ice.

Topography: the shape of a surface such as Earth’s, including the rise and fall of such features as mountains and valleys.

【Paragraph 1】Most of the world’s potable water----freshwater suitable for drinking----is accounted for by groundwater, which is stored in the pores and fractures in rocks. There is more than 50 times as much freshwater stored underground than in all the freshwater rivers and lakes at the surface. Nearly 50 percent of all groundwater is stored in the upper 1,000 meters of Earth. At greater depths within Earth, the pressure of the overlying rock causes pores and cracks to close, reducing the space that pore water can occupy, and almost complete closure occurs at a depth of about 10 kilometers. The greatest water storage, therefore, lies near the surface.

1.In paragraph 1, why does the author mention “the pressure of the overlying rock”?

○ To show how water can be forced deep under Earth’s surface

○ To show why groundwater is more plentiful than surface freshwater

○ To correct a commonly made error about the location of groundwater

○ To explain why most groundwater lies near Earth’s surface

2.According to paragraph 1, groundwater differs from the water in rivers and lakes in terms of its

○ portability

○ usefulness

○ abundance

○ cost

【Paragraph 2】Groundwater is stored in a variety of rock types. A groundwater reservoir from which water can be extracted is called an aquifer. We can effectively think of an aquifer as a deposit of water. Extraction of water depends on two properties of the aquifer: porosity and permeability. Between sediment grains are spaces that can be filled with water. This pore space is known as porosity and is expressed as a percentage of the total rock volume. Porosity is important for water-storage capacity, but for water to flow through rocks, the pore spaces must be connected. The ability of water, or other fluids, to flow through the interconnected pore spaces in rocks is termed permeability. In the intergranular spaces of rocks, however, fluid must flow around and between grains in a tortuous path; this winding path causes a resistance to flow. The rate at which the flowing water overcomes this resistance is related to the permeability of rock.

3.The word “extracted”in the passage is closest in meaning to

○ used

○ poured

○ removed

○ kept out

4.The word “termed”in the passage is closest in meaning to

○ considered

○ called

○ limited to

○ caused by

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5.According to paragraph 2, what does porosity determine?

○ The rate at which the aquifer’s water overcomes resistance to flow

○ The amount of water that the aquifer can hold

○ The likelihood that fractures and joints will occur in the aquifer

○ The depth underground at which the aquifer lies

6.According to paragraph 2, what is the relationship between permeability and porosity?

○ The more pores a rock has, the higher its porosity but the lower its permeability.

○ Rocks with many internal spaces that are not connected with each other will have high porosity but low permeability.

○ If water flows through a rock easily, it has high permeability but low porosity.

○ Rocks that have high permeability have high porosity and vice versa.

【Paragraph 3】Sediment sorting and compaction influence permeability and porosity. The more poorly sorted or the more tightly compacted a sediment is ,the lower its porosity and permeability. Sedimentary rocks----the most common rock type near the surface----are also the most common reservoirs for water because they contain the most space that can be filled with water. Sandstones generally make good aquifers, while finer-grained mudstones are typically impermeable. Impermeable rocks are referred to as aquicludes. Igneous and metamorphic rocks are more compact, commonly crystalline, and rarely contain spaces between grains. However, even igneous and metamorphic rocks may act as groundwater reservoirs if extensive fracturing occurs in such rocks and if the fracture system is interconnected.

7.The word “compacted”in the passage is closest in meaning to

○ hard

○ compressed

○ heavy

○ deeply buried

8.According to paragraph 3, when can igneous rock serve as an aquifer?

○ When it has many connected fractures

○ When it lies next to metamorphic rock

○ When it lies relatively near the surface

○ When it is crystalline

【Paragraph 4】The water table is the underground boundary below which all the cracks and pores are filled with water. In some cases, the water table reaches Earth’s surface, where it is expressed as rivers, lakes and marshes. Typically, though, the water table may be tens or hundreds of meters below the surface. The water table is not flat but usually follows the contours of the topography. Above the water table is the vadose zone, through which rainwater percolates. Water in the vadose zone drains down to the water table, leaving behind a thin coating of water on mineral grains. The vadose zone supplies plant roots near the surface with water.

9.The word “coating”in the passage is closest in meaning to

○ stream

○ barrier

○ amount

○ layer

10.Paragraph 4 implies which of the following about the roots of plants?

○ They prevent water from reaching the vadose zone.

○ They mark the boundary between the vadose zone and the water table

○ They do not typically get their water from the water table.

○ They help keep the water table from dropping farther.

【Paragraph 5】Because the surface of the water table is not flat but instead rises and falls with topography, groundwater is affected by gravity in the same fashion as surface water. Groundwater flows downhill to topographic lows. If the water table intersect the land surface, groundwater will flow out onto the surface at springs, whether to be collected there or to subsequently flow farther along a drainage. Groundwater commonly collects in stream drainages but may remain entirely beneath the surface of dry stream-beds in arid regions. In particularly wet years, short stretches of an otherwise dry stream-bed may have flowing water because the water table rises to intersect the land surface.

11. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Groundwater only flows out of the ground if the water table intersects the land surface.

○ If the land surface and the water table intersect, groundwater can flow underground.

○ Groundwater may be drained if springs occur where the water table intersects the land surface.

○ Where the water table meets the land surface, groundwater flows out through surface springs.

12.Paragraph 5 implies which of the following about the level of the water

○ It may rise or fall from year to year, depending on annual rainfall.

○ It does not vary in arid regions.

○ It rarely intersects the land surface of most regions.

○ It is unrelated to the rate at which groundwater flows.

【Paragraph 4】The water table is the underground boundary below which all the cracks and pores are filled with water. In some cases, the water table reaches Earth’s surface, where it is expressed as rivers, lakes and marshes. ■Typically, though, the water table may be tens or hundreds of meters below the surface. ■The water table is not flat but usually follows the contours of the topography. ■Above the water table is the vadose zone, through which rainwater percolates. ■Water in the vadose zone drains down to the water table, leaving behind a thin coating of water on mineral grains. The vadose zone supplies plant roots near the surface with water.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This is a consequence of the slow rate of movement of the groundwater, which often prevents the water table from attaining a flat (horizontal) level.**

Where would the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Most of the world’s potable water is stored as groundwater in the pores and fractures of underground rock, much of it at depths of less than 1,000 meters.

●

Answer Choices

○ Sedimentary rock may make poor aquifers because of tightly compacted sediment, which reduces porosity and permeability.

○ Porosity is a measure of the empty space within rock while permeability measures the degree to which water can flow freely through rock.

○ In arid regions, the water tables remain at a constant level far below the surface, preventing stream-beds from filling up even during wet years.

○ Groundwater reservoirs are characterized by the porosity and permeability of the rock in which they lie, and these factors vary according to the type of rock.

○ The vadose zone is typically dry because water does not stay in it, but instead percolates down to aquifers below or drains out through springs and streams.

○ Although the water table usually follows the contours of the land surface, its level may vary from year to year and may intersect to the surface in places.

参考答案

1.○4

2.○3

3.○3

4.○2

5.○2

6.○2

7.○2

8.○1

9.○4

10.○3

11.○4

12.○1

13.○3

14. Porosity is a measure of the…

Groundwater reservoirs are characterized

Although the water table usually …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：地下水**

世界上绝大部分饮用水----可以饮用的淡水----都是地下水，它们储藏在岩石孔隙和裂缝中。储藏于地下的淡水是地表淡水河流和湖泊中总水量的50倍。大约50%的地下水存在于地下深1000m以内的地层中。随深度增加，上覆岩层压力使岩石孔隙和裂缝闭合，减少了水的储存空间，而超过10公里深的地下孔隙几乎全部闭合。因此绝大部分水储存于接近地表的地层中。

水层，孔隙度和渗透率

地层水储存在多种岩石中。可以取出的地下水的聚集层叫做水层。我们可以认为水层即水的聚集地层。从地层中取水取决于水层的两个因素：孔隙度和渗透率。沉积颗粒之间的空间可以储存水，这种孔隙空间由孔隙度表征。孔隙度是岩石孔隙体积与总体积的百分比。孔隙度对地层储水能力尤为重要，但欲使水从岩石中流出，孔隙之间必须相互连通。水或其它流体从相互连通的孔隙中流动的能力即为渗透率。在粒间孔发育的岩石中，流体必须在颗粒周围的曲折通道中流动；这种曲折通道会对流动产生阻力。水克服阻力流动的速率与岩石渗透率相关。

沉积物的分选性和压实程度影响其渗透率和孔隙度。岩石分选越差或压实越紧则其孔隙度和渗透率越低。沉积岩----地表最常见的岩石----也是最常见的水储集层，因为它们常带有最多的可以储水的孔隙空间。砂岩一般是最好的储水层，但小颗粒的泥岩则通常不可渗透。不渗透岩层都称为隔水层。火成岩和变质岩压实更紧，通常有结晶，并几乎没有粒间孔隙。但是即便是火成岩和变质岩也可因裂缝大量发育并相互连接而成为储水层。

地下水位

地下水位指地层岩石裂缝和孔隙充满水的边界。某些情况下，地下水位可能到达地表，在那里它以河流、湖泊或沼泽地的形式存在。但通常情况下地下水位位于地面数十或数百米以下。地下水位不是水平的，而是通常沿着地势起伏。地下水位以上称为包气带，在这里降水得以过滤。包气带中的水会沉降到地下水位，只在矿物颗粒表面留下一层水膜。包气带为地表附近植物根部提供水分。

因为地下水位表面并非水平，而是沿着地势起伏，地下水和地表水受到重力影响的模式相同。地下水沿着下倾地层流向地势低洼处。如果地下水位与地表相交，地下水将以喷泉的形式流出地面，要么就地聚集，要么沿排水通道流向更远的地方。地下水通常在小溪中聚集，但在干旱地区也可能全部停留在干涸河床下。在特定湿润的年月里，一段干涸的河床下游可能有水流动，因为地下水位抬升到了那里的地表以上。

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## **Early Saharan Pastoralists**

The Sahara is a highly diverse, albeit dry, region that has undergone major climatic changes since 10,000 B.C. As recently as 6,000 B.C. the southern frontier of the desert was far to the north of where it is now, while semiarid grassland and shallow freshwater lakes covered much of what are now arid plains. This was a landscape where antelope of all kinds abounded----along with Bos primigenius, a kind of oxen that has become extinct. The areas that are now desert were, like all arid regions, very susceptible to cycles of higher and lower levels of rainfall, resulting in major, sudden changes in distributions of plants and animals. The people who hunted the sparse desert animals responded to drought by managing the wild resources they hunted and gathered, especially wild oxen, which had to have regular water supplies to survive.

Even before the drought, the Sahara was never well watered. Both humans and animals were constantly on the move, in search of food and reliable water supplies. Under these circumstances, archaeologist Andrew Smith believes, the small herds of Bos primigenius in the desert became smaller, more closely knit breeding units as the drought took hold. The beasts were more disciplined, so that it was easier for hunters to predict their habits, and capture animals at will. At the same time, both cattle and humans were more confined in their movements, staying much closer to permanent water supplies for long periods of time. As a result, cattle and humans came into close association.

Smith believes that the hunters were well aware of the more disciplined ways in which their prey behaved. Instead of following the cattle on their annual migrations, the hunters began to prevent the herd from moving from one spot to another. At first, they controlled the movement of the herd while ensuring continuance of their meat diet. But soon they also gained genetic control of the animals, which led to rapid physical changes in the herd. South African farmers who maintain herds of wild eland (large African antelopes with short, twisted horns) report that the offspring soon diminish in size, unless wild bulls are introduced constantly from outside. The same effects of inbreeding may have occurred in controlled cattle populations, with some additional, and perhaps unrecognized, advantages. The newly domesticated animals behaved better, were easier to control, and may have enjoyed a higher birth rate, which in turn yielded greater milk supplies. We know from rock paintings deep in the Sahara that the herders were soon selecting breeding animals to produce offspring with different horn shapes and hide colors.

It is still unclear whether domesticated cattle were tamed independently in northern Africa or introduced to the continent from southwest Asia. Whatever the source of the original tamed herds might have been, it seems entirely likely that much the same process of juxtaposition (living side by side) and control occurred in both southwest Asia and northern Africa, and even in Europe, among peoples who had an intimate knowledge of the behavior of wild cattle. The experiments with domestication probably occurred in many places, as people living in ever-drier environments cast around for more predictable food supplies.

The cattle herders had only a few possessions: unsophisticated pots and polished adzes. They also hunted with bow and arrow. The Saharan people left a remarkable record of their lives painted on the walls of caves deep in the desert. Their artistic endeavors have been preserved in paintings of wild animals, cattle, goats, humans, and scenes of daily life that extend back perhaps to 5,000 B.C.. The widespread distribution of pastoral sites of this period suggests that the Saharans ranged their herds over widely separated summer and winter grazing grounds.

About 3,500 B.C., climatic conditions again deteriorated. The Sahara slowly became drier and lakes vanished. On the other hand, rainfall increased in the interior of western Africa, and the northern limit of the tsetse fly, an insect fatal to cattle, moved south. So the herders shifted south, following the major river systems into savanna regions. By this time, the Saharan people were probably using domestic crops, experimenting with such summer rainfall crops as sorghum and millet as they move out of areas where they could grow wheat, barley, and other Mediterranean crops.

[Glossary]

adzes: cutting tools with blades set at right angles to the handle.

【Paragraph 1】The Sahara is a highly diverse, albeit dry, region that has undergone major climatic changes since 10,000 B.C. As recently as 6,000 B.C. the southern frontier of the desert was far to the north of where it is now, while semiarid grassland and shallow freshwater lakes covered much of what are now arid plains. This was a landscape where antelope of all kinds abounded----along with Bos primigenius, a kind of oxen that has become extinct. The areas that are now desert were, like all arid regions, very susceptible to cycles of higher and lower levels of rainfall, resulting in major, sudden changes in distributions of plants and animals. The people who hunted the sparse desert animals responded to drought by managing the wild resources they hunted and gathered, especially wild oxen, which had to have regular water supplies to survive.

1.According to paragraph 1, what was true of the Sahara region around 6,000 B.C.?

○ Much less of it was desert than is now the case.

○ Most areas that are now grassland were covered by shallow lakes.

○ It had just undergone a major climatic change.

○ Wild oxen and antelopes lived in separate parts of the region.

2.The word “albeit”in the passage is closest in meaning to

○ usually

○ almost

○ though

○ rather

3.According to paragraph 1, which of the following is true of all arid regions?

○ They include at least some freshwater lakes.

○ They have similar distributions of plants and animals.

○ They are greatly affected by changes in the amount of rain they receive.

○ They have frequent droughts that make it difficult to manage the wild resources.

【Paragraph 2】Even before the drought, the Sahara was never well watered. Both humans and animals were constantly on the move, in search of food and reliable water supplies. Under these circumstances, archaeologist Andrew Smith believes, the small herds of Bos primigenius in the desert became smaller, more closely knit breeding units as the drought took hold. The beasts were more disciplined, so that it was easier for hunters to predict their habits, and capture animals at will. At the same time, both cattle and humans were more confined in their movements, staying much closer to permanent water supplies for long periods of time. As a result, cattle and humans came into close association.

4.Paragraph 2 supports which of the following ideas about wild oxen in the Sahara region after the drought took hold?

○ They traveled in smaller herds.

○ They were harder for hunters to capture.

○ They tended to be significantly smaller in size.

○ They moved along less predictable routes.

5.According to paragraph 2, what was it that brought cattle and humans into close association?

○ The development of smaller breeding units within herds.

○ Cattle and humans staying close to permanent water supplies for long period of time.

○ The development of greater discipline among cattle.

○ Cattle and humans constantly on the move searching for food and reliable water supplies.

【Paragraph 3】Smith believes that the hunters were well aware of the more disciplined ways in which their prey behaved. Instead of following the cattle on their annual migrations, the hunters began to prevent the herd from moving from one spot to another. At first, they controlled the movement of the herd while ensuring continuance of their meat diet. But soon they also gained genetic control of the animals, which led to rapid physical changes in the herd. South African farmers who maintain herds of wild eland (large African antelopes with short, twisted horns) report that the offspring soon diminish in size, unless wild bulls are introduced constantly from outside. The same effects of inbreeding may have occurred in controlled cattle populations, with some additional, and perhaps unrecognized, advantages. The newly domesticated animals behaved better, were easier to control, and may have enjoyed a higher birth rate, which in turn yielded greater milk supplies. We know from rock paintings deep in the Sahara that the herders were soon selecting breeding animals to produce offspring with different horn shapes and hide colors.

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6.Why does the author mention the “rock paintings deep in the Sahara”?

○ To help explain why the hunters wanted to control the herds.

○ To provide support for the idea that the herders soon gained genetic control of the cattle

○ To show that the herders had artistic as well as practical abilities

○ To argue that the herders soon began to value their cattle for more than food.

7.According to paragraph 3, all of the following statements were true of newly domesticated animals EXCEPT

○ They were controlled more easily by the farmers.

○ They produced a larger number of offspring.

○ They produce more milk.

○ They were larger in size.

【Paragraph 4】t is still unclear whether domesticated cattle were tamed independently in northern Africa or introduced to the continent from southwest Asia. Whatever the source of the original tamed herds might have been, it seems entirely likely that much the same process of juxtaposition (living side by side) and control occurred in both southwest Asia and northern Africa, and even in Europe, among peoples who had an intimate knowledge of the behavior of wild cattle. The experiments with domestication probably occurred in many places, as people living in ever-drier environments cast around for more predictable food supplies.

8. .which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Regardless of where the first tamed herds came from, people tried to control them by living in juxtaposition with them.

○ Regardless of where the first tamed herds came from, they resulted from the same process of juxtaposition and control by people who understood the behavior of wild cattle.

○ People who had an intimate knowledge of the behavior of wild cattle moved closer together to cooperate in taming the herd, regardless of where they found them.

○ The process of taming herds was certainly the same in southwest Asia, northern Africa, and Europe because people knew a lot about the behavior of wild cattle, regardless of where they lived.

【Paragraph 5】The cattle herders had only a few possessions: unsophisticated pots and polished adzes. They also hunted with bow and arrow. The Saharan people left a remarkable record of their lives painted on the walls of caves deep in the desert. Their artistic endeavors have been preserved in paintings of wild animals, cattle, goats, humans, and scenes of daily life that extend back perhaps to 5,000 B.C.. The widespread distribution of pastoral sites of this period suggests that the Saharans ranged their herds over widely separated summer and winter grazing grounds.

9.According to paragraph 5, each of the following was true about the early Saharan people EXCEPT

○ They had few possessions apart from cattle.

○ After about 5,000 B.C., they lived primarily in caves that were located deep in the desert.

○ Between the summer and winter seasons, they moved their herds over long distances.

○ They painted animals and scenes of daily life on the walls of caves.

10.The word “endeavors”in the passage is closest in meaning to

○ methods

○ styles

○ scenes

○ efforts

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【Paragraph 6】About 3,500 B.C., climatic conditions again deteriorated. The Sahara slowly became drier and lakes vanished. On the other hand, rainfall increased in the interior of western Africa, and the northern limit of the tsetse fly, an insect fatal to cattle, moved south. So the herders shifted south, following the major river systems into savanna regions. By this time, the Saharan people were probably using domestic crops, experimenting with such summer rainfall crops as sorghum and millet as they move out of areas where they could grow wheat, barley, and other Mediterranean crops.

11.The word “deteriorated”in the passage is closest in meaning to

○ became unstable

○ caused hardship

○ changed completely

○ got worse

12.According to paragraph 6, what allowed the herders to shift south into the savanna regions after about 3,500 B.C.?

○ They could easily grow Mediterranean crops in those regions.

○ They could more easily domesticated sorghum and millet in those regions.

○ The tsetse fly was no longer a problem in those regions.

○ The river systems in those regions provided reliable sources of water in the summer.

【Paragraph 3】Smith believes that the hunters were well aware of the more disciplined ways in which their prey behaved. ■Instead of following the cattle on their annual migrations, the hunters began to prevent the herd from moving from one spot to another. ■At first, they controlled the movement of the herd while ensuring continuance of their meat diet. ■But soon they also gained genetic control of the animals, which led to rapid physical changes in the herd. ■South African farmers who maintain herds of wild eland (large African antelopes with short, twisted horns) report that the offspring soon diminish in size, unless wild bulls are introduced constantly from outside. The same effects of inbreeding may have occurred in controlled cattle populations, with some additional, and perhaps unrecognized, advantages. The newly domesticated animals behaved better, were easier to control, and may have enjoyed a higher birth rate, which in turn yielded greater milk supplies. We know from rock paintings deep in the Sahara that the herders were soon selecting breeding animals to produce offspring with different horn shapes and hide colors.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This knowledge enabled the hunters to adopt a different approach to hunting.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

As recently as 6,000 B.C., much of the Sahara region was semiarid grassland where humans hunted wild oxen and antelope.

●

●

●

Answer Choices

○ There was enough freshwater for Saharan peoples to move freely throughout the region without having to manage the resources they hunted and gathered.

○ Once Saharans controlled the breeding of their cattle, the characteristics of the cattle changed rapidly, increasing their reproductive rate and milk production.

○ Although the Saharan peoples were remarkably sophisticated artists, they had only a few simple possessions, like adzes and the bows and arrows they used for hunting.

○ When the drying climate forced cattle and humans close to each other in areas with water supplies, humans gained control over the cattle and eventually domesticated them.

○ Herders soon began selecting breeding animals to produce offspring with different horn shapes and hide colors, although the advantage of controlled inbreeding were not apparent to them at first.

○ As the drought worsened around 3,500 B.C. and conditions for herders became more favorable to the south, the Saharan people moved into savanna regions, where they grew different crops.

参考答案

1.○1

2.○3

3.○3

4.○1

5.○2

6.○2

7.○4

8.○2

9.○2

10.○4

11.○4

12.○3

13.○1

14. Once Saharans controlled the …

As the drought worsened around…

When the drying climate forced cattle and humans

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## **参考译文：早期撒哈拉的田园画家**

尽管干旱，撒哈拉的物种极其多样，并自公元前10,000年前开始已经历了数次重大气候变迁。直到公元前6,000年前，沙漠的南部边界比现在的位置要靠北很多，那时半干旱的草原和浅淡水湖泊覆盖了现在干旱的平原。这里曾经是各种羚羊和一种已灭绝的野牛出没的地方。现在的沙漠地区，像所有干旱地区一样，对降雨量的变化周期极为敏感，因而其动植物的分布变化巨大且迅速。依靠捕食稀少的沙漠动物的居民对待干旱的方式是管理他们捕捉和收集到的野生资源，尤其是需要可靠水源维持生命的野牛。

甚至在干旱之前，撒哈拉地区也从未有充足的水分。人类和野生动物都不停的迁徙，以寻找食物和可靠的水源。在这些情况下，考古学家Andrew Smith 认为随着干旱的持续，沙漠中野牛群会变成更小，组织更紧密的族群。兽群变得更加自律，因此猎人更容易预测他们的习性并随意抓捕。同时，骆驼和人类的行动范围进一步靠近，在固定水源附近长期更亲近的共处。结果骆驼和人类形成了紧密的联合。

Smith相信猎人对猎物更加自律的行为了然于胸。猎人们不再跟随骆驼进行每年一度的迁徙而是开始阻止兽群的迁移。起初他们控制兽群的迁移以获得持续的肉食来源。但很快他们能够在遗传上控制动物，使得兽群的体征迅速变化。南非牧养大羚羊（一种体型较大的非洲羚羊，它们的角短且扭曲）的农民说如果不持续从野外引进公羚羊则其后代体型迅速变小。近亲繁殖的影响同样发生在控制拥有某些额外的可能并未认清的优势的骆驼数量上。最新驯化的动物更易控制，出生率也更高，而反过来也会提供更多奶源。我们从撒哈拉腹地的岩石绘画可知牧民很快就选择一些动物进行繁殖以产生角和颜色不同的后代。

我们仍无法知道骆驼是在北非独立驯化的还是从东南亚引入的。不管驯化的兽群起源何处，东南亚和北非，甚至是欧洲的那些对野生骆驼的行为了然于胸的人们都可能经过了同样的和他们要驯化的动物毗邻而居并逐渐控制它们的过程。随着人们居住环境不断干燥和食物供给的可预测性更强，驯化的尝试很可能发生在很多地方。

骆驼牧养人的财产很少：一些并不精致的罐子和磨光的斧子。他们也利用弓箭捕猎。撒哈拉人在撒哈拉腹地洞穴的墙壁上留下了很重要的关于他们生活的记录。他们的艺术创作保存了大量关于野生动物、骆驼、山羊、人类及其日常生活的各种场景的绘画。这些场景可能追溯到公元前5,000年前。这一时期田园画古迹的广泛分布表明撒哈拉人曾在广泛且独立的牧场上放牧。

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大约公元前3,500年前，气候条件又一次恶化。撒哈拉沙漠渐渐地更加干旱，湖泊相继干涸。另外西非内陆降雨增加，并且舌蝇，一种对骆驼致命的昆虫，的种群的北部边界向南移动。所以骆驼牧民也追随大平原区域的主要河流系统向南迁徙。此时，随着撒哈拉人从原本可以种植小麦、大麦和其它一些地中海农作物的区域中迁出，他们可能依靠当地的农作物，例如像高粱和小米一类的依靠夏季降雨的作物。

## **Buck Rubs and Buck Scrapes**

A conspicuous sign indicating the presence of white-tailed deer in a woodlot is a buck rub. A male deer makes a buck rub by striping the bark (outer layer) of a small tree with its antlers. When completed, the buck rub is an obvious visual signal to us and presumable to other deer in the area. A rub is usually located at the shoulder height of a deer (one meter or less above the ground) on a smooth-barked, small-diameter (16-25 millimeters) tree. The smooth bark of small red maples makes this species ideal for buck rubs in the forests of the mid-eastern United States.

Adult male deer usually produce rubs in late summer or early autumn when the outer velvet layer is being shed from their antlers. Rubs are created about one to two months before the breeding season (the rut). Hence for a long time biologists believed that male deer used buck rubs not only to clean and polish antlers but also to provide practice for the ensuing male-to-male combat during the rut. However, biologists also noted deer sniff and lick an unfamiliar rub, which suggests that this visual mark on a small tree plays an important communication purpose in the social life of deer.

Buck rubs also have a scent produced by glands in the foreheads of deer that is transferred to the tree when the rub is made. These odors make buck rubs an important means of olfactory communication between deer. The importance of olfactory communication (using odors to communicate) in the way of life of deer was documented by a study of captive adult male deer a few decades ago, which noted that males rubbed their foreheads on branches and twigs, especially as autumn approached. A decade later another study reported that adult male white-tailed deer exhibited forehead rubbing just before and during the rut. It was found that when a white-tailed buck makes a rub, it moves both antlers and forehead glands along the small tree in a vertical direction. This forehead rubbing behavior coincides with a high level of glandular activity in the modified scent glands found on the foreheads of male deer; the glandular activity causes the forehead pelage (hairy covering) of adult males to be distinctly darker than in females or younger males.

Forehead rubbing by male deer on buck rubs presumably sends a great deal of information to other members of the same species. First, the chemicals deposited on the rub provide information on the individual identity of an animal; no two mammals produce the same scent. For instance, as we all know, dogs recognize each other via smell. Second, because only male deer rub, the buck rub and its associated chemicals indicate the sex of the deer producing the rub. Third, older, more dominant bucks produce more buck rubs and probably deposit more glandular secretions on a given rub. Thus the presence of many well-marked rubs is indicative of older, higher-status males being in the general vicinity rather than simply being a crude measure of relative deer abundance in a given area. The information conveyed by the olfactory signals on a buck rub make it the social equivalent of some auditory signals in other deer species, such as trumpeting by bull elk.

Because both sexes of white-tailed respond to buck rubs by smelling and licking them, rubs may serve a very important additional function. Fresher buck rubs (less than two days old), in particular, are visited more frequently by adult females than older rubs. In view of this behavior it has been suggested that chemicals present in fresh buck rubs may help physiologically induce and synchronize fertility in females that visit these rubs. This would be an obvious advantage to wide-ranging deer, especially to a socially dominant buck when courting several adult females during the autumn rut. Another visual signal produced by while-tailed deer is termed a buck scrape. Scrapes consist of a clearing (about 0.5 meter in diameter) and shallow depression made by pushing aside the leaves covering the ground; after making the scrape, the deer typically urinates in the depression. Thus, like a buck rub, a scrape is both a visual and an olfactory signal. Buck scrapes are generally created after leaf-fall in autumn, which is just before or during the rut. Scrapes are usually placed in open or conspicuous places, such as along a deer trail. Most are made by older males, although females and younger males (2.5 years old or less) occasionally make scrapes.

【Paragraph 1】A conspicuous sign indicating the presence of white-tailed deer in a woodlot is a buck rub. A male deer makes a buck rub by striping the bark (outer layer) of a small tree with its antlers. When completed, the buck rub is an obvious visual signal to us and presumable to other deer in the area. A rub is usually located at the shoulder height of a deer (one meter or less above the ground) on a smooth-barked, small-diameter (16-25 millimeters) tree. The smooth bark of small red maples makes this species ideal for buck rubs in the forests of the mid-eastern United States.

1. The word “conspicuous”in the passage is closest in meaning to

noticeable

○ noticeable

○ common

○ strange

○ particular

2.According to paragraph 1, why are small red maple trees ideal for buck rubs?

○ They have smooth bark.

○ They are found in the mid-eastern United States.

○ They grow very slowly.

○ They tend to grow in open spaces.

【Paragraph 3】Buck rubs also have a scent produced by glands in the foreheads of deer that is transferred to the tree when the rub is made. These odors make buck rubs an important means of olfactory communication between deer. The importance of olfactory communication (using odors to communicate) in the way of life of deer was documented by a study of captive adult male deer a few decades ago, which noted that males rubbed their foreheads on branches and twigs, especially as autumn approached. A decade later another study reported that adult male white-tailed deer exhibited forehead rubbing just before and during the rut. It was found that when a white-tailed buck makes a rub, it moves both antlers and forehead glands along the small tree in a vertical direction. This forehead rubbing behavior coincides with a high level of glandular activity in the modified scent glands found on the foreheads of male deer; the glandular activity causes the forehead pelage (hairy covering) of adult males to be distinctly darker than in females or younger males.

3.The studies of forehead rubbing by deer described in paragraph 3 showed that

○ forehead rubbing encourages the growth of antlers

○ male deer and white-tailed deer behave differently during the rut.

○ the rut can occur at different times of the year

○ deer convey important information through scent

4. The word “exhibited”in the passage is closest in meaning to

○ relied on

○ increased

○ displayed

○ preferred

【Paragraph 4】Forehead rubbing by male deer on buck rubs presumably sends a great deal of information to other members of the same species. First, the chemicals deposited on the rub provide information on the individual identity of an animal; no two mammals produce the same scent. For instance, as we all know, dogs recognize each other via smell. Second, because only male deer rub, the buck rub and its associated chemicals indicate the sex of the deer producing the rub. Third, older, more dominant bucks produce more buck rubs and probably deposit more glandular secretions on a given rub. Thus the presence of many well-marked rubs is indicative of older, higher-status males being in the general vicinity rather than simply being a crude measure of relative deer abundance in a given area. The information conveyed by the olfactory signals on a buck rub make it the social equivalent of some auditory signals in other deer species, such as trumpeting by bull elk.

5.Why does the author mention that “dogs recognize each other via smell”?

○ To point out the similarities between dogs and deer

○ To argue that animals communicate through scent rather than through vision

○ To support the claim that the scent of a buck rub serves to identify its maker to other deer

○ To suggest that buck rubs can be detected by other species

6. The word “crude”in the passage is closest in meaning to

○ rough

○ useful

○ necessary

○ obvious

7.What can be inferred from paragraph 4 about the trumpeting of bull elk?

○ Trumpeting by higher-status bull elk signals their presence to other members of their species.

○ Bull elk need to combine trumpeting with olfactory signals to convey information about their identity.

○ Trumpeting alerts white-tailed deer to the presence of bull elk in their vicinity.

○ Trumpeting provides a better measure of deer presence in a given area than buck rubs do.

8.According to paragraph 4, the buck rubs occurring in a given area reveal all of the following information about deer EXCEPT

○ the individual identity of the deer

○ the gender of the deer

○ the likely social status of the deer

○ the number of deer in the vicinity

【Paragraph 5】Because both sexes of white-tailed respond to buck rubs by smelling and licking them, rubs may serve a very important additional function. Fresher buck rubs (less than two days old), in particular, are visited more frequently by adult females than older rubs. In view of this behavior it has been suggested that chemicals present in fresh buck rubs may help physiologically induce and synchronize fertility in females that visit these rubs. This would be an obvious advantage to wide-ranging deer, especially to a socially dominant buck when courting several adult females during the autumn rut. Another visual signal produced by while-tailed deer is termed a buck scrape. Scrapes consist of a clearing (about 0.5 meter in diameter) and shallow depression made by pushing aside the leaves covering the ground; after making the scrape, the deer typically urinates in the depression. Thus, like a buck rub, a scrape is both a visual and an olfactory signal. Buck scrapes are generally created after leaf-fall in autumn, which is just before or during the rut. Scrapes are usually placed in open or conspicuous places, such as along a deer trail. Most are made by older males, although females and younger males (2.5 years old or less) occasionally make scrapes.

9. The word “induce”in the passage is closest in meaning to

○ increase

○ extend

○ delay

○ stimulate

10.According to paragraph 5, which of the following is true about chemicals in buck rubs?

○ They have to be at least two days old for females to be able to detect them.

○ They are more effective in older buck rubs than in fresher ones.

○ They may affect fertility in female deer.

○ They can be more easily detected by young males than adult females.

11. The word “termed”in the passage is closest in meaning to

○ associated with

○ visible as

○ known as

○ provided by

12.According to the passage, in what way do buck scrapes differ from buck rubs?

○ Buck scrapes are made by both male and female deer.

○ Buck scrapes are purely visual signals.

○ Buck scrapes are made closer to the breeding season than buck rubs.

○ Buck scrapes can be smelled only by deer.

【Paragraph 1】A conspicuous sign indicating the presence of white-tailed deer in a woodlot is a buck rub. ■A make deer makes a buck rub by striping the bark (outer layer) of a small tree with its antlers. ■When completed, the buck rub is an obvious visual signal to us and presumable to other deer in the area. ■A rub is usually located at the shoulder height of a deer (one meter or less above the ground) on a smooth-barked, small-diameter (16-25 millimeters) tree. ■The smooth bark of small red maples makes this species ideal for buck rubs in the forests of the mid-eastern United States.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This process can take a few hours to several days.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Buck rubs and buck scrapes are two types of markings made by white-tailed deer.

●

●

●

Answer Choices

○ The observation that deer sniff and lick buck rubs first led scientists to connect buck rubs with combat between adult males during the breeding season.

○ Buck rubs and buck scrapes are visual signals and smells that deer use to communicate a variety of information to other deer.

○ The number of buck rubs and buck scrapes in a given area changes as the density of the population of male deer in the area changes.

○ As they rub the bark from trees, male deer leave behind chemicals produced by the glands in their foreheads, creating a scent that other deer can detect.

○ The height of a buck rub, the type of tree used, and the direction in which the deer applies the rub can give different kinds of information to other deer.

○ Buck rubs are created close to the breeding season of deer and may affect the timing of fertility in the female deer that visit the rubs.

参考答案

1.○1

2.○1

3.○4

4.○3

5.○3

6.○1

7.○1

8.○4

9.○4

10.○3

11.○3

12.○1

13.○2

14. Buck rubs and buck scrapes are …

As they rub the bark from trees…

Buck rubs are created close…

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

If you are tired of looking up TPO words in a dictionary, try*《新托福TPO阅读词汇速查速记》*!

## **参考译文：雄鹿擦痕与雄鹿窝**

一个表示白尾鹿在小树林中存在的显著标志是雄鹿擦痕。雄鹿利用鹿角剥除小树的树皮以制造雄鹿擦痕。完工后，雄鹿擦痕对我们来说是一道明显的标志，对当地的其它鹿来说也可能如此。擦痕常与鹿肩齐高（距地面一米或不到一米），并位于树皮光滑、树径较细（16-25cm）的树上。美国中东部森林中的树皮光滑的红色小枫树是雄鹿擦痕的理想物种。

成年雄鹿通常在夏末或秋初当它们的鹿茸上的外皮脱落时制造擦痕。雄鹿差不多在它们交配期（发情期）的前一到两个月制造擦痕。因此长期以来，生物学家们认为雄鹿擦痕不仅可以清除并磨光鹿茸，还可以借此练习发情期时雄鹿之间的角斗。然而，生物学家们也认识到鹿会嗅和舔舐陌生的擦痕，这表明这种小树上的视觉记号在鹿群社会生活中起到重要的交流目的。

雄鹿擦痕都有一种由雄鹿前额上的腺体分泌的气味，它在制造擦痕时涂抹到树上。这些气味使得雄鹿擦痕成为鹿与鹿之间重要的嗅觉交流方式。嗅觉交流（利用气味交流）在鹿群生活中的重要性可以通过几十年前一项对圈禁的雄鹿的研究得以印证。研究发现，特别是当秋天将近时，雄鹿就将其前额在树枝上蹭来蹭去。十年后的另一项研究发现成年雄性白尾鹿在其发情期或发情期前会摩擦其前额。当白尾鹿制造擦痕时，它将其鹿茸和前额腺体在小树上垂直磨蹭。这种前额的磨蹭行为和雄鹿前额上散发气味的腺体的异常活跃一致。该腺体活动导致成年雄鹿的前额皮毛比雌鹿或未成年鹿的暗很多。

雄鹿前额在擦痕上的摩擦很可能向同类中的其它成员发出了大量信息。首先擦痕上残留的化学物质提供了一只动物的个体信息。没有两只气味相同的哺乳动物。就如我们熟知的那样，狗就是通过气味区别彼此的。第二，因为只有雄鹿制造擦痕，所以擦痕及其携带的化学物质表示了制造擦痕的鹿的性别信息。第三，年龄更大、更具统治地位的雄鹿制造的擦痕更多，而且其分泌在擦痕上的气味分泌物很可能也更多。因此大量的标记得很好的擦痕的出现表明年龄较大、地位较高的雄鹿就在附近，而不仅只是粗略的说明了该区域鹿群的相对丰度。雄鹿擦痕上的气味记号所携带的信息使它成为与其它种类鹿群中的某些声音信号，比如雄性麋鹿的叫声，同等重要。

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因为雄性和雌性白尾鹿都会嗅和舔舐雄鹿擦痕，所以这些擦痕还有一个重要的功能。特别的，新鲜擦痕（两天以内制造的）要比更久远的擦痕受到更多关注。这种行为表明新鲜擦痕上的化学物质可能有助于从生理上诱导并让关注这些擦痕的雌鹿同时受孕。这对分布广泛的鹿群显然是一个有利条件，尤其对秋天发情期中一只处于较高社会统治地位的同时向几只成年雌鹿求爱的雄鹿而言。由白尾鹿制造的另一种视觉记号叫做雄鹿窝。雄鹿窝是一个通过将地面上的树叶推开而产生的干净而较浅的低坑（直径约0.5m）。雄鹿窝制造完成后，鹿通常会在低坑里小便。因此，像雄鹿擦痕一样，雄鹿窝既是视觉上的也是嗅觉上的记号。雄鹿窝通常在秋天树叶落下后，雄鹿发情期或之前出现。雄鹿窝常位于开阔或显眼的位置，比如沿着鹿的行动路线。绝大部分雄鹿窝由年龄更大的雄鹿制造，但有些雌鹿和年轻雄鹿（2.5年或更年轻）偶尔也制造雄鹿窝。

TPO-29

## **Characteristics of Roman Pottery**

The pottery of ancient Romans is remarkable in several ways. The high quality of Roman pottery is very easy to appreciate when handling actual pieces of tableware or indeed kitchenware and amphorae (the large jars used throughout the Mediterranean for the transport and storage of liquids, such as wine and oil). However, it is impossible to do justice to Roman wares on the page, even when words can be backed up by photographs and drawing. Most Roman pottery is light and smooth to touch and very tough, although, like all pottery, it shatters if dropped on a hard surface. It is generally made with carefully selected and purified clay, worked to thin-walled and standardized shapes on a fast wheel and fired in a kiln (pottery oven) capable of ensuring a consistent finish. With handmade pottery, inevitably there are slight differences between individual vessels of the same design and occasional minor blemishes (flaws). But what strikes the eye and the touch most immediately and most powerfully with Roman pottery is its consistent high quality.

This is not just an aesthetic consideration but also a practical one. These vessels are solid (brittle, but not fragile), they are pleasant and easy to handle (being light and smooth), and, with their hard and sometimes glossy (smooth and shiny) surfaces, they hold liquids well and are easy to wash. Furthermore, their regular and standardized shapes would have made them simple to stack and store. When people today are shown a very ordinary Roman pot and, in particular, are allowed to handle it, they often comment on how modern it looks and feels, and they need to be convinced of its true age.

As impressive as the quality of Roman pottery is its sheer massive quantity. When considering quantities, we would ideally like to have some estimates for overall production from particular sites of pottery manufacture and for overall consumption at specific settlements. Unfortunately, it is in the nature of the archaeological evidence, which is almost invariable only a sample of what once existed, that such figures will always be elusive. However, no one who has ever worked in the field would question the abundance of Roman pottery, particularly in the Mediterranean region. This abundance is notable in Roman settlements (especially urban sites) where the labor that archaeologists have to put into the washing and sorting of potsherds (fragments of pottery) constitutes a high proportion of the total work during the initial phases of excavation.

Only rarely can we derive any “real”quantities from deposits of broken pots. However, there is one exceptional dump, which does represent a very large part of the site’s total history of consumption and for which an estimate of quantity has been produced. On the left bank of the Tiber River in Rome, by one of the river ports of the ancient city, is a substantial hill some 50 meters high called Monte Testaccio. It is made up entirely of broken oil amphorae, mainly of the second and third centuries A.D. It has been estimated that Monte Testaccio contains the remains of some 53 million amphorae, in which around 6,000million liters of oil were imported into the city from overseas. Imports into imperial Rome were supported by the full might of the state and were therefore quite exceptional ——but the size of the operations at Monte Testaccio, and the productivity and complexity that lay behind them, nonetheless cannot fail to impress.. This was a society with similarities to modern one----moving goods on a gigantic scale, manufacturing high-quality containers to do so, and occasionally, as here, even discarding them on delivery.

Roman pottery was transported not only in large quantities but also over substantial distances. Many Roman pots, in particular amphorae and the fine wares designed for use at tables, could travel hundreds of miles----all over the Mediterranean and also further afield. But maps that show the various spots where Roman pottery of a particular type has been found tell only part of the story. What is more significant than any geographical spread is the access that different levels of society had to good-quality products. In all but the remotest regions of the empire, Roman pottery of a high standard is common at the sites of humble villages and isolated farmsteads.

【Paragraph 1】The pottery of ancient Romans is remarkable in several ways. The high quality of Roman pottery is very easy to appreciate when handling actual pieces of tableware or indeed kitchenware and amphorae (the large jars used throughout the Mediterranean for the transport and storage of liquids, such as wine and oil). However, it is impossible to do justice to Roman wares on the page, even when words can be backed up by photographs and drawing. Most Roman pottery is light and smooth to touch and very tough, although, like all pottery, it shatters if dropped on a hard surface. It is generally made with carefully selected and purified clay, worked to thin-walled and standardized shapes on a fast wheel and fired in a kiln (pottery oven) capable of ensuring a consistent finish. With handmade pottery, inevitably there are slight differences between individual vessels of the same design and occasional minor blemishes (flaws). But what strikes the eye and the touch most immediately and most powerfully with Roman pottery is its consistent high quality.

1. Paragraph 1 indicates which of the following about Roman pottery?

○ Roman amphorae were of much higher quality overall than other Roman pottery.

○ Roman pottery can best be appreciated when actual pieces are handled.

○ Roman pottery declined slightly in quality when the use of fast wheels and kilns was introduced.

○ Roman practical tableware spread more rapidly across the Mediterranean than amphorae did.

2.All of the following are mentioned in paragraph 1 as characteristics of Roman pottery EXCEPT:

○ It was usually made with high-quality clay.

○ It generally did not weigh much.

○ It did not break as easily as other ancient pottery.

○ It sometimes had imperfections.

【Paragraph 2】This is not just an aesthetic consideration but also a practical one. These vessels are solid (brittle, but not fragile), they are pleasant and easy to handle (being light and smooth), and, with their hard and sometimes glossy (smooth and shiny) surfaces, they hold liquids well and are easy to wash. Furthermore, their regular and standardized shapes would have made them simple to stack and store. When people today are shown a very ordinary Roman pot and, in particular, are allowed to handle it, they often comment on how modern it looks and feels, and they need to be convinced of its true age.

3.According to paragraph 2, which of the following is NOT true of Roman vessels?

○ They were good containers for liquids.

○ Their shapes allowed for easy stacking and storing.

○ They sometimes had shiny surfaces.

○ Their true age is immediately apparent.

【Paragraph 3】As impressive as the quality of Roman pottery is its sheer massive quantity. When considering quantities, we would ideally like to have some estimates for overall production from particular sites of pottery manufacture and for overall consumption at specific settlements. Unfortunately, it is in the nature of the archaeological evidence, which is almost invariable only a sample of what once existed, that such figures will always be elusive. However, no one who has ever worked in the field would question the abundance of Roman pottery, particularly in the Mediterranean region. This abundance is notable in Roman settlements (especially urban sites) where the labor that archaeologists have to put into the washing and sorting of potsherds (fragments of pottery) constitutes a high proportion of the total work during the initial phases of excavation.

4.The author mentions the work of archaeologists in paragraph 3 in order to

○ support the idea that pottery was produced in large quantities by the Romans

○ illustrate how hard it is for archaeologists to find complete pieces of Roman pottery

○ contrast archaeological sites in Roman urban areas with other sites in the Mediterranean

○ explain why the quantities of pottery found vary significantly from one site to another

【Paragraph 4】Only rarely can we derive any “real”quantities from deposits of broken pots. However, there is one exceptional dump, which does represent a very large part of the site’s total history of consumption and for which an estimate of quantity has been produced. On the left bank of the Tiber River in Rome, by one of the river ports of the ancient city, is a substantial hill some 50 meters high called Monte Testaccio. It is made up entirely of broken oil amphorae, mainly of the second and third centuries A.D. It has been estimated that Monte Testaccio contains the remains of some 53 million amphorae, in which around 6,000million liters of oil were imported into the city from overseas. Imports into imperial Rome were supported by the full might of the state and were therefore quite exceptional ——but the size of the operations at Monte Testaccio, and the productivity and complexity that lay behind them, nonetheless cannot fail to impress.

5.The word “substantial”in the passage is closest in meaning to

○ protected

○ man-made

○ large

○ famous

6.According to paragraph 4, Monte Testaccio is particularly important for archaeologists because archaeologists were able to

○ conclude how amphorae manufacturing increased rapidly after the second century A.D.

○ find the locations where most of the amphorae in the Roman Empire were produced

○ obtain relatively accurate calculations of the quantities of amphorae used over time in that place

○ discover that the Roman state had supported amphorae production

7. The word “entirely”in the passage is closest in meaning to

○ apparently

○ completely

○ basically

○ mostly

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8.Paragraph 4 indicates which of the following about the port on the Tiber River near Monte Testaccio?

○ It was built around the third century A.D.

○ It was close to areas where large quantities of oil were produced.

○ It was in use only for a very short period of time.

○ It had impressive level of commercial activity.

9.The statement in paragraph 4 that amphorae delivered to the port near Monte Testaccio were occasionally discarded support which of the following?

○ Traders at the port were often careless.

○ The quality of the amphorae used at the port was not very good.

○ The scale of the trade made it possible to waste quality amphorae sometimes.

○ The importing of oil from overseas gradually declined, reducing the need for pottery containers.

【Paragraph 5】Roman pottery was transported not only in large quantities but also over substantial distances. Many Roman pots, in particular amphorae and the fine wares designed for use at tables, could travel hundreds of miles----all over the Mediterranean and also further afield. But maps that show the various spots where Roman pottery of a particular type has been found tell only part of the story. What is more significant than any geographical spread is the access that different levels of society had to good-quality products. In all but the remotest regions of the empire, Roman pottery of a high standard is common at the sites of humble villages and isolated farmsteads.

10.The statement that “maps show the various spots where Roman pottery of a particular type has been found tell only part of the story”makes the point that

○ maps indicate where specific pottery styles have been found, but they do not indicate where these styles originated

○ maps show the geographical spread of Roman pottery but not the people who had access to it

○ maps do not usually include pottery styles found in the remotest regions the Roman Empire

○ archaeologist studying Roman pottery need to use a range of techniques in their investigations

11.The word “humble”in the passage is closest in meaning to

○ rural

○ distant

○ ancient

○ modest

12.The word “particular”in the passage is closest in meaning to

○ specific

○ common

○ ancient

○ superior

■Only rarely can we derive any “real”quantities from deposits of broken pots. ■However, there is one exceptional dump, which does represent a very large part of the site’s total history of consumption and for which an estimate of quantity has been produced. ■On the left bank of the Tiber River in Rome, by one of the river ports of the ancient city, is a substantial hill some 50 meters high called Monte Testaccio. ■It is made up entirely of broken oil amphorae, mainly of the second and third centuries A.D. It has been estimated that Monte Testaccio contains the remains of some 53 million amphorae, in which around 6,000million liters of oil were imported into the city from overseas. Imports into imperial Rome were supported by the full might of the state and were therefore quite exceptional ——but the size of the operations at Monte Testaccio, and the productivity and complexity that lay behind them, nonetheless cannot fail to impress.. This was a society with similarities to modern one----moving goods on a gigantic scal, manufacturing high-quality containers to do so, and occasionally, as here, even discarding them on delivery.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**That is because residents of a city did not usually discard used pottery at the same site over a long period of time.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

The pottery of the ancient Roman Empire is remarkable.

●

●

●

Answer Choices

○ Roman pottery is considered to be practical and of consistently high quality.

○ Roman pottery was transported over long distances, and different levels of society had access to quality pottery.

○ Archaeologists looking for the remains of Roman pottery concentrate on urban sites because that is where the oldest pieces of kitchenware and amphorae have been found.

○ Even though the exact quantity of pottery produced by the Romans is almost impossible to calculate, it is certain that is was produced in large quantities.

○ People are not familiar with the whole range of pottery of Romans created because most of the available pieces represent only a limited number of styles and shapes.

○ It is still unclear to archaeologists what the role of the Roman state in the commercial success of Roman pottery was.

参考答案

1.○2

2.○3

3.○4

4.○1

5.○3

6.○3

7.○2

8.○4

9.○3

10.○2

11.○4

12.○1

13.○2

14. Roman pottery is considered…

Roman pottery was transported…

Even though…

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：古罗马陶器的特征**

古罗马的陶器在诸多方面成就惊人。当把玩古罗马陶制餐具或厨房用具和双耳陶罐（遍及整个地中海地区用以运输或储存酒或油之类液体的大型陶罐）时，人们对其良好的质量赞不绝口。尽管有照片和画像的记录，却无法轻易的对罗马陶器做出公正评价。绝大部分罗马陶器都很轻很光滑也很坚韧，尽管，像所有陶器一样，当撞到坚硬地面时也容易破碎。它们一般由精心筛选和净化后的粘土在快速旋转的圆盘上制成壁薄而形状标准的坯子，然后放入陶器窑中烧结，并确保一气呵成。由于是手工制作，同一型号的陶器难免有微小差别和瑕疵。但罗马陶器让人瞠目结舌的最直接最有力的是它那一以贯之的高质量。

这不仅是审美的考虑也有实用之处。这些容器都很坚硬（脆却并不易碎），很优雅也很好用（质轻而光滑），其表面坚硬而有时带有光泽。它们很适合盛放液体也很易清洁。而且，它们形状规则且标准，极易堆放储藏。当将这些陶器展示给今天的人们，并允许他们把玩时，他们常常认为其形状和手感如此现代以至于很难相信其实际年龄。

和其高质量一样让人印象深刻的是罗马陶器的巨大的数量。当确定数量时，我们常喜欢去评估某一陶器生产地点生产陶器的总量以及某地居民对陶器的消费总量。不幸的是，考古证据本质上只能是历史存在的一个样本，因而由此得到的数据并不可靠。但是，那些曾经在现场工作过的人绝不会怀疑罗马陶器的数量，尤其是在地中海地区。陶器数量的罗马人聚集区（尤其是城市遗址）家喻户晓。在那些遗址上考古学家们在挖掘的第一阶段不得不花费很大比例的劳动力去清洗和整理陶器碎片。

从陶罐碎片堆中我们很难推算出真正的数量。但也有例外。有一处遗址出土的陶器代表了其曾经的陶器消费的很大一部分，因此可以据此推测出其数量。罗马第伯尔河左岸上一座古代城市码头的旁边有一座约50米高的大山，叫做Monte Testaccio. 该山全部由公元二到三世纪的油罐碎片组成。据估计，Monte Testaccio山上约有5300万只油罐并由此从海外进口了约6亿升的油。向罗马帝国的进口由国家全力支持，因此也非常例外----但是Monte Testaccio的制作规模及其背后的生产力和复杂性却绝对不容忽视。

罗马陶器不仅运输数量庞大而且其运输距离遥远。很多罗马陶罐，尤其是双耳陶罐和桌上餐具可能被运输了几百英里----遍及整个地中海乃至更远。但是显示各种罗马陶器出土地点的地图只是故事的一部分。比地理上的广阔分布更重要的是社会的不同阶层都能够使用这种高质量的陶罐。在帝国的几乎所有的偏远地区，高质量的罗马陶器在其最凋敝的村庄和偏远田野中都随处可见。

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## **Competition**

When several individuals of the same species or of several different species depend on the same limited resource, a situation may arise that is referred to as competition. The existence of competition has been long known to naturalists; its effects were described by Darwin in considerable detail. Competition among individuals of the same species (intraspecies competition), one of the major mechanisms of natural selection, is the concern of evolutionary biology. Competition among the individuals of different species (interspecies competition) is a major concern of ecology. It is one of the factors controlling the size of competing populations, and extreme cases it may lead to the extinction of one of the competing species. This was described by Darwin for indigenous New Zealand species of animals and plants, which died out when competing species from Europe were introduced.

No serious competition exists when the major needed resource is in superabundant supply, as in most cases of the coexistence of herbivores (plant eaters). Furthermore, most species do not depend entirely on a single resource, if the major resource for a species becomes scarce, the species can usually shift to alternative resources. If more than one species is competing for a scarce resource, the competing species usually switch to different alternative resources. Competition is usually most severe among close relatives with similar demands on the environment. But it may also occur among totally unrelated forms that compete for the same resource, such as seed-eating rodents and ants. The effects of such competition are graphically demonstrated when all the animals or all the plants in an ecosystem come into competition, as happened 2 million years ago at the end of Pliocene, when North and South America became joined by the Isthmus of Panama. North and South American species migrating across the Isthmus now came into competition with each other. The result was the extermination of a large fraction of the South American mammals, which were apparently unable to withstand the competition from invading North American species----although added predation was also an important factor.

To what extent competition determines the composition of a community and the density of particular species has been the source of considerable controversy. The problem is that competition ordinarily cannot be observed directly but must be inferred from the spread or increase of one species and the concurrent reduction or disappearance of another species. The Russian biologist G. F. Gause performed numerous tow-species experiments in the laboratory, in which one of the species became extinct when only a single kind of resource was available. On the basis of these experiments and of field observations, the so-called law of competitive exclusion was formulated, according to which no two species can occupy the same niche. Numerous seeming exceptions to this law have since been found, but they can usually be explained as cases in which the two species, even though competing for a major joint resource, did not really occupy exactly the same niche.

Competition among species is of considerable evolutionary importance. The physical structure of species competing for resources in the same ecological niche tends to gradually evolve in ways that allow them to occupy different niches. Competing species also tend to change their ranges so that their territories no longer overlap. The evolutionary effect of competition on species has been referred to as “species selection”; however, this description is potentially misleading. Only the individuals of a species are subject to the pressures of natural selection. The effect on the well-being and existence of a species is just the result of the effects of selection on all the individuals of the species. Thus species selection is actually a result of individual selection.

Competition may occur for any needed resource. In the case of animals it is usually food; in the case of forest plants it may be light; in the case of substrate inhabitants it may be space, as in many shallow-water bottom-dwelling marine organisms. Indeed, it may be for any of the factors, physical as well as biotic, that are essential for organisms. Competition is usually the more severe the denser the population. Together with predation, it is the most important density-dependent factor in regulating population growth.

【Paragraph 1】When several individuals of the same species or of several different species depend on the same limited resource, a situation may arise that is referred to as competition. The existence of competition has been long known to naturalists; its effects were described by Darwin in considerable detail. Competition among individuals of the same species (intraspecies competition), one of the major mechanisms of natural selection, is the concern of evolutionary biology. Competition among the individuals of different species (interspecies competition) is a major concern of ecology. It is one of the factors controlling the size of competing populations, and extreme cases it may lead to the extinction of one of the competing species. This was described by Darwin for indigenous New Zealand species of animals and plants, which died out when competing species from Europe were introduced.

1.The phrase “mechanisms of natural selection”in the passage is closest in meaning to

○ types of natural selection

○ dangers of natural selection

○ problems natural selection solves

○ ways natural selection works

2.According to paragraph 1, what is one effect of competition among individuals of different species?

○ It results in the eventual elimination of the resource for which they are competing.

○ It leads to competition among individuals of the same species.

○ It encourages new species to immigrate to an area.

○ It controls the number of individuals in the competing populations.

3. The word “indigenous”in the passage is closest in meaning to

○ native

○ rate

○ most

○ numerous

4.In paragraph 1, why does the author mention what happened in New Zealand?

○ To indicate that Darwin understood the importance of competition

○ To illustrate that competition can lead to the extinction of species

○ To identify where the idea of competition among species first arose

○ To argue against the idea that the process of selection is a natural occurrence

【Paragraph 2】No serious competition exists when the major needed resource is in superabundant supply, as in most cases of the coexistence of herbivores (plant eaters). Furthermore, most species do not depend entirely on a single resource, if the major resource for a species becomes scarce, the species can usually shift to alternative resources. If more than one species is competing for a scarce resource, the competing species usually switch to different alternative resources. Competition is usually most severe among close relatives with similar demands on the environment. But it may also occur among totally unrelated forms that compete for the same resource, such as seed-eating rodents and ants. The effects of such competition are graphically demonstrated when all the animals or all the plants in an ecosystem come into competition, as happened 2 million years ago at the end of Pliocene, when North and South America became joined by the Isthmus of Panama. North and South American species migrating across the Isthmus now came into competition with each other. The result was the extermination of a large fraction of the South American mammals, which were apparently unable to withstand the competition from invading North American species----although added predation was also an important factor.

5.According to paragraph 2, competition is not usually a significant factor among two coexisting species when

○ one of the species has only recently moved into the territory of the other

○ the species are closely related to each other

○ the population of one species is much larger than that of the other

○ both of the species are herbivores

6.The word “graphically”in the passage is closest in meaning to

○ vividly

○ frequently

○ broadly

○ typically

7.In paragraph 2, why does the author talk about what happened as a result of North and South America becoming joined at the Isthmus of Panama?

○ To make the point that predation can have as much effect on species survival as competition does

○ To show how the ability to switch to an alternative resource can give a species a competitive advantage

○ To account for the current species composition of North and South America

○ To provide an example of the serious effects of competition between unrelated species

【Paragraph 3】To what extent competition determines the composition of a community and the density of particular species has been the source of considerable controversy. The problem is that competition ordinarily cannot be observed directly but must be inferred from the spread or increase of one species and the concurrent reduction or disappearance of another species. The Russian biologist G. F. Gause performed numerous tow-species experiments in the laboratory, in which one of the species became extinct when only a single kind of resource was available. On the basis of these experiments and of field observations, the so-called law of competitive exclusion was formulated, according to which no two species can occupy the same niche. Numerous seeming exceptions to this law have since been found, but they can usually be explained as cases in which the two species, even though competing for a major joint resource, did not really occupy exactly the same niche.

8.Paragraph 3 supports the idea that Gause’s experiments were important because they

○ provided a situation in which competition could be removed from the interaction between two species

○ showed that previous ideas about the extent to which competition determines the composition of a community were completely mistaken

○ helped establish that competition will remove all but one species from any given ecological niche

○ offered evidence that competition between species is minimal when there is an overabundance of a single food source

9. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Apparent exceptions to this law usually involves cases in which two species compete for the same major resource but occupy slightly different niches.

○ Although it may appear that two species always have different niches, many exceptions show that species compete with each other.

○ Cases in which two species not only compete for a shared resource but also occupy similar niches are considered exceptions to this law.

○ Cases in which the two species do not occupy that same niche yet still compete for the same resource are believed to be exceptions to this law.

【Paragraph 4】Competition among species is of considerable evolutionary importance. The physical structure of species competing for resources in the same ecological niche tends to gradually evolve in ways that allow them to occupy different niches. Competing species also tend to change their ranges so that their territories no longer overlap. The evolutionary effect of competition on species has been referred to as “species selection”; however, this description is potentially misleading. Only the individuals of a species are subject to the pressures of natural selection. The effect on the well-being and existence of a species is just the result of the effects of selection on all the individuals of the species. Thus species selection is actually a result of individual selection.

10.According to paragraph 4, how does competition affect evolution?

○ It results in the evolution of physical structures that allow the species to compete with each other more effectively.

○ It results I the evolutionary extinction of all but one of the competing species.

○ It results in the competing species evolving in such a way that they no longer compete for the same resources.

○ It results in the competing species evolving to become so much like each other that competition between them eventually disappears.

11.According to paragraph 4, “species selection”is a misleading term because it

○ overemphasizes the role of selection pressure in species extinction

○ suggests that selection pressures directly influence whole species

○ does not make a distinction between species extinction and species evolution

○ suggests that extinction always results whenever there is a competition

【Paragraph 5】Competition may occur for any needed resource. ■In the case of animals it is usually food; in the case of forest plants it may be light; in the case of substrate inhabitants it may be space, as in many shallow-water bottom-dwelling marine organisms. ■Indeed, it may be for any of the factors, physical as well as biotic, that are essential for organisms. ■Competition is usually the more severe the denser the population. ■Together with predation, it is the most important density-dependent factor in regulating population growth.

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12.The word “regulating”in the passage is closest in meaning to

○ controlling

○ explaining

○ observing

○ stopping

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**That is, as the density of a population increases, competition has a greater impact and leads to greater mortality.**

Where would the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

When necessary resources are limited, competition can occur among individuals of the same species or of different species.

●

●

●

Answer Choices

○ Competition can eliminate a species, but since most species do not depend on a single resource, competition is often reduced by switching to alternative resources.

○ Investigation of the ecological role of competition is difficult because ordinarily the competition cannot be observed directly and must be inferred from its presumed effects.

○ Competition between a pair of species tends to lessen over time because the species tend to evolve to occupy different ecological niches and ranges.

○ Competition between individual of the same species is usually for food whereas competition between species is usually for habitat.

○ Experiments and field observation have established that competition between species is strong enough to prevent two species from occupying the same ecological niche.

○ Competition is usually strongest when the density of the competing populations is the same.

参考答案

1.○4

2.○4

3.○1

4.○2

5.○4

6.○1

7.○4

8.○3

9.○1

10.○3

11.○2

12.○1

13.○4

14. Competition can eliminate…

Competition between a pair of species…

Experiments and field observation…

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：竞争**

当同一物种的不同个体或不同的物种都依靠同一有限资源时，这种情况往往会引发成所谓的竞争。竞争的存在已为生物学家们所熟知，其结果也已被达尔文详尽叙述过。同一物种不同个体之间的竞争（种内竞争），作为自然选择的一个主要原理，现在属于进化生物学。不同物种个体之间的竞争（种间竞争）是生态学的主要部分。它是控制有竞争关系的种群数量的一个因素，而其极端情况可能导致竞争的一方灭绝。达尔文在描述新西兰本土动植物物种在与引进的欧洲物种的竞争中灭绝时讲到该情况。

当主要需求的资源能充分供给时，竞争就不会很激烈，正如很多情况下植食动物都能够共存。而且绝大部分物种并不只依靠一种资源，当某物种的主要资源匮乏时，它们常转向其它候选资源。如果多个物种竞争同一稀缺资源，他们常会转向不同的候选资源。近亲之间的竞争往往最激烈，因为他们对环境有相似需求。但激烈竞争也可能发生在毫不相关却需要同一资源的物种之间，例如吃种子的啮齿动物和蚂蚁。当一个生态系统中的所有动植物都参与到竞争中来时竞争的影响将表现得淋漓尽致，比如在两百万年前上新世末期当南、北美洲在巴拿马地峡处聚拢时所发生的一切。南、北美洲的物种可以穿越地峡而相互竞争。结果是大量南美洲哺乳动物因抵抗不了来自北美洲物种的竞争而灭绝----尽管过度捕杀也是一个很重要的因素。

竞争在多大程度上决定群落的组成和某特定物种的密度一直备受争议。问题是竞争通常无法直接观察得到而必须通过某一物种的扩张或增加而另外一种物种同时减少或消失的对比中推测出来。俄罗斯生物学家G. F. Gause进行了大量的两物种的室内实验，结果表明当只提供一种资源时其中一个物种将会灭绝。基于以上实验和实地观察，所谓的竞争灭绝法则是成立的，因为两个物种不可能同时完全占有同一有限资源。不过也发现了很多例外，但这些情况下两个物种，尽管会争夺某一主要资源，但它们争夺的资源不完全相同。

物种间的竞争对进化至关重要。争夺同一生态资源的物种趋向于朝着依赖不同资源的方向进化。相互竞争的物种会逐渐改变他们的活动范围使其领地不再重叠。竞争对进化的影响称为“物种选择”，但这一描述有很大误导性。只有某一物种中的个体才能面临自然选择的压力。某一物种的繁盛或生存正是其所有个体自然选择的结果。因此物种选择实际上是个体选择的结果。

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任何必须的资源都可能引发竞争。这种资源对动物而言常是食物，对森林植物而言可能是阳光，对地面物种来说可能是空间，比如很多生活在浅海海床上生物。实际上，竞争对象可能是生物所必需的任何生物的或非生物的因素。通常生物密度越大，竞争越激烈。和捕杀一起，竞争是与生物密度相关的调控生物密度增长的重要因素。

## **The History of Waterpower**

Moving water was one of the earliest energy sources to be harnessed to reduce the workload of people and animals. No one knows exactly when the waterwheel was invented, but irrigation systems existed at least 5,000 years ago, and it seems probable that the earliest waterpower device was the noria, a waterwheel that raised water for irrigation in attached jars. The device appears to have evolved no later than the fifth century B.C., perhaps independently in different regions of the Middle and Far East.

The earliest waterpower mills were probably vertical-axis mills for grinding corn, known as Norse or Greek mills, which seem to have appeared during the first or second century B.C. in the Middle East and a few centuries later in Scandinavia. In the following centuries, increasingly sophisticated waterpower mills were built throughout the Roman Empire and beyond its boundaries in the Middle East and northern Europe. In England, the Saxons are thought to have used both horizontal-and vertical-axis wheels. The first documented English mill was in the eighth century, but three centuries later about 5,000 were recorded, suggesting that every settlement of any size had its mill.

Raising water and grinding corn were by no means the only uses of the waterpower mill, and during the following centuries, the applications of waterpower kept pace with the developing technologies of mining, iron working, paper making, and the wool and cotton industries. Water was the main source of mechanical power, and by the end of the seventeenth century, England alone is thought to have had some 20,000 working mill.

There was much debate on the relative efficiencies of different types of waterwheels. The period from about 1650 until 1800 saw some excellent scientific and technical investigations of different designs. They revealed output powers ranging from about 1 horsepower to perhaps 60 for the largest wheels and confirmed that for maximum efficiency, the water should pass across the blades as smoothly as possible and fall away with minimum speed, having given up almost all of its kinetic energy. (They also proved that, in principle, the overshot wheel, a type of wheel in which an overhead stream of water powers the wheel, should win the efficiency competition.)

But then steam power entered the scene, putting the whole future of waterpower in doubt. An energy analyst writing in the year 1800 would have painted a very pessimistic picture of the future for waterpower. The coal-fired steam engine was taking over, and the waterwheel was fast becoming obsolete. However, like many later experts, this one would have suffered from an inability to see into the future. A century later the picture was completely different: by then, the world had an electric industry, and a quarter of its generating capacity was water powered.

The growth of the electric-power industry was the result of a remarkable series of scientific discoveries and development in electrotechnology during the nineteenth century, but significant changes in what we might now call hydro (water) technology also played their part. In 1832, the year of Michael Faraday’s discovery that a changing magnetic field produces an electric field, a young French engineer patented a new and more efficient waterwheel. His name was Benoit Fourneyron, and his device was the first successful water turbine. (The word turbine comes form the Latin turbo: something that spins). The waterwheel, unaltered for nearly 2,000 years, had finally been superseded.

Half a century of development was needed before Faraday’s discoveries in electricity were translated into full-scale power stations. In 1881 the Godalming power station in Surrey, England, on the banks of the Wey River, created the world’s first public electricity supply. The power source of this most modern technology was a traditional waterwheel. Unfortunately this early plant experienced the problem common to many forms of renewable energy: the flow in the Wey River was unreliable, and the waterwheel was soon replaced by a steam engine.

From this primitive start, the electric industry grew during the final 20 years of the nineteenth century at a rate seldom if ever exceeded by any technology. The capacity of individual power stations, many of them hydro plants, rose from a few kilowatts to over a megawatt in less than a decade.

【Paragraph 1】Moving water was one of the earliest energy sources to be harnessed to reduce the workload of people and animals. No one knows exactly when the waterwheel was invented, but irrigation systems existed at least 5,000 years ago, and it seems probable that the earliest waterpower device was the noria, a waterwheel that raised water for irrigation in attached jars. The device appears to have evolved no later than the fifth century B.C., perhaps independently in different regions of the Middle and Far East.

1. The word “harnessed” in the passage is closest in meaning to

○ known

○ depended on

○ recognized

○ utilized

2.In paragraph 1, uncertainty is expressed about all of the following aspects of the early development of waterpower EXCEPT

○ when exactly the very first waterpower devices were invented

○ when exactly the very first waterpower devices were developed

○ whether water was one of the earliest sources of power to be used by humans

* whether the very earliest waterpower devices arose independently

【Paragraph 2】The earliest waterpower mills were probably vertical-axis mills for grinding corn, known as Norse or Greek mills, which seem to have appeared during the first or second century B.C. in the Middle East and a few centuries later in Scandinavia. In the following centuries, increasingly sophisticated waterpower mills were built throughout the Roman Empire and beyond its boundaries in the Middle East and northern Europe. In England, the Saxons are thought to have used both horizontal0 and vertical-axis wheels. The first documented English mill was in the eighth century, but three centuries later about 5,000 were recorded, suggesting that every settlement of any size had its mill.

3.According to paragraph 2, what was true of the waterpower mills built throughout the Roman Empire?

○ Most had horizontal-axis wheels

○ Their design was based on mills that had long been used in Scandinavia

○ Their design was more popular beyond the Empire’s boundaries than it was within the Empire.

○ They are more advanced than the mills used in the Middle East at an earlier time.

【Paragraph 3】Raising water and grinding corn were by no means the only uses of the waterpower mill, and during the following centuries, the applications of waterpower kept pace with the developing technologies of mining, iron working, paper making, and the wool and cotton industries. Water was the main source of mechanical power, and by the end of the seventeenth century, England alone is thought to have had some 20,000 working mill. There was much debate on the relative efficiencies of different types of waterwheels. The period from about 1650 until 1800 saw some excellent scientific and technical investigations of different designs. They revealed output powers ranging from about 1 horsepower to perhaps 60 for the largest wheels and confirmed that for maximum efficiency, the water should pass across the blades as smoothly as possible and fall away with minimum speed, having given up almost all of its kinetic energy. (They also proved that, in principle, the overshot wheel, a type of wheel in which an overhead stream of water powers the wheel, should win the efficiency competition.)

4. The phrase “the application of waterpower” in the passage is closest in meaning to

○ the uses to which waterpower was put

○ the improvement made to waterpower

○ the method by which waterpower was supplied

○ the source of waterpower available

【Paragraph 4】There was much debate on the relative efficiencies of different types of waterwheels. The period from about 1650 until 1800 saw some excellent scientific and technical investigations of different designs. They revealed output powers ranging from about 1 horsepower to perhaps 60 for the largest wheels and confirmed that for maximum efficiency, the water should pass across the blades as smoothly as possible and fall away with minimum speed, having given up almost all of its kinetic energy. (They also proved that, in principle, the overshot wheel, a type of wheel in which an overhead stream of water powers the wheel, should win the efficiency competition.)

5.According to paragraph 4, which of the following was discovered as a result of scientific and technical investigations of waterpower conducted between 1650 and 1800?

○ Some types of small waterwheel can produce as much horsepower as the very largest wheels.

○ Waterwheels operate more efficiently when water falls away from their blades slowly than when water falls away quickly.

○ Waterwheel efficiency can be improved by increasing the amount of kinetic energy water contains as it passes over a waterwheel’s blades.

○ Unlike other types of waterwheels, the overshot wheel is capable of producing more than 60 horsepower units of energy.

【Paragraph 5】But then steam power entered the scene, putting the whole future of waterpower in doubt. An energy analyst writing in the year 1800 would have painted a very pessimistic picture of the future for waterpower. The coal-fired steam engine was taking over, and the waterwheel was fast becoming obsolete. However, like many later experts, this one would have suffered from an inability to see into the future. A century later the picture was completely different: by then, the world had an electric industry, and a quarter of its generating capacity was water powered.

6.The word “pessimistic” in the passage is closest in meaning to

○ negative

○ unlikely

○ surprising

○ incomplete

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7.The term “by then” in the passage refers to

○ by the time steam power entered the scene

○ by the year 1800

○ by the year 1900

○ by the time waterwheel was becoming obsolete

8.According to paragraph 5, why did waterpower become more importantly by 1900?

○ Better waterwheel designs improved the efficiency of waterpower.

○ Waterpower was needed to operate steam engines.

○ Waterpower was used to generate electricity.

○ Waterwheels became more efficient than coal-powered engines.

【Paragraph 6】The growth of the electric-power industry was the result of a remarkable series of scientific discoveries and development in electrotechnology during the nineteenth century, but significant changes in what we might now call hydro (water) technology also played their part. In 1832, the year of Michael Faraday’s discovery that a changing magnetic field produces an electric field, a young French engineer patented a new and more efficient waterwheel. His name was Benoit Fourneyron, and his device was the first successful water turbine. (The word turbine comes form the Latin turbo: something that spins). The waterwheel, unaltered for nearly 2,000 years, had finally been superseded.

9. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The growth of the electric-power industry stimulated significant changes in hydro technology and scientific progress in electrotechnology in the nineteenth century.

○The changes in hydro technology that led to the growth of the electric-power industry also led to discoveries and developments in electrotechnology in the nineteenth century.

○Advances in electrotechnology in the nineteenth century and changes in hydro technology were responsible for the growth of the electric-power industry.

○In the nineteenth century, the scientific study of electrotechnology and hydro technology benefited greatly from the growth of the electric-power industry.

10.The word “unaltered” in the passage is closest in meaning to

○ unimproved

○ unequaled

○ unchanged

* unsatisfactory

11.The discussion of the history of electric power production in paragraph 6 supports which of the following?

○ 1832 marked the beginning of the industrial production of electric power.

○ Turbines using Benoit Fourneyron’s design were eventually used to generate electric power.

○ Benoit Fourneyron quickly applied Michael Faraday’s discovery about electric fields to acquire a pattern for a new and more efficient waterwheel.

○ Practical advances in hydro technology were more important to the development of electric power than were advances in the theoretical understanding of electricity.

【Paragraph 7】Half a century of development was needed before Faraday’s discoveries in electricity were translated into full-scale power stations. In 1881 the Godalming power station in Surrey, England, on the banks of the Wey River, created the world’s first public electricity supply. The power source of this most modern technology was a traditional waterwheel. Unfortunately this early plant experienced the problem common to many forms of renewable energy: the flow in the Wey River was unreliable, and the waterwheel was soon replaced by a steam engine.

12.According to paragraph 7, what problem did the early power station in the town of Godalming in Surrey, United Kingdom, face in providing electricity?

○ The traditional waterwheel is used was not large enough to meet the demand for energy.

○ The flow of the River Wey, on which the power station depended, was unreliable.

○ The operators of the Godalming power station had little experience with hydro technology.

○ The steam engine that turned the waterwheel was faulty and needed to be replaced.

There was much debate on the relative efficiencies of different types of waterwheels. ■The period from about 1650 until 1800 saw some excellent scientific and technical investigations of different designs. ■They revealed output powers ranging from about 1 horsepower to perhaps 60 for the largest wheels and confirmed that for maximum efficiency, the water should pass across the blades as smoothly as possible and fall away with minimum speed, having given up almost all of its kinetic energy. ■(They also proved that, in principle, the overshot wheel, a type of wheel in which an overhead stream of water powers the wheel, should win the efficiency competition.) ■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Happily, serious studies began to be conducted to help resolve disagreements.**

Where would the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Ever since the development of waterwheel, which occurred no later than 500 B.C., people have used moving water as a source of power.

●

●

●

Answer Choices

* The first water-powered machines were probably used to grind corn, and as technology advanced, waterwheels were used as the main source of power in many industries.
* Almost every large town in England had a waterpower mill, allowing England to become the world’s leader in industries that depended on water for their power.

○ In the late nineteenth century an electric power station in England began using water power from a nearby river, creating a dependable source of power that quickly replaced the steam engine.

○ Waterpower mills were probably invented about the same time in the Middle East and Scandinavia and then spread to England by about the second century B.C.

○ In the seventeenth and eighteenth centuries, design improvements in waterwheels led to discoveries of how to increase their efficiency and power output.

○ After declining in importance in the early 1800’s, waterpower came back into demand by the end of the century as a means to power electric plants and water turbines.

参考答案

1.○4

2.○3

3.○4

4.○1

5.○2

6.○1

7.○3

8.○3

9.○3

10.○3

11.○2

12.○2

13.○1

14. The first water-powered machines…

Waterpower mills were probably…

After declining in importance in…

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## **参考译文：水力的历史**

流水是人类最早利用的能量来源，以减少人和牲畜的工作负担。无法知晓水轮是什么时候发明的，但灌溉系统至少在五千年前就已存在。最早的水力设施很可能是戽水车，一种通过附带的瓦罐将水举起以便灌溉的水轮。这种设备在公元前十五世纪就可能独立的出现在中东和远东的一些地区了。

最早用于研磨谷物的水力磨可能都是垂直轴的，比如可能在公元前一到二世纪出现在中东的希腊磨以及几个世纪之后出现在斯堪的纳维亚的斯堪的纳维亚磨。后来的几个世纪里，更加先进的水磨在整个罗马帝国及其边界以外的中东和北欧各地兴建起来。在英国，撒克逊人可能既有水平轴的也有垂直轴的水磨。有记录的最早的英国磨出现在八世纪，但三百年后大约有5000口水磨记录再案，也就是说几乎每一处居民聚集地，无论规模大小如何都有自己的水磨。

举升水和研磨谷物绝不是水力磨的唯一用途，在后来几个世纪中，对水力的利用与采矿、炼铁、造纸以及棉毛纺织工业的技术进步同步。水力是机械能的主要来源，在十七世纪末，光英国就有约两万座水磨。不同类型水轮的效率的高低向来争议很多。从1650到1800年间，人们设计了一些在科学和技术上都很先进的水轮。它们的输出功率从1马力到最大的60马力，并且人们确信要想产生最高效率，水应该从叶轮上尽可能光滑的流过，并以最小的速度落下，以便输出其几乎所有动能。（已经证明从原则上，上射水轮，一种利用从顶部倾泻的水流驱动叶轮的水轮，的效率最高。）

但当蒸汽动力进入历史舞台，水力的前途就备受怀疑了。一位能源分析者在1800年写的一篇论文给水力的前途铺上了一层悲观的色调。燃煤蒸汽动力正在普及，而水轮则被迅速遗弃。然而，正如后来很多专家所言，这位分析者对未来过于短视。一个世纪之后，情况完全不同：那时世界已经有了电力工业，而四分之一的发电能力都来自水力。

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十九世纪电力工业的崛起源自一系列的科学发现和电工业的发展，但我们现在目睹的水力技术的重大进步也发挥了重要作用。在1832年，当Michael Faraday发现了变化的磁场能够产生电场理论时，一位年轻的法国工程师申请了一种新型的更有效率的水轮专利。他的名字叫Nenoit Fourneyron，而他的设备是最早的成功的水力涡轮。水轮在保持了近2000年的原始模样后终于被超越了。

在半个世纪里的时间里，法拉第的电学理论终于发展成了设施齐备的发电厂。1881年在英国的萨里，在卫河河畔建成了世界上第一座公用水力发电站----Godalming 发电站。这种现代化的发电站所用的仍是传统的水轮。不幸的是，这座早起的水力发电站也遭受了所有可再生能源的共同弊端：卫河的水流极不稳定，而水轮很快被蒸汽机代替了。

从这次原始的尝试开始，电工业在十九世纪最后的二十年中以比任何其它技术都快得多的速度发展起来。单个发电站，很多都是水力发电站，的发电能力从几千瓦在不到十年时间内就发展到了几兆瓦。

TPO-30

## **Role of Play in Development**

Play is easier to define with examples than with concepts. In any case, in animals it consists of leaping, running, climbing, throwing, wrestling, and other movements, either along, with objects, or with other animals. Depending on the species, play may be primarily for social interaction, exercise, or exploration. One of the problems in providing a clear definition of play is that it involves the same behaviors that take place in other circumstance--dominance, predation, competition, and real fighting. Thus, whether play occurs or not depends on the intention of the animals, and the intentions are not always clear from behaviors alone.

Play appears to be a developmental characteristic of animals with fairly sophisticated nervous systems, mainly birds and mammals. Play has been studied most extensively in primates and canids (dogs). Exactly why animals play is still a matter debated in the research literature, and the reasons may not be the same for every species that plays. Determining the functions of play is difficult because the functions may be long-term, with beneficial effects not showing up until the animal's adulthood.

Play is not without considerable costs to the individual animal. Play is usually very active, involving movement in space and, at times, noisemaking. Therefore, it results in the loss of fuel or energy that might better be used for growth or for building up fat stores in a young animal. Another potential cost of this activity is greater exposure to predators since play is attention-getting behavior. Great activities also increase the risk of injury in slipping or falling.

The benefits of play must outweigh costs, or play would not have evolved, according to Darwin' s theory. Some of the potential benefits relate directly to the healthy development of the brain and nervous system. In one research study, two groups of young rats were raised under different conditions. One group developed in an "enriched" environment, which allowed the rats to interact with other rats, play with toys, and receive maze training. The other group lived in an "impoverished" environment in individual cages in a dimly lit room with little stimulation. At the end of the experiments, the results showed that the actual weight of the brains of the impoverished rats was less than that of those raised in the enriched environment (though they were fed the same diets). Other studies have shown that greater stimulation not only affects the size of the brain but also increase the number of connections between the nerve cells. Thus, active play may provide necessary stimulation to the growth of synaptic connections in the brain, especially the cerebellum, which is responsible for motor functioning and movements.

Play also stimulates the development of the muscle tissues themselves and may provide the opportunities to practice those movements needed for survival. Prey species, like young deer or goats, for example, typically play by performing sudden flight movements and turns, whereas predator species, such as cats, practice stalking, pouncing, and biting.

Play allows a young animal to explore its environment and practice skill in comparative safety since the surrounding adults generally do not expect the young to deal with threats or predators. Play can also provide practice in social behaviors needed for courtship and mating. Learning appropriate social behaviors is especially important for species that live in groups, like young monkeys that needed to learn to control selfishness and aggression and to understand the give-and-take involved in social groups. They need to learn how to be dominant and submissive because each monkey might have to play either role in the future. Most of these things are learned in the long developmental periods that primates have, during which they engage in countless play experiences with their peers.

There is a danger, of course, that play may be misinterpreted or not recognized as play by others, potentially leading to aggression. This is especially true when play consists of practicing normal aggressive or predator behaviors. Thus, many species have evolved clear signals to delineate playfulness. Dogs, for example, will wag their tails, get down their front legs, and stick their behinds in the air to indicate "what follows is just for play."

【Paragraph 1】Play is easier to define with examples than with concepts. In any case, in animals it consists of leaping, running, climbing, throwing, wrestling, and other movements, either along, with objects, or with other animals. Depending on the species, play may be primarily for social interaction, exercise, or exploration. One of the problems in providing a clear definition of play is that it involves the same behaviors that take place in other circumstance--dominance, predation, competition, and real fighting. Thus, whether play occurs or not depends on the intention of the animals, and the intentions are not always clear from behaviors alone.

1.According to paragraph 1, why is play difficult to define?

○ Play must be defined with concepts, not examples.

○ Play behavior often looks like nonplay behavior

○ Play often occurs in the presence of animals that are not playing

○ Play occurs independently of an animal’s intentions

【Paragraph 2】Play appears to be a developmental characteristic of animals with fairly sophisticated nervous systems, mainly birds and mammals. Play has been studied most extensively in primates and canids (dogs). Exactly why animals play is still a matter debated in the research literature, and the reasons may not be the same for every species that plays. Determining the functions of play is difficult because the functions may be long-term, with beneficial effects not showing up until the animal's adulthood.

2.According to paragraph 2, which of the following presents a particular challenge to researchers who study play behavior in animals

○ The delay between activities and the benefits the animal derives from them.

○ The difficulty in determining which animal species play and which do not.

○ The fact that for most animals, there is no clear transition from youth to full adulthood.

○ The lack of research on the play behavior of animals other than canids and primates.

【Paragraph 3】Play is not without considerable costs to the individual animal. Play is usually very active, involving movement in space and, at times, noisemaking. Therefore, it results in the loss of fuel or energy that might better be used for growth or for building up fat stores in a young animal. Another potential cost of this activity is greater exposure to predators since play is attention-getting behavior. Great activities also increase the risk of injury in slipping or falling.

3.The word “considerable”in the passage is closest in the meaning to

○ Initial

○ Practical

○ Eventually

○ Significant

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4.According to paragraph 3, each of the following is a cost to animals that engage in play EXCEPT

○ exposure to predators

○ a buildup of fat stores

○ a loss of fuel that could be used for growth

○ risk of injury from slipping or falling

【Paragraph 4】The benefits of play must outweigh costs, or play would not have evolved, according to Darwin' s theory. Some of the potential benefits relate directly to the healthy development of the brain and nervous system. In one research study, two groups of young rats were raised under different conditions. One group developed in an "enriched" environment, which allowed the rats to interact with other rats, play with toys, and receive maze training. The other group lived in an "impoverished" environment in individual cages in a dimly lit room with little stimulation. At the end of the experiments, the results showed that the actual weight of the brains of the impoverished rats was less than that of those raised in the enriched environment (though they were fed the same diets). Other studies have shown that greater stimulation not only affects the size of the brain but also increase the number of connections between the nerve cells. Thus, active play may provide necessary stimulation to the growth of synaptic connections in the brain, especially the cerebellum, which is responsible for motor functioning and movements.

5.Why does the author include the comment “though they were fed the same diets”?

○ To show why rats living in impoverished environments need less food than those living in enriched environments

○ To eliminate the possibility that differences in diet were responsibly for observed differences in brain weight

○ To emphasize the point that rats were fed only the amount of food needed to keep them alive

○ To suggest that rats fed the same diet have smaller brains than those fed a varied food

6.Paragraph 4 supports which of the following statements about an animal’s brain.

○ The heavier the brain, the richer the environment in which the animal was raised.

○ The younger the animal, the harder it is to develop new connections between nerve cells.

○ The larger the animal, the harder it is to develop new connections between nerve cells.

○ The larger the animal’s cerebellum, the larger will be the animal’s nerve cells.

【Paragraph 5】Play also stimulates the development of the muscle tissues themselves and may provide the opportunities to practice those movements needed for survival. Prey species, like young deer or goats, for example, typically play by performing sudden flight movements and turns, whereas predator species, such as cats, practice stalking, pouncing, and biting.

7.According to paragraph 5, why might play behavior of prey species be different from those of predator species?

○ Unlike predator species, prey species use play to prevent inappropriate social behaviors, such as biting.

○ Some prey species are physically incapable of certain types of predator movements.

○ The survival of each species type is linked to particular sets of muscular movements.

○ Predator species have more opportunities to practice play behaviors than prey species.

【Paragraph 6】Play allows a young animal to explore its environment and practice skill in comparative safety since the surrounding adults generally do not expect the young to deal with threats or predators. Play can also provide practice in social behaviors needed for courtship and mating. Learning appropriate social behaviors is especially important for species that live in groups, like young monkeys that needed to learn to control selfishness and aggression and to understand the give-and-take involved in social groups. They need to learn how to be dominant and submissive because each monkey might have to play either role in the future. Most of these things are learned in the long developmental periods that primates have, during which they engage in countless play experiences with their peers.

8.The word “comparative”in the passage is closest in meaning to

○ relative

○ temporary

○ sufficient

○ complete

9. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ Only monkeys that have learned to control their selfish and aggressive behaviors can be involved in social groups.

○ Selfish and aggressive animals like monkeys live in groups in order to practice appropriate social behaviors.

○ Monkeys and other social animals need to learn behaviors appropriate for their social groups.

○ Some monkeys are naturally too selfish and aggressive to understand the give-and-take of social groups, so they learn such important behaviors while young.

10. What can be inferred from paragraph 6 about the role of adults in play activities of the young?

○ Adults help their young learn to become dominant within the social group.

○ Young animals learn how to play from the adults within their social group.

○ Adults allow the young to engage in play behaviors within a protected, sage environment.

○ The long developmental period of some animals allows adults more time to teach their young how to deal with the threats of predators.

【Paragraph 7】There is a danger, of course, that play may be misinterpreted or not recognized as play by others, potentially leading to aggression. ■This is especially true when play consists of practicing normal aggressive or predator behaviors. ■Thus, many species have evolved clear signals to delineate playfulness. ■Dogs, for example, will wag their tails, get down their front legs, and stick their behinds in the air to indicate "what follows is just for play." ■

11. The word “potentially”in the passage is closest in meaning to

○ undoubtedly

○ possibly

○ unfortunately

○ quickly

12. According to paragraph 7, how do some animals ensure that other animals understand that they are just playing?

○ By playing only with animals who are not predator

○ By avoiding any aspects of the play behavior that are dangerous

○ By practicing nonaggressive and non-predatory behaviors

○ By using a set of signals that occurs only in play

13. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**With messages such as those, even dogs that are strangers to each other can be playing within a few minutes.**

Where would the sentence best fit?

14.【Directions】an introductory sentence for a brief summary of the passage is provided below. Complete the summary be selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Play appears to be a developmental characteristic of animals with fairly sophisticated nervous systems, mainly birds and mammals.

●

●

●

Answer Choices

○ Although play often resembles aggression, flight, or other purposeful activities, researchers do not agree on the reasons for and functions of play

○ Although many animals develop physically from play, too many young animals become victims of their natural predators while playing.

○ Animals such as rats, dogs, deer, goats and monkeys learn how to be both dominant and submissive during play activities so that they will fit in better with their adult social groups.

○ The function of play is still debated in the research literature primarily because each animal species uses so few of the many available types of play behavior.

○ Energy expenditure and security risks are some of the costs to animals of play behavior, but the costs are not so great that they outweigh the long-term benefits of play to the species.

○ As experiments and observations have shown, animals that play at some stages of their development obtain neurological, muscular, or social benefits from the play behaviors.

参考答案

1.○2

2.○1

3.○4

4.○2

5.○2

6.○1

7.○3

8.○1

9.○3

10.○3

11.○2

12.○4

13.○4

14. Although play often resembles …

Energy expenditure and …

As experiments and …

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## **参考译文：玩耍在发育中的角色**

用例证来定义玩耍要比用概念简单得多。在任何情况下，动物间的玩耍都包括跳跃，奔跑，攀登，投掷，格斗和另外的一些动作，而玩耍的对象可能有其它物品或者动物。根据物种的不同，玩耍的目的主要包括社交，锻炼，或探索。定义“玩耍”的难点之一是，玩耍过程中常常包含一些与其它情况下相似的行为，例如统治，捕食，竞争和搏斗。因此，判断其是否玩耍，要根据动物的目的来确认，而常常通过行为本身很难分析其目的。

玩耍似乎是那些有着相对复杂的神经系统的动物，主要是鸟类和哺乳动物，的一个发育，发展的特征。玩耍的大量研究主要在灵长类和犬类中进行。动物到底为什么要玩耍仍然在文献中存在争议，并且每种物种玩耍的原因也不尽相同。确定玩耍的功能很难，因为它的功能是长期的，伴随着一些直到动物成年才会显现出来的有利影响。

玩耍对于动物个体并非没有一定的代价。玩耍通常是非常活跃的，包括一些动作，有时也会发出声音。所以，这些都会导致一些年幼的动物的本来可以用来生长或者储存脂肪的能量流失。另一个潜在的代价是玩耍增加了动物暴漏给天敌的几率，因为这些多动是吸引注意的行为。大量的运动也会增加摔倒滑倒导致受伤的危险。

根据达尔文理论，玩耍的好处一定超过其损失，不然玩耍就不会得以进化。其中一些潜在的好处就是直接关于动物的大脑和神经系统的健康发展。在一项研究中，两组小鼠被养在不同的环境中。第一组成长在一个比较“富裕”的环境中，这样的环境使其可以与其他老鼠接触，和玩具玩儿，并且接受迷宫训练。另一组生活在“穷困”的环境中，它们被养在独立笼子里，只有微弱的光照和极少的刺激。最后，结果表明生活在单一环境中的老鼠的大脑重量要比生活在复杂情况下的老鼠的大脑轻（即使它们被喂养的食物一样的）。另外一些研究表明，较大的刺激不仅会影响大脑的大小，而且也会增加神经细胞间连接的数量。因此，活跃的玩耍可以为大脑中的突触连接提供必要的刺激，特别是负责运动机能的小脑。

玩耍也会刺激肌肉组织的生长，并能提供练习生存技能的机会。被捕食者，比如小鹿或者山羊，其典型的玩耍动作就是突然快速跳跃和转弯，相反捕食者，比如猫科动物，则练习潜行追踪，猛扑和撕咬。

玩耍有助于幼年动物探索其生存环境，并且由于周围的成年动物一般不期望孩子去处理威胁和捕食者，所以它们可以在相对安全的环境中练习技能。玩耍也可以练习求爱和交配的社交行为。学习适当的社交行为特别重要，尤其是对于群居动物，比如猴子，它们需要学会控制自己的自私和攻击性，学着去懂得付出和收获的关系以融入群体。它们要学习怎么去统治和顺从因为每只猴子都会在将来扮演其中某个角色。大部分这类事情都在灵长类的长期的幼龄时期学习，期间它们有数不清的玩耍经验。

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当然玩耍也有危险。玩耍可能会被别的动物误会，或者不被当做玩耍而潜在地造成攻击。这个情况尤其在扮演练习正常的侵略性或捕食行为过程中。因此，许多物种都有其明确的表明玩耍的信号。比如狗，它们用会摇尾巴，前腿趴下，撅着屁股来表示“以下行为都是逗你玩儿的！”

## **The Pace of Evolutionary Change**

A heated debate has enlivened recent studies of evolution. Darwin' s original thesis, and the viewpoint supported by evolutionary gradualists, is that species change continuously but slowly and in small increments. Such changes are all but invisible over the short time scale of modern observations, and, it is argued, they are usually obscured by innumerable gaps in the imperfect fossil record. Gradualism, with its stress on the slow pace of change, is a comforting position, repeated over and over again in generations of textbooks. By the early twentieth century, the question about the rate of evolution had been answered in favor of gradualism to most biologists' satisfaction.

Sometimes a closed question must be reopened as new evidence or new arguments based on old evidence come to light. In 1972 paleontologist Stephen Jay Gould and Niles Eldredge challenged conventional wisdom with an opposing viewpoint, the punctuated equilibrium hypothesis, which posits that species give rise to new species in relatively sudden bursts, without a lengthy transition period. These episodes of rapid evolution are separated by relatively long static spans during which a species may hardly change at all.

The punctuated equilibrium hypothesis attempts to explain a curious feature of the fossil record --- one that has been familiar to paleontologist for more than a century but has usually been ignored. Many species appear to remain unchanged in the fossil record for millions of years --- a situation that seems to be at odds with Darwin' s model of continuous change. Intermediated fossil forms, predicted by gradualism, are typically lacking. In most localities a given species of clam or coral persists essentially unchanged throughout a thick formation of rock, only to be replaced suddenly by a new and different species.

The evolution of North American horse, which was once presented as a classic textbook example of gradual evolution, is now providing equally compelling evidence for punctuated equilibrium. A convincing 50-million-year sequence of modern horse ancestors --- each slightly larger, with more complex teeth, a longer face, and a more prominent central toe ---seemed to provide strong support for Darwin' s contention that species evolve gradually. But close examination of those fossil deposits now reveals a somewhat different story. Horses evolved in discrete steps, each of which persisted almost unchanged for millions of years and was eventually replaced by a distinctive newer model. The four-toed Eohippus preceded the three-toed Miohippus, for example, but North American fossil evidence suggests a jerky, uneven transition between the two. If evolution had been a continuous, gradual process, one might expect that almost every fossil specimen would be slightly different from every year.

If it seems difficult to conceive how major changes could occur rapidly, consider this: an alteration of a single gene in files is enough to turn a normal fly with a single pair of wings into one that has two pairs of wings.

The question about the rate of evolution must now be turned around: does evolution ever proceed gradually, or does it always occur in short bursts? Detailed field studies of thick rock formations containing fossils provide the best potential tests of the competing theories.

Occasionally , a sequence of fossil-rich layers of rock permits a comprehensive look at one type of organism over a long period of time. For example, Peter Sheldon' s studies of trilobites, a now extinct marine animal with a segmented body, offer a detailed glimpse into three million years of evolution in one marine environment. In that study, each of eight different trilobite species was observed to undergo a gradual change in the number of segments --- typically an increase of one or two segments over the whole time interval. No significant discontinuous were observed, leading Sheldon to conclude that environmental conditions were quite stable during the period he examined.

Similar exhaustive studies are required for many different kinds of organisms from many different periods. Most researchers expect to find that both modes of transition from one species to another are at work in evolution. Slow, continuous change may be the norm during periods of environmental stability, while rapid evolution of new species occurs during periods of environment stress. But a lot more studies like Sheldon' s are needed before we can say for sure.

【Paragraph 1】A heated debate has enlivened recent studies of evolution. Darwin' s original thesis, and the viewpoint supported by evolutionary gradualists, is that species change continuously but slowly and in small increments. Such changes are all but invisible over the short time scale of modern observations, and, it is argued, they are usually obscured by innumerable gaps in the imperfect fossil record. Gradualism, with its stress on the slow pace of change, is a comforting position, repeated over and over again in generations of textbooks. By the early twentieth century, the question about the rate of evolution had been answered in favor of gradualism to most biologists' satisfaction.

1. The word “innumerable”in the passage is closest in the meaning to

○ countless

○ occasional

○ large

○ repeated

2. According to paragraph 1, all of the following are true EXCEPT

○ Darwin saw evolutionary change as happening slowly and gradually

○ Gaps in the fossil record were used to explain why it is difficult to see continuous small changes in the evolution of species

○ Darwin’s evolutionary thesis was rejected because small changes could not be observed in the evolutionary record

○ By the early twentieth century, most biologists believed that gradualism explained evolutionary change

【Paragraph 2】Sometimes a closed question must be reopened as new evidence or new arguments based on old evidence come to light. In 1972 paleontologist Stephen Jay Gould and Niles Eldredge challenged conventional wisdom with an opposing viewpoint, the punctuated equilibrium hypothesis, which posits that species give rise to new species in relatively sudden bursts, without a lengthy transition period. These episodes of rapid evolution are separated by relatively long static spans during which a species may hardly change at all.

3. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ The punctuated equilibrium hypothesis challenged gradualism, which holds that species evolve in relatively sudden bursts of brief duration.

○ The punctuated equilibrium hypothesis developed by Stephen Jay Gould and Niles Eldredge was challenged in 1972.

○ In 1972 Stephen Jay Gould and Niles Eldredge challenged gradualism by positing that change from one species to another cannot occur without a lengthy transition period.

○ The punctuate equilibrium hypothesis, in opposition to gradualism, holds that transitions from one species to another occur in comparatively sudden burst.

4. According to paragraph 1 and paragraph 2, the punctuated equilibrium hypothesis and the gradualism hypothesis differed about

○ Whether the fossil record is complete

○ Whether all species undergo change

○ Whether evolution proceeds an a constant rate

○ How many new species occur over long periods of time

【Paragraph 3】The punctuated equilibrium hypothesis attempts to explain a curious feature of the fossil record --- one that has been familiar to paleontologist for more than a century but has usually been ignored. Many species appear to remain unchanged in the fossil record for millions of years --- a situation that seems to be at odds with Darwin' s model of continuous change. Intermediated fossil forms, predicted by gradualism, are typically lacking. In most localities a given species of clam or coral persists essentially unchanged throughout a thick formation of rock, only to be replaced suddenly by a new and different species.

5. According to paragraph 3, the lack of intermediate fossils in the fossil record of some species

○ has been extensively studied by paleontologist for over a century

○ contradicts the idea that most species have remained unchanged for millions of years

○ challenges the view that evolutionary change is gradual

○ is most common in the fossil records of clam and coral species

【Paragraph 4】The evolution of North American horse, which was once presented as a classic textbook example of gradual evolution, is now providing equally compelling evidence for punctuated equilibrium. A convincing 50-million-year sequence of modern horse ancestors --- each slightly larger, with more complex teeth, a longer face, and a more prominent central toe ---seemed to provide strong support for Darwin' s contention that species evolve gradually. But close examination of those fossil deposits now reveals a somewhat different story. Horses evolved in discrete steps, each of which persisted almost unchanged for millions of years and was eventually replaced by a distinctive newer model. The four-toed Eohippus preceded the three-toed Miohippus, for example, but North American fossil evidence suggests a jerky, uneven transition between the two. If evolution had been a continuous, gradual process, one might expect that almost every fossil specimen would be slightly different from every year.

6. The word “compelling”in the passage is closest in the meaning to

○ surprising

○ persuasive

○ controversial

○ detailed

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7. Paragraph 4 mentions that North American horses have changed in all the following ways EXCEPT in

○ the number of toes they have

○ the length of their face

○ their overall size

○ the number of years they live

【Paragraph 5】If it seems difficult to conceive how major changes could occur rapidly, consider this: an alteration of a single gene in files is enough to turn a normal fly with a single pair of wings into one that has two pairs of wings.

8. The word “alteration”in the passage is closest in meaning to

○ imperfection

○ replacement

○ change

○ duplication

【Paragraph 7】Occasionally , a sequence of fossil-rich layers of rock permits a comprehensive look at one type of organism over a long period of time. For example, Peter Sheldon' s studies of trilobites, a now extinct marine animal with a segmented body, offer a detailed glimpse into three million years of evolution in one marine environment. In that study, each of eight different trilobite species was observed to undergo a gradual change in the number of segments --- typically an increase of one or two segments over the whole time interval. No significant discontinuous were observed, leading Sheldon to conclude that environmental conditions were quite stable during the period he examined.

9. According to paragraph 7, Peter Sheldon’s studies demonstrated which of the following about trilobites?

○ They underwent gradual change over a long time period

○ They experienced a number of discontinuous transitions during their history

○ They remained unchanged during a long period of environmental stability

○ They evolved in ways that cannot be counted for by either of the two competing theories.

10. The word “occasionally”in the passage is closest in meaning to

○ undoubtedly

○ basically

○ once in a while

○ to some extent

11. The main purpose of paragraph 7 is to

○ Describe one test of the competing theories

○ Provide an example of punctuated equilibrium

○ Describe how segmented animals evidence both competing theories

○ Explain why trilobites became extinct

【Paragraph 8】■Similar exhaustive studies are required for many different kinds of organisms from many different periods. ■Most researchers expect to find that both modes of transition from one species to another are at work in evolution. ■Slow, continuous change may be the norm during periods of environmental stability, while rapid evolution of new species occurs during periods of environment stress. ■But a lot more studies like Sheldon' s are needed before we can say for sure.

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12. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

**They believe that environmental conditions may play a crucial role in determining which of the two modes will be in operation over a given period.**

Where could the sentence best fit?

13.【Directions】selected from the seven phrases below the phrases that correctly characterize punctuated equilibrium and the phrases that correctly characterize gradualism. Two of the phrases will not be used. This question is worth 3 points.

Gradualism punctuated equilibrium

●●

●●

●

Answer Choices

○ States that new species emerge from existing species during relatively brief period of time

○ Was first formulated by Charles Darwin

○ Explain why North American horses have become smaller over time

○ States that new species evolve slowly and continuously from existing species

○ Explain the lack of intermediate fossil forms in the fossil record of many species

○ Competition is usually strongest when the density of the competing populations is the same

○ States that a species will not change unless its environment changes

参考答案

1.○1

2.○3

3.○4

4.○3

5.○3

6.○2

7.○4

8.○3

9.○1

10.○3

11.○1

12.○3

13. Was first formulate …

States that new species evolve …

States that a species …

States that new species emerge …

Explain the lack of intermediate …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：进化的速度**

最近的一个关于进化的研究引发了激烈的争论。达尔文的原始论点和进化渐进主义者支持的观点是物种会持续地改变，但非常缓慢，增量也很小。这种改变是普遍的，但是现在短时间的观察是不能察觉的，并且，这个观点声称，它们通常被掩盖于不完美的化石记录的不可计数的缺失中。渐进主义及其对物种缓慢变化的引力让人欣然接受，并在世代的教科书中重复出现。在20世纪早前之前，令大部分的生物学家满足于利用渐进主义来回答关于进化速率的问题。

有时，已经有了结论的问题必须由在已有证据基础上出现的新的证据和新的论点使其重新展开讨论。在1972年，古生物学者Stephen Jay Gould和Niles Eldredge用相反的论点挑战了世俗的结论，即断点平衡说，它假设了物种演变为新的物种是通过相对突然的爆发，并非通过长时间的过渡时期。迅速的进化期被时间相对更长的静态期分开，而在静态时期，物种是几乎完全不变的。

断点平衡论试着去解释化石记录的一个古怪的特点----在超过一个世纪的时间里它已经为古生物学者所熟悉，但一直被忽视。许多物种似乎在上百万年的化石记录中一直没有改变，这个情况与达尔文的模型所支持的物种的持续变化相悖。进化渐进论的支持者所预测的中间状态的化石一直没有出现。在大部分蛤和珊瑚的聚集地，其化石在很厚的岩石中都实际上没有变化，只是突然被另一新的并且不同的物种而取代。

北美马的进化曾经被用作经典的教科书案例来证明渐变进化论，现在却为断点平衡学提供了同样有说服力的证据。一个有说服力的5千万年的马祖先的进化模型----每一代都稍稍大一点，有更复杂的牙齿，更长的脸，和中间更突出的脚趾----这一切都看似强有力的支持了达尔文的论点，物种是逐步地进化的。但是，对这些化石更严谨的验证现在揭示了一个不太一样的故事。马是在不连续的步骤中进化的，其中每个进化步骤中间都有上百万年时间保持不变，在最后被一个不同的更新的模型取代。比如四只脚趾的Eohippus 在三只脚趾的moihippus之前，但北美化石证据表明在这之间有一个不平稳的，不均衡的转换过程。如果进化一直都是连续，渐进的过程，人们应该预期到的是每年的化石样本都会存在细微的差别。

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如果很难设想大的改变会迅速发生，想想这些：一个单一基因的改变就足以将有一对翅膀的苍蝇变成两对翅膀。

关于进化速度的问题现在发生了转变：进化过程是逐渐发生的么，还是总是突然短时间的爆发？对含有化石的厚岩层的细致的现场调查可以检验这两个备受争论的理论。

偶尔，有一个系列的化石丰富的岩石可以允许人们综合性的观察一种生物在很长一段时间中的变化。比如，Peter Sheldon对于三叶虫，一种已灭绝的身体分节的海洋生物，的研究提供了其对三百万年来在同一海洋环境下进化的一些细节。研究中，八种三叶虫都观察到了其身体节数数量逐渐改变的过程，在整个时间段中，一般身体都增加了一到两节。没有明显的不连贯，这使sheldon得出结论：海洋环境在那段时间是比较稳定的。

很多来自不同时期的不同的生物都需要开展相似的相近研究。大多数研究者希望发现物种进化的这两种模式都存在。缓慢的，连续的变化可能是在环境稳定的时间段下的规律，而快速进化的新物种则发生在环境变化时期的压力下。但是，我们需要更多的想Sheldon所做的研究以证明这个观点。

## **The Invention of the Mechanical Clock**

In Europe, before the introduction of the mechanical clock, people told time by sun (using, for example, shadow sticks or sun dials) and water clocks. Sun clocks worked, of course, only on clear days; water clocks misbehaved when the temperature fell toward freezing, to say nothing of long-run drift as the result of sedimentation and clogging. Both these devices worked well in sunny climates; but in northern Europe the sun may be hidden by clouds for weeks at a time, while temperatures vary not only seasonally but from day to night.

Medieval Europe gave new importance to reliable time. The Catholic Church had its seven daily prayers, one of which was at night, requiring an alarm arrangement to waken monks before dawn. And then the new cities and towns, squeezed by their walls, had to know and order time in order to organize collective activity and ration space. They set a time to go to sleep. All this was compatible with older devices so long as there was only one authoritative timekeeper; but with urban growth and the multiplication of time signals, discrepancy brought discord and strife. Society needed a more dependable instrument of time measurement and found it in the mechanical clock.

We do not know who invented this machine, or where. It seems to have appeared in Italy and England (perhaps simultaneous invention) between 1275 and 1300. Once known, it spread rapidly, driving out water clocks but not solar dials, which were needed to check the new machines against the timekeeper of last resort. These early versions were rudimentary, inaccurate, and prone to breakdown.

Ironically, the new machine tended to undermine Catholic Church authority. Although church ritual had sustained an interest in timekeeping throughout the centuries of urban collapse that followed the fall of Rome, church time was nature’s time. Day and night were divided into the same number of parts, so that except at the equinoxes, days and night hours were unequal; and then of course the length of these hours varied with the seasons. But the mechanical clock kept equal hours, and this implied a new time reckoning. The Catholic Church resisted, not coming over to the new hours for about a century. From the start, however, the towns and cities took equal hours as their standard, and the public clocks installed in town halls and market squares became the very symbol of a new, secular municipal authority. Every town wanted one; conquerors seized them as especially precious spoils of war; tourists came to see and hear these machines the way they made pilgrimages to sacred relics.

The clock was the greatest achievement of medieval mechanical ingenuity. Its general accuracy could be checked against easily observed phenomena, like the rising and setting of the sun. The result was relentless pressure to improve technique and design. At every stage, clockmakers led the way to accuracy and precision; they became masters of miniaturization, detectors and correctors of error, searchers for new and better. They were thus the pioneers of mechanical engineering and served as examples and teachers to other branches of engineering.

The clock brought order and control, both collective and personal. Its public display and private possession laid the basis for temporal autonomy: people could now coordinate comings and goings without dictation from above. The clock provided the punctuation marks for group activity, while enabling individuals to order their own work (and that of others) so as to enhance productivity. Indeed, the very notion of productivity is a by-product of the clock: once on can relate performance to uniform time units, work is never the same. One moves from the task-oriented time consciousness of the peasant (working on job after another, as time and light permit) and the time-filling busyness of the domestic servant (who always had something to do) to an effort to maximize product per unit of time.

【Paragraph 1】In Europe, before the introduction of the mechanical clock, people told time by sun (using, for example, shadow sticks or sun dials) and water clocks. Sun clocks worked, of course, only on clear days; water clocks misbehaved when the temperature fell toward freezing, to say nothing of long-run drift as the result of sedimentation and clogging. Both these devices worked well in sunny climates; but in northern Europe the sun may be hidden by clouds for weeks at a time, while temperatures vary not only seasonally but from day to night.

1.Why does the author provide the information that ”in northern Europe the sun may be hidden by clouds for weeks at a time, while temperatures vary not only seasonally but from day to night”?

○ To emphasize the variety of environments in which people used sun and water clocks to tell time

○ To illustrate the disadvantage of sun and water clocks

○ To provide an example of an area where water clocks have an advantage over sun clocks

○ To counter the claim that sun and water clocks were used all over Europe

【Paragraph 2】Medieval Europe gave new importance to reliable time. The Catholic Church had its seven daily prayers, one of which was at night, requiring an alarm arrangement to waken monks before dawn. And then the new cities and towns, squeezed by their walls, had to know and order time in order to organize collective activity and ration space. They set a time to go to sleep. All this was compatible with older devices so long as there was only one authoritative timekeeper; but with urban growth and the multiplication of time signals, discrepancy brought discord and strife. Society needed a more dependable instrument of time measurement and found it in the mechanical clock.

2. According to paragraph 2, all of the following are examples of the importance of timekeeping to medieval European society EXCEPT

○ the need of different towns to coordinate timekeeping with each other

○ the setting of specific times for the opening and closing of markets

○ the setting of specific time for the start and finish of the working day

○ the regulation of the performance of daily church rituals

3. According to paragraph 2, why did the medieval church need an alarm arrangement?

○ The alarm warned the monks of discord or strife in the town.

○ The church was responsible for regulating working hours and market hours.

○ The alarm was needed in case fires were not put out each night.

○ One of the church’s daily rituals occurred during the night.

4. The word “authoritative”in the passage is closest in meaning to

○ actual

○ important

○ official

○ effective

【Paragraph 3】We do not know who invented this machine, or where. It seems to have appeared in Italy and England (perhaps simultaneous invention) between 1275 and 1300. Once known, it spread rapidly, driving out water clocks but not solar dials, which were needed to check the new machines against the timekeeper of last resort. These early versions were rudimentary, inaccurate, and prone to breakdown.

5. The author uses the phrase “the timekeeper of last resort”to refer to

○ water clocks

○ the sun

○ mechanical clocks

○ the church

6. The word “rudimentary”in the passage is closest in meaning to

○ rare

○ small

○ impractical

○ basic

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【Paragraph 4】Ironically, the new machine tended to undermine Catholic Church authority. Although church ritual had sustained an interest in timekeeping throughout the centuries of urban collapse that followed the fall of Rome, church time was nature’s time. Day and night were divided into the same number of parts, so that except at the equinoxes, days and night hours were unequal; and then of course the length of these hours varied with the seasons. But the mechanical clock kept equal hours, and this implied a new time reckoning. The Catholic Church resisted, not coming over to the new hours for about a century. From the start, however, the towns and cities took equal hours as their standard, and the public clocks installed in town halls and market squares became the very symbol of a new, secular municipal authority. Every town wanted one; conquerors seized them as especially precious spoils of war; tourists came to see and hear these machines the way they made pilgrimages to sacred relics.

7. According to paragraph 4, how did the Catholic Church react to the introduction of mechanical clocks?

○ It used mechanical clocks through the period of urban collapse

○ It used clocks to better understand natural phenomena, like equinoxes

○ It tried to preserve its own method of keeping time, which was different from mechanical-clock time.

○ It used mechanical clocks to challenge secular, town authorities.

8. The word “installed”in the passage is closest in meaning to

○ required

○ expected by the majority of people

○ standardized

○ put in place

【Paragraph 5】The clock was the greatest achievement of medieval mechanical ingenuity. Its general accuracy could be checked against easily observed phenomena, like the rising and setting of the sun. The result was relentless pressure to improve technique and design. At every stage, clockmakers led the way to accuracy and precision; they became masters of miniaturization, detectors and correctors of error, searchers for new and better. They were thus the pioneers of mechanical engineering and served as examples and teachers to other branches of engineering.

9. It can be inferred from paragraph 5 that medieval clockmakers

○ were able to continually make improvements in the accuracy of mechanical clocks

○ were sometimes not well respected by other engineers

○ sometimes made claims about the accuracy of mechanical clocks that were not true

○ rarely shared their expertise with other engineers

10. Paragraph 5 answers which of the following questions about mechanical clocks.

○ How did early mechanical clocks work?

○ Why did the design of mechanical clocks affect engineering in general?

○ How were mechanical clocks made?

○ What influenced the design of the first mechanical clock?

11. The word “pioneers”in the passage is closest in meaning to

○ leaders

○ opponents

○ employers

○ guardians

【Paragraph 6】The clock brought order and control, both collective and personal. Its public display and private possession laid the basis for temporal autonomy: people could now coordinate comings and goings without dictation from above. The clock provided the punctuation marks for group activity, while enabling individuals to order their own work (and that of others) so as to enhance productivity. Indeed, the very notion of productivity is a by-product of the clock: once on can relate performance to uniform time units, work is never the same. One moves from the task-oriented time consciousness of the peasant (working on job after another, as time and light permit) and the time-filling busyness of the domestic servant (who always had something to do) to an effort to maximize product per unit of time.

12. According to paragraph 6, how did the mechanical clock affect labor?

○ It encouraged workers to do more time-filling busywork.

○ It enabled workers to be more task oriented.

○ It pushed workers to work more hours every day.

○ It led to a focus on productivity.

【Paragraph 4】Ironically, the new machine tended to undermine Catholic Church authority. Although church ritual had sustained an interest in timekeeping throughout the centuries of urban collapse that followed the fall of Rome, church time was nature’s time.■Day and night were divided into the same number of parts, so that except at the equinoxes, days and night hours were unequal; and then of course the length of these hours varied with the seasons.■But the mechanical clock kept equal hours, and this implied a new time reckoning.■The Catholic Church resisted, not coming over to the new hours for about a century.■From the start, however, the towns and cities took equal hours as their standard, and the public clocks installed in town halls and market squares became the very symbol of a new, secular municipal authority. Every town wanted one; conquerors seized them as especially precious spoils of war; tourists came to see and hear these machines the way they made pilgrimages to sacred relics.

13. Look at the four squares[■] that indicate where the following sentence can be added to the passage.

**The division of time no longer reflected the organization of religious ritual.**

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

The introduction of the mechanical clock caused important changes to the society of medieval Europe.

●

●

●

Answer Choices

○ The increasing complexity of social and economic activity in medieval Europe led to the need for a more dependable means of keeping time than sun and water clocks provided.

○ Because they were unreliable even in sunny climates, sun clocks and water clocks were rarely used in Europe, even before the invention of the mechanical clock.

○ Before the mechanical clock, every city wanted a large number of timekeepers because more timekeepers allowed for better organization of collective activities.

○ Soon after the invention of mechanical clocks, sun and water clocks became obsolete because mechanical clocks were far more accurate.

○ Although society in general was quick to adopt the mechanical clock, the Catholic Church resisted it because it challenged the authority of the church .

○ Clockmakers introduced precision engineering and their clocks gave individuals and groups more control over the organization of their activities.

参考答案

1.○2

2.○1

3.○4

4.○3

5.○2

6.○4

7.○3

8.○4

9.○1

10.○2

11.○1

12.○4

13.○3

14. The increasing complexity of social

Predators help maintain biological

The removal of sea stars reduces

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：机械钟的发明**

在欧洲，在机械表被引入以前，人们利用太阳（比如棍子的影子和日晷）和水钟来确定时间。当然，太阳钟只能用于晴天使用，而水钟表在水温下降到冰点时会出错，长期漂浮的东西因为下沉或堵塞而无法工作。这两种仪器在晴天都运行的很好，但北欧，太阳可能会藏在云后长达一周，同时，温度不仅会随季节中变化，也因昼夜而不同。

中世纪欧洲使得可靠的时间变得更重要。天主教堂每天有七次的祷告，有一个是在晚上，它要求设定闹钟以便在破晓前叫醒布道师。另外新的城市和小镇，由于其空间的限制，他们必须要知道并且安排时间去组织集体活动和分配空间。他们设定时间睡觉。所有这些用老的仪器都是可以一致的，只要只有一个权威的时间记录者。但是随着城市的发展和报时信号的倍增，时间错乱导致了不和与争吵。社会需要一个更加可靠的工具去衡量时间，这个仪器就是机械钟表。

我们并不知道是谁发明了这个机器，或者在哪。它好像是出现在意大利或是英国（也许是同时发明的）在1275年到1300之间。一旦被人们所知，它就快速传播并替代了水钟表，但日晷依然存在，用来对照这个新仪器与原来的计时法。早期的版本很原始，不准确且易坏。

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讽刺的是，新仪器有破坏天主教堂权威性的倾向。虽然几世纪以来，尽管城市瓦解，罗马没落，但教堂仪式一直保持着对时间记录的兴趣，教堂时间是自然的时间。白天和黑夜被分为均等的部分，所以除去昼夜平分点，白天和黑夜时间是不均等的；当然因此，这些时间的长度也随着季节变化。但是，机械时钟时间间隔相等，这意味着新的时间计算法。天主教会进行反抗，将近一个世纪都不肯转化到新的时间。但一开始，城镇都接受了均等时间作为他们的标准，并且安装公共的时钟在城镇大楼和市场变成了新的世俗市政权威的标志。每个城镇都想要一个；胜利者视它们为珍贵的战利品，在游人去神圣古迹朝圣的路上，他们专程去看并听这些钟表。

钟表是中世纪机械精巧装置的最大成就。它的正确性的可以通过简单地可观察日出日落等常见现象来证明。这样的结果是对技术和设计进步的残酷的压力。在每个阶段，制表人引领者准确与精度，他们成为了微型化的大师，错误的探测器和校正者，更新更好的搜寻者。因此他们是机械工程的先驱，是工程学其它分支的典范和老师。

钟表带来了秩序和控制，既有集体的也有个人的。它的公开展示和私人拥有铺设了短期自治的基础：人们现在可以不用根据上层的命令来调整去留。钟表也为集体活动提供了时间提示，同时使个人能够安排他们自己的工作，以加强生产力。事实上，生产力的准确概念是时钟的副产物，一旦一个人可以将其表现用统一的时间单位衡量，那么工作就永远都不会一样了。人们从农民以任务为导向的工作方式（在时间和光线条件允许的情况下，一件工作接着一件的干）和家奴以时间为导向的工作方式（总有事情做）中转变到了将单位时间的生产量达到最大化的努力中。

TPO-31

## **Speciation in Geographically Isolated Populations**

Evolutionary biologists believe that speciation, the formation of a new species, often begins when some kind of physical barrier arises and divides a population of a single species into separate subpopulations. Physical separation between subpopulations promotes the formation of new species because once the members of one subpopulation can no longer mate with members of another subpopulation, they cannot exchange variant genes that arise in one of the subpopulations. In the absence of gene flow between the subpopulations, genetic differences between the groups begin to accumulate. Eventually the subpopulations become so genetically distinct that they cannot interbreed even if the physical barriers between them were removed. At this point the subpopulations have evolved into distinct species. This route to speciation is known as allopatry (“allo-” means “different”, and “patria” means “homeland”).

Allopatric speciation may be the main speciation route. This should not be surprising, since allopatry is pretty common. In general, the subpopulations of most species are separated from each other by some measurable distance. So even under normal situations the gene flow among the subpopulations is more of an intermittent trickle than a steady stream. In addition, barriers can rapidly arise and shut off the trickle. For example, in the 1800s a monstrous earthquake changed the course of the Mississippi River, a large river flowing in the central part of the United States of America. The change separated populations of insects now living along opposite shore, completely cutting off gene flow between them.

Geographic isolation also can proceed slowly, over great spans of time. We find evidence of such extended events in the fossil record, which affords glimpses into the breakup of formerly continuous environments. For example, during past ice ages, glaciers advanced down through North America and Europe and gradually cut off parts of populations from one another. When the glaciers retreated, the separated populations of plants and animals came into contact again. Some groups that had descended from the same parent population were no longer reproductively compatible— they had evolved into separate species. In other groups, however, genetic divergences had not proceeded so far, and the descendants could still interbreed— for them, reproductive isolation was not completed, and so speciation had not occurred.

Allopatric speciation can also be brought by the imperceptibly slow but colossal movements of the tectonic plates that make up Earth’s surface. About 5 million years ago such geologic movements created the land bridge between North America and South America that we call the Isthmus of Panama. The formation of the isthmus had important consequences for global patterns of ocean water flow. While previously the gap between the continents had allowed a free flow of water, now the isthmus presented a barrier that divided the Atlantic Ocean from the Pacific Ocean. This division set the stage for allopatric speciation among populations of fishes and other marine species.

In the 1980s, John Graves studied two populations of closely related fishes, one population from the Atlantic side of isthmus, the other from the Pacific side. He compared four enzymes found in the muscles of each population. Graves found that all four Pacific enzymes function better at lower temperatures than the four Atlantic versions of the same enzymes. This is significant because Pacific seawater is typically 2 to 3 degrees cooler than seawater on the Atlantic side of isthmus. Analysis by gel electrophoresis revealed slight differences in amino acid sequence of the enzymes of two of the four pairs. This is significant because the amino acid sequence of an enzyme is determined by genes.

Graves drew two conclusions from these observations. First, at least some of the observed differences between the enzymes of the Atlantic and Pacific fish populations were not random but were the result of evolutionary adaptation. Second, it appears that closely related populations of fishes on both sides of the isthmus are starting to genetically diverge from each other. Because Graves’s study of geographically isolated populations of isthmus fishes offers a glimpse of the beginning of a process of gradual accumulation of mutations that are neutral or adaptive, divergences here might be evidence of allopatric speciation in process.

【Paragraph 1】Evolutionary biologists believe that speciation, the formation of a new species, often begins when some kind of physical barrier arises and divides a population of a single species into separate subpopulations. Physical separation between subpopulations promotes the formation of new species because once the members of one subpopulation can no longer mate with members of another subpopulation, they cannot exchange variant genes that arise in one of the subpopulations. In the absence of gene flow between the subpopulations, genetic differences between the groups begin to accumulate. Eventually the subpopulations become so genetically distinct that they cannot interbreed even if the physical barriers between them were removed. At this point the subpopulations have evolved into distinct species. This route to speciation is known as allopatry (“allo-” means “different”, and “patria” means “homeland”).

1.The word “promotes” in the passage is closest in meaning to

○describes

○encourages

○delays

○requires

2.According to paragraph 1, allopatric speciation involves which of the following?

○The division of a population into subspecies

○The reuniting of separated populations after they have become distinct species

○The movement of a population to a new homeland

○The absence of gene flow between subpopulations

【Paragraph 2】Allopatric speciation may be the main speciation route. This should not be surprising, since allopatry is pretty common. In general, the subpopulations of most species are separated from each other by some measurable distance. So even under normal situations the gene flow among the subpopulations is more of an intermittent trickle than a steady stream. In addition, barriers can rapidly arise and shut off the trickle. For example, in the 1800s a monstrous earthquake changed the course of the Mississippi River, a large river flowing in the central part of the United States of America. The change separated populations of insects now living along opposite shore, completely cutting off gene flow between them.

3.Why does the author provide the information that “the subpopulations of most species are separated from each other by some measurable distance”?

○To indicate how scientists are able to determine whether subpopulations of a species are allopathic.

○To define what it means for a group of animals or plants to be a subpopulation.

○To suggest that allopathic speciation is not the only route to speciation.

○To help explain why allopatric speciation is a common way for new species to come about.

4.The word “accumulate” in the passage is closest in meaning to

○Become more significant

○Occur randomly

○Gradually increase in number

○Cause changes

5. In paragraph 2, why does the author mention that some insect populations were separated from each other by a change in the course of Mississippi River caused by an earthquake?

○To make the point that some kind of physical barrier separates the subpopulations of most species

○To support the claim that the condition of allopatry can sometimes arise in a short time

○To provide an example of a situation in which gene flow among the subpopulations of a species happens at a slow rate

○To explain insects living along opposite shores of the Mississippi River are very different from each other

【Paragraph 3】Geographic isolation also can proceed slowly, over great spans of time. We find evidence of such extended events in the fossil record, which affords glimpses into the breakup of formerly continuous environments. For example, during past ice ages, glaciers advanced down through North America and Europe and gradually cut off parts of populations from one another. When the glaciers retreated, the separated populations of plants and animals came into contact again. Some groups that had descended from the same parent population were no longer reproductively compatible— they had evolved into separate species. In other groups, however, genetic divergences had not proceeded so far, and the descendants could still interbreed— for them, reproductive isolation was not completed, and so speciation had not occurred.

6.According to paragraph 3, separation of subpopulations by glaciers resulted in speciation in those groups of plants and animals that

○were reproductively isolated even after the glaciers disappeared

○had adjusted to the old conditions caused by the glaciers

○were able to survive being separated from their parent population

○had experienced some genetic divergences from their parent population

【Paragraph 4】Allopatric speciation can also be brought by the imperceptibly slow but colossal movements of the tectonic plates that make up Earth’s surface. About 5 million years ago such geologic movements created the land bridge between North America and South America that we call the Isthmus of Panama. The formation of the isthmus had important consequences for global patterns of ocean water flow. While previously the gap between the continents had allowed a free flow of water, now the isthmus presented a barrier that divided the Atlantic Ocean from the Pacific Ocean. This division set the stage for allopatric speciation among populations of fishes and other marine species.

7. The word “colossal” in the passage is closest in meaning to

○consistent

○gradual

○enormous

○effective

8.According to paragraph 4, which of the following is true of the geologic movements that brought about the Isthmus of Panama?

○The movement brought populations of certain fishes and marine organisms into contact with one another for the first time.

○The movement transferred populations of fishes and other marine animals between the Pacific and Atlantic Oceans.

○The movement created conditions that allowed water to flow more freely between the Pacific and Atlantic Oceans.

○The movement created conditions for the formation of new species of fished and other marine animals.

【Paragraph 5】In the 1980s, John Graves studied two populations of closely related fishes, one population from the Atlantic side of isthmus, the other from the Pacific side. He compared four enzymes found in the muscles of each population. Graves found that all four Pacific enzymes function better at lower temperatures than the four Atlantic versions of the same enzymes. This is significant because Pacific seawater is typically 2 to 3 degrees cooler than seawater on the Atlantic side of isthmus. Analysis by gel electrophoresis revealed slight differences in amino acid sequence of the enzymes of two of the four pairs. This is significant because the amino acid sequence of an enzyme is determined by genes.

9.The word “sequence” in the passage is closest in meaning to

○quality

○order

○function

○number

10.According to paragraph 5, by comparing the enzymes from two related groups of fishes on opposite sides of the Isthmus, Graves found evidence that

○there were slight genetic divergences between the two groups

○the Atlantic group of fishes were descended from the Pacific group of fishes

○the temperature of water on either side of the Isthmus had changed

○genetic changes in the Atlantic group of fishes were more rapid and frequent than in the Pacific group of fishes

【Paragraph 6】Graves drew two conclusions from these observations. First, at least some of the observed differences between the enzymes of the Atlantic and Pacific fish populations were not random but were the result of evolutionary adaptation. Second, it appears that closely related populations of fishes on both sides of the isthmus are starting to genetically diverge from each other. Because Graves’s study of geographically isolated populations of isthmus fishes offers a glimpse of the beginning of a process of gradual accumulation of mutations that are neutral or adaptive, divergences here might be evidence of allopatric speciation in process.

11.It can be inferred from paragraph 5 and 6 that the reason Graves concluded that some of the differences between the Pacific and Atlantic enzymes were not random was that

○each of the Pacific enzymes works better in cooler waters

○the Enzymes of the Atlantic fish populations had not changed since the formation of the Isthmus of Panama

○gel electrophoresis showed that the changes benefited both the Atlantic and the Pacific fish populations

○the differences between the enzymes disappeared when the two fish populations were experimentally switched to other side of the isthmus

12. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Graves’s study provides evidence that isthmus fishes are in the process of becoming geographically isolated.

○Graves’s study of mutating isthmus fishes yields results that differ from results of other studies involving allopatric speciation.

○Graves’s study of isolated populations of isthmus fishes provides some evidence that allopatric speciation might be beginning.

○Graves’s study indicates that when isolated, populations of isthmus fishes register neutral or adaptive mutations.

【Paragraph 4】Allopatric speciation can also be brought by the imperceptibly slow but colossal movements of the tectonic plates that make up Earth’s surface. ■About 5 million years ago such geologic movements created the land bridge between North America and South America that we call the Isthmus of Panama. The formation of the isthmus had important consequences for global patterns of ocean water flow. ■While previously the gap between the continents had allowed a free flow of water, now the isthmus presented a barrier that divided the Atlantic Ocean from the Pacific Ocean. ■This division set the stage for allopatric speciation among populations of fishes and other marine species.■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

The formation of the isthmus had important consequences for global patterns of ocean water flow.

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

●

●

●

Answer Choices

○Allopatric speciation is common because the gene flow between subpopulations is generally limited and the barriers that completely separate subpopulations can arise in a variety of ways.

○During past ice ages, some, but not all, subpopulations separated by glaciers evolved into distinct species.

○Speciation does not need to take place through allopatry because subpopulations will form distinct species whenever there are adaptive advantage to not.

○Physical barriers from glaciers and the movement of tectonic plates form so slowly that the subpopulations on either side of the barriers usually do not form distinct species.

○Graves’s study of fish populations separately by the Isthmus of Panama may well provide a picture of the beginning stages of speciation.

○Graves’s study of physically separated fish populations show that there must be large differences between the environments of the isolated populations if allopatric speciation is to take place.

参考答案

1.○2

2.○4

3.○4

4.○3

5.○2

6.○1

7.○3

8.○4

9.○2

10.○1

11.○1

12.○3

13.○2

14. Allopatric speciation is common because…

During past ice ages, some, …

Graves’s study of fish populations …

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：地理隔离导致物种形成**

进化论生物学家认为物种的形成，即形成一个新的物种，通常由某一障碍将一个族群分割成亚族群开始的。亚族群间的物理隔离可以促进物种形成是因为隔离之后一个亚族群里的个体无法与其他亚族群个体交配，因此该族群里突变的基因将无法与其他亚族群交流。之后亚族群间的基因差异将逐渐累积。最终即便物理隔离不复存在，亚族群间的基因差异过大而无法杂交。此时亚族群就进化为不同的物种。这种物种形成的轨迹称为异域分布。

异域分布可能是主要的物种形成路线。这不足奇怪，因为异域分布很常见。一般，绝大部分的物种的亚族群都由一定程度的距离隔离。所以就算在正常情况下，亚族群间基因交流更多可能像是间歇的细流而不是稳定的流动。另外，障碍可以迅速形成并切断这种细流。例如，十九世纪一场巨大的地震改变了密西西比河，美国中部的一条大河，的河道。这一改变将两岸的昆虫隔离开来，完全隔断了他们之间的基因交流。

地理隔离也可能进程缓慢，跨越很长时间。在化石记录中发现过这类事件。原本连续的环境突然终止。例如在以往的冰河时期，冰河从北美和欧洲向下扩张，逐渐切断了族群间的联系。冰河消退后分隔的动植物种群又重新接触。一些来自同一物种的后代就不能再相互交配----它们已形成新的物种。然而其它亚族群间基因差异没有如此之大，其后代仍可相互交配----对他们而言，繁殖隔离并未完成，因而新物种没有形成。

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异域分布导致的物种形成也可能源自察觉不到但巨大的板块运动，他们造就了地球表面。约500万年前，这种地质运动产生了连接北美洲和南美洲的陆地通道，我们称为巴拿马地峡。地峡的形成对全球洋流的形式产生重大影响。之前两大陆之间的间隙可使洋流畅通流动，现在地峡将大西洋和太平洋隔开。这种分割为海洋生物和鱼类提供了异域分布导致物种形成的舞台。

在二十世纪80年代，John Graves研究了两种极相关的鱼群，一个族群来自地峡的大西洋一侧，另一个来自地峡太平洋一侧。他对比了族群个体肌肉中的四种酶。这很重要因为太平洋的海水一般比大西洋的低2-3度。胶体电泳分析表明四对酶的氨基酸系列有微小差别。其重要性在于酶的氨基酸系列是由基因决定的。

Graves得出两条结论。首先至少太平洋族群和大西洋族群酶的一些差别不是随机的，而是进化适应的结果。第二，地峡两侧关系紧密的鱼群的基因正在开始变异。Graves的关于地峡分割的鱼群的研究得以让我们窥见那些适应性变化的积累过程的开始。这里的变异可能是异地分布物种形成过程的证据。

## **Early Childhood Education**

Preschools--educational programs for children under the age of five--differ significantly from one country to another according to the views that different societies hold regarding the purpose of early childhood education. For instance, in a cross-country comparison of preschools in China, Japan, and the United States, researchers found that parents in the three countries view the purpose of preschools very differently. Whereas parents in China tend to see preschools primarily as a way of giving children a good start academically, Japanese parents view them primarily as a way of giving children the opportunity to be members of a group. In the United States, in comparison, parents regard the primary purpose of preschools as making children more independent and self-reliant, although obtaining a good academic start and having group experience are also important.

While many programs designed for preschoolers focus primarily on social and emotional factors, some are geared mainly toward promoting cognitive gains and preparing preschoolers for the formal instruction they will experience when they start kindergarten. In the United States, the best-known program designed to promote future academic success is Head Start. Established in the 1960s when the United States declared the War on Poverty, the program has served over 13 million children and their families. The program, which stresses parental involvement, was designed to serve the "whole child", including children's physical health, self-confidence, social responsibility, and social and emotional development.

Whether Head Start is seen as successful or not depends on the lens through which one is looking. If, for instance, the program is expected to provide long-term increases in IQ (intelligence quotient) scores, it is a disappointment. Although graduates of Head Start programs tend to show immediate IQ gains, these increases do not last. On the other hand, it is clear that Head Start is meeting its goal of getting preschoolers ready for school. Preschoolers who participate in Head Start are better prepared for future schooling than those who do not. Furthermore, graduates of Head Start programs have better future school grade. Finally, some research suggests that ultimately Head Start graduates show higher academic performance at the end of high school, although the gains are modest.

In addition, results from other types of preschool readiness programs indicate that those who participate and graduate are less like to repeat grades, and they are more like to complete school than readiness program, for every dollar spent on the program, taxpayers saved seven dollars by the time the graduates reached the age of 27.

The most recent comprehensive evaluation of early intervention programs suggests that, taken as a group, preschool programs can provide significant benefits, and that government funds invested early in life may ultimately lead to a reduction in future costs. For instance, compared with children who did not participate in early intervention programs, participants in various programs showed gains in emotional or cognitive development, better educational outcomes, increased economic self-sufficiency, reduced levels of criminal activity, and improved health-related behaviors. Of course, not every program produced all these benefits, and not every child benefited to the same extent, Furthermore, some researchers argue that less-expensive programs are just as good as relatively expensive ones, such as Head Start. Still, the results of the evaluation were promising, suggesting that the potential benefits of early intervention can be substantial.

Not everyone agrees that programs that seek to enhance academic skills during the preschool years are a good thing. In fact, according to developmental psychologist David Elkind, United States society tends to push children so rapidly that they begin to feel stress and pressure at a young age. Elkind argues that academic success is largely dependent upon factors out of parents' control, such as inherited abilities and a child's rate of maturation. Consequently, children of a particular age cannot be expected to master educational material without taking into account their current level of cognitive development. In short, children require development appropriate educational practice, which is education that is based on both typical development and the unique characteristics of a given child.

【Paragraph 1】Preschools—educational programs for children under the age of five--differ significantly from one country to another according to the views that different societies hold regarding the purpose of early childhood education. For instance, in a cross-country comparison of preschools in China, Japan, and the United States, researchers found that parents in the three countries view the purpose of preschools very differently. Whereas parents in China tend to see preschools primarily as a way of giving children a good start academically, Japanese parents view them primarily as a way of giving children the opportunity to be members of a group. In the United States, in comparison, parents regard the primary purpose of preschools as making children more independent and self-reliant, although obtaining a good academic start and having group experience are also important.

1. According to paragraph 1, parents in Japan tend to think of preschool primarily as a place where children can

○get a good academic start

○expand their emotional development

○become more independent

○experience being part of a group

2. The word “Whereas” in the passage is closest in meaning to

○Although

○Because

○Moreover

○Already

【Paragraph 2】While many programs designed for preschoolers focus primarily on social and emotional factors, some are geared mainly toward promoting cognitive gains and preparing preschoolers for the formal instruction they will experience when they start kindergarten. In the United States, the best-known program designed to promote future academic success is Head Start. Established in the 1960s when the United States declared the War on Poverty, the program has served over 13 million children and their families. The program, which stresses parental involvement, was designed to serve the "whole child", including children's physical health, self-confidence, social responsibility, and social and emotional development.

3. The word “focus” in the passage is closest in meaning to

○consider

○respect

○concentrate

○advise

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4. It can be inferred from paragraph 2 that the Head Start program was designed to serve children who

○come from families that do not have a lot of money

○are not doing very well in kindergarten

○were born in the 1950s

○need programs that focus primarily on social and emotional factors

【Paragraph 3】Whether Head Start is seen as successful or not depends on the lens through which one is looking. If, for instance, the program is expected to provide long-term increases in IQ (intelligence quotient) scores, it is a disappointment. Although graduates of Head Start programs tend to show immediate IQ gains, these increases do not last. On the other hand, it is clear that Head Start is meeting its goal of getting preschoolers ready for school. Preschoolers who participate in Head Start are better prepared for future schooling than those who do not. Furthermore, graduates of Head Start programs have better future school grade. Finally, some research suggests that ultimately Head Start graduates show higher academic performance at the end of high school, although the gains are modest.

5. According to paragraph 3, the Head Start program had NOT been successful at which of the following?

○Helping children adjust to school

○ Providing long-term increase in IQ scores

○Improving school performance throughout high school

○Preventing children from being placed in special-education classes

【Paragraph 4】In addition, results from other types of preschool readiness programs indicate that those who participate and graduate are less like to repeat grades, and they are more like to complete school than readiness program, for every dollar spent on the program, taxpayers saved seven dollars by the time the graduates reached the age of 27.

6. In paragraph 4, the author mentions the “results from other types of readiness programs” to

○provide support for the idea that preschool readiness programs have been somewhat successful

○question the idea that Head Start is more effective than other preschool readiness programs

○indicate school completion is usually the most reliable indicator of success in most reading programs

○emphasize that participation in readiness programs can be increased if costs are reduced

7. According to paragraph 4, a cost-benefit analysis of one preschool readiness program revealed that

○only one dollar’s worth of benefit was gained for every seven dollars spent on the program

○the benefits of the program lasted only until the participants reached age 27

○taxpayers saved seven dollars for every dollar spent on the program

○to be successful, the program would need to receive about seven times as much money as it currently receives

【Paragraph 5】The most recent comprehensive evaluation of early intervention programs suggests that, taken as a group, preschool programs can provide significant benefits, and that government funds invested early in life may ultimately lead to a reduction in future costs. For instance, compared with children who did not participate in early intervention programs, participants in various programs showed gains in emotional or cognitive development, better educational outcomes, increased economic self-sufficiency, reduced levels of criminal activity, and improved health-related behaviors. Of course, not every program produced all these benefits, and not every child benefited to the same extent, Furthermore, some researchers argue that less-expensive programs are just as good as relatively expensive ones, such as Head Start. Still, the results of the evaluation were promising, suggesting that the potential benefits of early intervention can be substantial.

8. The word “comprehensive” in the passage is closest in meaning to

○easily understood

○thorough

○respectable

○objective

9. Paragraph 5 mentions that participants in early intervention programs have been shown to do all of the following better than nonparticipants EXCEPT

○Take care of their health

○Support themselves financially

○Take care of their own children

○Have increased emotional development

10. According to paragraph 5, which of the following is true about the benefits of early intervention programs?

○These programs produce good short-term benefits but few long-term benefits.

○Only the most expensive programs provide substantial benefits.

○The Head Start provides a range of benefits that no other program can provide.

○Some children benefit more than others do from these programs.

【Paragraph 6】Not everyone agrees that programs that seek to enhance academic skills during the preschool years are a good thing. ■In fact, according to developmental psychologist David Elkind, United States society tends to push children so rapidly that they begin to feel stress and pressure at a young age. ■Elkind argues that academic success is largely dependent upon factors out of parents' control, such as inherited abilities and a child's rate of maturation. ■Consequently, children of a particular age cannot be expected to master educational material without taking into account their current level of cognitive development. ■In short, children require development appropriate educational practice, which is education that is based on both typical development and the unique characteristics of a given child.

11. The word “seek”in the passage is closest in meaning to

○ claim

○ manage

○ fail

○ attempt

12. The passage mentions “developmental psychologist David Elkind”in order to

○ give an example of an expert who has designed an effective early childhood education program

○ introduce an alternative view about the value of early childhood education

○ explain why early childhood education programs are less effective in the United States than in other countries

○ refute the claim that academic success is dependent on factors outside parents’ control

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

According to Elkind, not only does this cause the child emotional distress, it also fails to bring the intended cognitive gains.

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Preschool programs provide opportunities for young children to develop socially, emotionally, and cognitively.

●

●

●

Answer Choices

○ In addition to stressing academic development, preschools should be enjoyable, since studies show that children benefit from programs they find fun.

○ Preschool programs such as Head Start have been shown to help prepare children for school and may also have long-term benefits in helping children become effective adults.

○ Studies have shown that preschool programs are most effective when they focus on only one area of development rather than trying to serve the “whole”

○ The primary purpose of preschool programs varies by country, with some stressing the importance of group experience, and others self-reliance or getting a good academic start.

○ Critics of preschool programs arguer that these programs put undue pressure on children and may not be effective if children are not developmentally ready for academic work.

○ David Elkind is a critic of public funded preschool programs, arguing that the parent cannot control their children’s emotional development.

参考答案

1.○4

2.○1

3.○3

4.○1

5.○2

6.○1

7.○3

8.○2

9.○3

10.○4

11.○4

12.○2

13.○2

14. Preschool programs such as Head Start…

The primary purpose of preschool…

Critics of preschool programs arguer…

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## **参考译文：学前教育**

根据不同社会对学前教育所持观点不同，不同国家的学前教育—针对5岁前小孩子的教育课程—差别很大。例如，一份关于中国、日本和美国学前教育的横向对比表面这些国家的家长对儿童学前教育的目的持截然不同的看法。中国家长认为学前教育主要可以为儿童提供一个学术启蒙的机会，而日本家长认为学前教育主要可以提供作为群体中的一员的机会。相比较而言，美国家长则认为学前教育的首要目的是有助于儿童更加独立，尽管他们进行学术启蒙和群体经验也很重要。

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尽管很多教育课程的设计首先关注社交和感情的因素，其它一些课程则主要为了促进认知能力，并为他们即将进行的幼儿园正规教育作准备。在美国，最著名的以促进未来学术能力的教育课程是Head Start。自二十世纪六十年代当美国决定向贫穷宣战时设立以来，该项目已经服务了1300万儿童及其家人。该项目注重家长的参与，并致力于培养“全才儿童”，即包括儿童的身体健康，自信心，社会责任和社交和情商发展。

Head Start是否成功取决于人们看待的角度。例如，如果这个课程是为了提高孩子长期的IQ（智商），那么它并不怎么样。尽管Head Start的毕业生往往表现出短期的IQ提高，但长期并非如此。另外，Head Start达到了帮助儿童为学校教育做好准备的目标。参加了Head Start课程的儿童比没有参加的儿童更能适应未来的学校教育。而且，Head Start毕业生在未来的学校中分数更高。最终一些研究表明Head Start毕业生在高中结束的时候的成绩稍微高一点，尽管只是一点点。

另外，其它学前准备课程的研究表明参加学前准备课程并毕业的儿童在读书期间更少留级，也更可能完成学校教育。纳税人每向学前课程花费1美元，则在孩子27岁前他们要节约7美元。

最近关于早期介入课程的综合研究表明，整体上看，学前课程意义重大，并且投资给早期教育的政府资金可以最终减少未来的成本。例如，相对于没有参加早期介入课程的儿童，那些参加课程的儿童表现出情感和认知上的进步，教育结果也更好，经济自足水平高，但不是每个孩子的受益程度都相同。而且，一些研究者认为较便宜的课程和较昂贵的课程，如Head Start，起到的效果相同。较便宜的课程的评价结果依然很好，早期介入有很重要的好处。

不是每个人都认为追求提高学术能力的学前课程是一件好事。事实上，根据发展心理学家David Elkind的观点，美国社会让孩子的发展速度太快以至于他们在很小的年纪就感觉到了压力。Elkind认为学术成功很大程度上取决于父母不能控制的因素，如遗传的能力和孩子成熟速度。因此，特定年龄段的孩子就很难掌握不考虑他们目前认知水平的发展而制定的教育材料。简而言之，孩子需要发展合适的教育实践，即根据一般孩子的发展水平和每个孩子的个性而制定的教育。

## **Savanna Formation**

Located in tropical areas at low altitudes, savannas are stable ecosystems, some wet and some dry consisting of vast grasslands with scattered trees or shrubs. They occur on a wide range of soil types and in extremes of climate. There is no simple or single factor that determines if a given site will be a savanna, but some factors seem to play important roles in their formation.

Savannas typically experience a rather prolonged dry season. One theory behind savanna formation is that wet forest species are unable to withstand the dry season, and thus savanna, rather than rain forest, is favored on the site. Savannas experience an annual rainfall of between 1,000 and 2,000 millimeters, most of it falling in a five- to eight-month wet season. Though plenty of rain may fall on a savanna during the year, for at least part of the year little does, creating the drought stress ultimately favoring grasses. Such conditions prevail throughout much of northern South America and Cuba, but many Central American savannas as well as coastal areas of Brazil and the island of Trinidad do not fit this pattern. In these areas, rainfall per month exceeds that in the above definition, so other factors must contribute to savanna formation.

In many characteristics, savanna soils are similar to those of some rain forests, though more extreme. For example, savanna soils, like many rain forest soils, are typically oxisols (dominated by certain oxide minerals) and ultisols (soils containing no calcium carbonate), with a high acidity and notably low concentrations of such minerals as phosphorus, calcium, magnesium, and potassium, while aluminum levels are high. Some savannas occur on wet, waterlogged soils; others on dry, sandy, well-drained soils. This may seem contradictory, but it only means that extreme soil conditions, either too wet or too dry for forests, are satisfactory for savannas. More moderate conditions support moist forests.

Waterlogged soils occur in areas that are flat or have poor drainage. These soils usually contain large amounts of clay and easily become water-saturated. Air cannot penetrate between the soil particles, making the soil oxygen-poor. By contrast, dry soils are sandy and porous, their coarse textures permitting water to drain rapidly. Sandy soils are prone to the leaching of nutrients and minerals and so tend to be nutritionally poor. Though most savannas are found on sites with poor soils (because of either moisture conditions or nutrient levels of both), poor soils can and do support lush rain forest.

Most savannas probably experience mild fires frequently and major burns every two years or so. Many savanna and dry-forest plant species are called pyrophytes, meaning they are adapted in various ways to withstand occasional burning. Frequent fire is a factor to which rain forest species seem unable to adapt, although ancient charcoal remains from Amazon forest soils dating prior to the arrival of humans suggest that moist forests also occasionally burn. Experiments suggest that if fire did not occur in savannas in the Americas, species composition would change significantly. When burning occurs, it prevents competition among plant species from progressing to the point where some species exclude others, reducing the overall diversity of the ecosystem. But in experimental areas protected from fire, a few perennial grass species eventually come to dominate, outcompeting all others. Evidence from other studies suggests that exclusion of fire results in markedly decreased plant-species richness, often with an increase in tree density. There is generally little doubt that fire is a significant factor in maintaining savanna, certainly in most regions.

On certain sites, particularly in South America, savanna formation seems related to frequent cutting and burning of moist forests for pastureland. Increase in pastureland and subsequent overgrazing have resulted in an expansion of savanna. The thin upper layer of humus (decayed organic matter) is destroyed by cutting and burning. Humus is necessary for rapid decomposition of leaves by bacteria and fungi and for recycling by surface roots. Once the humus layer disappears, nutrients cannot be recycled and leach from the soil, converting soil from fertile to infertile and making it suitable only for savanna vegetation. Forests on white, sandy soil are most susceptible to permanent alteration.

【Paragraph 2】Savannas typically experience a rather prolonged dry season. One theory behind savanna formation is that wet forest species are unable to withstand the dry season, and thus savanna, rather than rain forest, is favored on the site. Savannas experience an annual rainfall of between 1,000 and 2,000 millimeters, most of it falling in a five- to eight-month wet season. Though plenty of rain may fall on a savanna during the year, for at least part of the year little does, creating the drought stress ultimately favoring grasses. Such conditions prevail throughout much of northern South America and Cuba, but many Central American savannas as well as coastal areas of Brazil and the island of Trinidad do not fit this pattern. In these areas, rainfall per month exceeds that in the above definition, so other factors must contribute to savanna formation.

1. The word “prolonged” in the passage is closest in meaning to

○predictable

○destructive

○lengthy

○unproductive

2. In paragraph 2, the author mentions savannas in Central America, Brazil, and the island of Trinidad in order to:

○argue that these savannas are similar to those in South America and Cuba

○point out exceptions to the pattern of savanna formation in areas with drought stress

○provide additional examples of savannas in areas with five-to-eight-month wet seasons

○indicate areas where savannas are being gradually replaced by rain forest

【Paragraph 3】In many characteristics, savanna soils are similar to those of some rain forests, though more extreme. For example, savanna soils, like many rain forest soils, are typically oxisols (dominated by certain oxide minerals) and ultisols (soils containing no calcium carbonate), with a high acidity and notably low concentrations of such minerals as phosphorus, calcium, magnesium, and potassium, while aluminum levels are high. Some savannas occur on wet, waterlogged soils; others on dry, sandy, well-drained soils. This may seem contradictory, but it only means that extreme soil conditions, either too wet or too dry for forests, are satisfactory for savannas. More moderate conditions support moist forests.

3. According to paragraph 3, rain forests and savannas differ in that:

○the soils in rain forests contain fewer minerals than savanna soils do

○savannas affect soil conditions more than rain forests do

○unlike rain forests, savannas prefer sandy, well-drained soils to solids that are very wet

○unlike rain forests, savannas may develop under both very dry and very wet soil conditions

4. The word “notably” in the passage is closest in meaning to

○similarly

○especially

○usually

○relatively

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5. According to paragraph 3, all of the following are true of savanna soils EXCEPT

○They have high concentrations of potassium.

○They contain high levels of aluminum.

○They are very acidic.

○They contain large amounts of certain oxide minerals.

6. According to paragraph 4, which of the following is true of waterlogged soils?

○Their upper layers are usually sandy and porous.

○They cannot support savannas.

○They contain little oxygen.

○They are prone to the leaching of nutrients and minerals.

【Paragraph 4】Waterlogged soils occur in areas that are flat or have poor drainage. These soils usually contain large amounts of clay and easily become water-saturated. Air cannot penetrate between the soil particles, making the soil oxygen-poor. By contrast, dry soils are sandy and porous, their coarse textures permitting water to drain rapidly. Sandy soils are prone to the leaching of nutrients and minerals and so tend to be nutritionally poor. Though most savannas are found on sites with poor soils (because of either moisture conditions or nutrient levels of both), poor soils can and do support lush rain forest.

7. The fact that “poor soils can and do support lush rain forest” suggests that:

○poor soils alone may not be enough to explain why an area becomes a savanna

○rain forest vegetation can significantly lower the quality of soils

○drought stress is the single most important factor in savanna formation

○minerals are more important than moisture for the growth of trees

【Paragraph 5】Most savannas probably experience mild fires frequently and major burns every two years or so. Many savanna and dry-forest plant species are called pyrophytes, meaning they are adapted in various ways to withstand occasional burning. Frequent fire is a factor to which rain forest species seem unable to adapt, although ancient charcoal remains from Amazon forest soils dating prior to the arrival of humans suggest that moist forests also occasionally burn. Experiments suggest that if fire did not occur in savannas in the Americas, species composition would change significantly. When burning occurs, it prevents competition among plant species from progressing to the point where some species exclude others, reducing the overall diversity of the ecosystem. But in experimental areas protected from fire, a few perennial grass species eventually come to dominate, outcompeting all others. Evidence from other studies suggests that exclusion of fire results in markedly decreased plant-species richness, often with an increase in tree density. There is generally little doubt that fire is a significant factor in maintaining savanna, certainly in most regions.

8. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Rain forest species seem unable to adapt to fires created by humans.

○Ancient charcoal remains suggest that, prior to the arrival of humans, fires occurred frequently in rain forests.

○Ancient charcoal remains in Amazon forests suggest that rain forest species adapted to the area long before the arrival of humans.

○Rain forest species appear unable to adapt to frequent fires, but evidence from the past suggests that rain forests sometimes do burn.

9. The word “markedly” in the passage is closest in meaning to

○dangerously

○noticeably

○rapidly

○gradually

10. Paragraph 5 supports which of the following statements regarding the importance of fires in maintaining savannas?

○Fires prevent the growth of pyrophytes.

○Fires eliminate some species and thus reduce the overall diversity of the ecosystem.

○Fires that occur once every two years are unlikely to help maintain savannas.

○Fires prevent some species from eliminating other species with which they compete.

【Paragraph 6】On certain sites, particularly in South America, savanna formation seems related to frequent cutting and burning of moist forests for pastureland. Increase in pastureland and subsequent overgrazing have resulted in an expansion of savanna. The thin upper layer of humus (decayed organic matter) is destroyed by cutting and burning. Humus is necessary for rapid decomposition of leaves by bacteria and fungi and for recycling by surface roots. Once the humus layer disappears, nutrients cannot be recycled and leach from the soil, converting soil from fertile to infertile and making it suitable only for savanna vegetation. Forests on white, sandy soil are most susceptible to permanent alteration.

11. The word “subsequent” in the passage is closest in meaning to

○expanded in area

○harmful

○following in time

○repeated

12. According to paragraph 6, human activity affects soils in all of the following ways EXCEPT

○Decomposition of leaves occurs too fast for surface roots to obtain nutrients.

○Nutrients are not recycled.

○Humus is destroyed.

○certain soils become unable to support vegetation other than savanna vegetation.

【Paragraph 5】Most savannas probably experience mild fires frequently and major burns every two years or so. Many savanna and dry-forest plant species are called pyrophytes, meaning they are adapted in various ways to withstand occasional burning. Frequent fire is a factor to which rain forest species seem unable to adapt, although ancient charcoal remains from Amazon forest soils dating prior to the arrival of humans suggest that moist forests also occasionally burn. Experiments suggest that if fire did not occur in savannas in the Americas, species composition would change significantly. When burning occurs, it prevents competition among plant species from progressing to the point where some species exclude others, reducing the overall diversity of the ecosystem. But in experimental areas protected from fire, a few perennial grass species eventually come to dominate, outcompeting all others. ■Evidence from other studies suggests that exclusion of fire results in markedly decreased plant-species richness, often with an increase in tree density. ■There is generally little doubt that fire is a significant factor in maintaining savanna, certainly in most regions.

【Paragraph 6】■On certain sites, particularly in South America, savanna formation seems related to frequent cutting and burning of moist forests for pastureland. ■Increase in pastureland and subsequent overgrazing have resulted in an expansion of savanna. The thin upper layer of humans (decayed organic matter) is destroyed by cutting and burning. Humus is necessary for rapid decomposition of leaves by bacteria and fungi and for recycling by surface roots. Once the humus layer disappears, nutrients cannot be recycled and leach from the soil, converting soil from fertile to infertile and making it suitable only for savanna vegetation. Forests on white, sandy soil are most susceptible to permanent alteration.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

In addition, humans have contributed to the conditions favoring the formation of savannas.

Where would the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

Several factors seem to play important roles in savanna formation.

●

●

●

Answer Choices

○ Savannas can form in areas with a five to eight month wet season, but they more commonly have a longer wet season.

○ Soil stress caused by drought, extreme moisture, or low nutrient levels favors the formation of savannas.

○ Studies conducted in various regions indicate that an upper layer of white, sandy, soil is present in most permanent savannas.

○ Drought stress affects trees and shrubs in savannas far less than it affects savanna grasses.

○ Frequent fire is a major factor contributing to the formation and maintenance of savannas.

○ In some areas, human cutting and burning is associated with savanna formation, and increase in pastureland had led to savanna expansion.

参考答案

1.○3

2.○2

3.○4

4.○2

5.○1

6.○3

7.○1

8.○4

9.○2

10.○4

11.○3

12.○1

13.○3

14. Soil stress caused by drought, extreme moisture…

Frequent fire is a major factor contributing…

In some areas, human cutting and…

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## **参考译文：稀树草原的形成**

坐落于低纬度的热带地区，稀树大草原是稳定的生态系统，一些潮湿，而另一些则干旱。它们由大面积的草地和零星的灌木或乔木组成。它们适应极宽泛的土壤类型和各种极端气候条件。决定一个地区是稀树草原的因素既不简单也非单一，但有一些因素在其形成过程中扮有重要角色。

稀树草原通常有很长的一段旱季。一种稀树草原形成的理论认为潮湿森林不能忍受这种旱季，因此在该地区就形成了稀树草原而不是雨林。稀树草原每年降雨量介于1000mm到2000mm，绝大部分降落在5-8个月的雨季。尽管一年降雨充沛，但至少有一半的时间很少下雨，干旱的压力更倾向于形成草原。这种情况发生在北美和古巴的大部分地区。但是美洲中部、巴西海岸地区和特立尼达和多巴哥共和国的岛屿上的稀树草原则不是这种情况。这些地区每个月的降雨都超过了上述定义，因此是其他因素导致稀树草原的形成。

稀树草原土壤的很多特征和雨林相似，只是更加极端。例如，稀树草原土壤，与雨林土壤相似，都是氧化物（大部分是某种氧化物矿物）和极育土（没有碳酸钙的土壤），酸性很强，但像磷、钙、镁和钾等矿物含量很少，而铝的含量很高。一些稀树草原土壤潮湿，而另一些则干燥、砂质、排水性好。这可能相互矛盾，但都是很极端的土壤条件，要么太潮湿要么太干燥，因而不能形成雨林而是稀树草原。潮湿的雨林需要更加温和的条件。

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浸满水的土壤一般位于平坦或排水极差的地区。这种土壤粘土含量一般很高，很容易饱和水。空气不能从土壤颗粒间穿过，因此土壤变成缺氧环境。相反，干旱的土壤都是砂质和多孔的，他们粗糙的性质使得水分很快就排出了。砂质土壤更容易遗失营养和矿物质，因此比较贫瘠。虽然绝大部分稀树草原土壤贫瘠（要么是水分少，要么是营养水平低），但是贫瘠土壤可以也已经支撑过茂密的雨林。

大部分稀树草原很可能经常有较小的野火，并大约每隔一年都会有一场大火。很多稀树草原和干旱森林的物种都称作防火物种，因为他们进化出各种方式以忍受间歇的野火。频繁的野火也是一个雨林物种无法适应的因素，尽管人类到达前亚马逊雨林的古老木炭遗迹表明潮湿的森林也时常有火灾。实验表明如果美国的稀树草原没有野火，则其物种组成将发生剧烈变化。燃烧可阻止植物物种间的竞争以防止某一物种将其他物种灭绝，进而减少了整个生态系统的多样性。其他研究的证据表明如果没有野火，植物物种的丰富程度将降低，乔木的密度将增加。很少有人怀疑野火是保持绝大部分稀树草原的一个重要因素。

在特定区域，尤其是南美，稀树草原的形成可能跟频繁的砍伐和燃烧森林以便形成牧场有关。牧场和随后的过度放牧的增加可导致稀树草原的扩张。腐殖质的表层（腐烂的有机物）被砍伐和燃烧破坏了。腐殖质是细菌或真菌分解树叶以便根系再度吸收的必要条件。一旦腐殖质被破坏，营养物质就不能循环利用，而从土壤流失了，因此土壤将变得贫瘠，只能适应稀树草原了。白色砂质土壤上的森林最容易遭受永久的改变。

TPO-32

## **Plant Colonization**

Colonization is one way in which plants can change the ecology of a site. Colonization is a process with two components: invasion and survival. The rate at which a site is colonized by plants depends on both the rate at which individual organisms (seeds, spores, immature or mature individuals) arrive at the site and their success at becoming established and surviving. Success in colonization depends to a great extent on there being a site available for colonization – a safe site where disturbance by fire or by cutting down of trees has either removed competing species or reduced levels of competition and other negative interactions to a level at which the invading species can become established. For a given rate of invasion, colonization of a moist, fertile site is likely to be much more rapid than that of a dry, infertile site because of poor survival on the latter. A fertile, plowed field is rapidly invaded by a large variety of weeds, whereas a neighboring construction site from which the soil hasbeen compacted or removed to expose a coarse, infertile parent material may remain virtually free of vegetation for many months or even years despite receiving the same input of seeds as the plowed field.

Both the rate of invasion and the rate of extinction vary greatly among different plant species. Pioneer species – those that occur only in the earliest stages of colonization - tend to have high rates of invasion because they produce very large numbers of reproductive propagules (seeds, spores, and so on) and because they have an efficient means of dispersal (normally, wind)

If colonizers produce short-lived reproductive propagules, they must produce very large numbers unless they have an efficient means of dispersal to suitable new habitats. Many plants depend on wind for dispersal and produce abundant quantities of small, relatively short-lived seeds to compensate for the fact that wind is not always a reliable means If reaching the appropriate type of habitat. Alternative strategies have evolved in some plants, such as those that produce fewer but larger seeds that are dispersed to suitable sites by birds or small mammals or those that produce long-lived seeds. Many forest plants seem to exhibit the latter adaptation, and viable seeds of pioneer species can be found in large numbers on some forest floors. For example, as many as 1,125 viable seeds per square meter were found in a 100-year-old Douglas fir/western hemlock forest in coastal British Columbia. Nearly all the seeds that had germinated from this seed bank were from pioneer species. The rapid colonization of such sites after disturbance is undoubtedly in part a reflection of the large seed band on the forest floor.

An adaptation that is well developed in colonizing species is a high degree of variation in germination (the beginning of a seed’s growth). Seeds of a given species exhibit a wide range of germination dates, increasing the probability that at least some of the seeds will germinate during a period of favorable environmental conditions. This is particularly important for species that colonize an environment where there is no existing vegetation to ameliorate climatic extremes and in which there may be great climatic diversity.

Species succession in plant communities, i.e., the temporal sequence of appearance and disappearance of species is dependent on events occurring at different stages in the life history of a species. Variation in rates of invasion and growth plays an important role in determining patterns of succession, especially secondary succession. The species that are first to colonize a site are those that produce abundant seed that is distributed successfully to new sites.Such species generally grow rapidly and quickly dominate new sites, excluding other species with lower invasion and growth rates. The first community that occupies a disturbed area therefore may be composed of specie with the highest rate of invasion, whereas the community of the subsequent stage may consist or plants with similar survival rates but lower invasion rates.

【Paragraph 1】Colonization is one way in which plants can change the ecology of a site. Colonization is a process with two components: invasion and survival. The rate at which a site is colonized by plants depends on both the rate at which individual organisms (seeds, spores, immature or mature individuals) arrive at the site and their success at becoming established and surviving. Success in colonization depends to a great extent on there being a site available for colonization – a safe site where disturbance by fire or by cutting down of trees has either removed competing species or reduced levels of competition and other negative interactions to a level at which the invading species can become established. For a given rate of invasion, colonization of a moist, fertile site is likely to be much more rapid than that of a dry, infertile site because of poor survival on the latter. A fertile, plowed field is rapidly invaded by a large variety of weeds, whereas a neighboring construction site from which the soil hasbeen compacted or removed to expose a coarse, infertile parent material may remain virtually free of vegetation for many months or even years despite receiving the sane input of seeds as the plowed field.

1. According to paragraph 1, how does disturbance of a site influence its colonization by a plant species?

○ Disturbance reduces or eliminates competition by other species.

○Disturbance increases negative interactions with other organisms on the site.

○Disturbance prevents a plant species from colonizing a new site.

○ Disturbance reduces the fertility of a site.

2. The word “virtually” in the passage is closest in meaning to

○ almost totally

○unusually

○consistently

○ unnaturally

3. Why does the author mention a plowed field and a construction site in the passage?

○ To argue that sites that have been affected by human activity tend to be colonized slowly

○ To illustrate the kind of sites that may be invaded by weeds

○ To contrast sites in terms of their suitability for colonization

○ To explain that exposing or compacting the soil results in successful colonization

4. The word “despite” in the passage is closest in meaning to

○ without

○ almost never

○ even though

○ perhaps

【Paragraph 2】Both the rate of invasion and the rate of extinction vary greatly among different plant species. Pioneer species – those that occur only in the earliest stages of colonization - tend to have high rates of invasion because they produce very large numbers of reproductive propagules (seeds, spores, and so on) and because they have an efficient means of dispersal (normally, wind)

5. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ The seeds of pioneer species are usually carried by the wind to fertile sites, where they reproduce very efficiently.

○ Pioneer species are successful invaders because they produce lots of seeds that are dispersed effectively.

○ Pioneer species produce their largest numbers of propagules during the earliest stages of their colonization.

○ Pioneer species reproduce very quickly and efficiently because they produce very large number of seeds.

【Paragraph 3】If colonizers produce short-lived reproductive propagules, they must produce very large numbers unless they have an efficient means of dispersal to suitable new habitats. Many plants depend on wind for dispersal and produce abundant quantities of small, relatively short-lived seeds to compensate for the fact that wind is not always a reliable means of reaching the appropriate type of habitat. Alternative strategies have evolved in some plants, such as those that produce fewer but larger seeds that are dispersed to suitable sites by birds or small mammals or those that produce long-lived seeds. Many forest plants seem to exhibit the latter adaptation, and viable seeds of pioneer species can be found in large numbers on some forest floors. For example, as many as 1,125 viable seeds per square meter were found in a 100-year-old Douglas fir/western hemlock forest in coastal British Columbia. Nearly all the seeds that had germinated from this seed bank were from pioneer species. The rapid colonization of such sites after disturbance is undoubtedly in part a reflection of the large seed bank on the forest floor.

6. What can be inferred from paragraph 3 about the reason that large seeds are dispersed by birds or small animals rather than by wind?

○ Large seeds are easier for birds and animals to see than are the small seeds dispersed by the wind.

○Large seeds are too heavy for the wind to disperse.

○ Large seeds cannot be eaten by birds and animals.

○ Large seeds are short-lived and thus require a more efficient means of dispersal than small seeds do.

7. The phrase “the latter adaptation” in the passage refers to

○ producing fewer seeds

○ producing larger seeds

○ dispersal by birds and small mammals

○ producing long-lived seeds

8. The word “viable” in the passage is closest in meaning to

○ able to survive

○ individual

○ large

○ remaining

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9. The example of the 100-year-old Douglas fir/western hemlock forest in paragraph to illustrates which of the following ideas?

○ It is uncommon for older seed to germinate.

○ Pioneer species tend to prefer forest floors for colonization purposes.

○ Long-lived seeds of pioneer species can successfully germinate over long periods of time.

○ Coastal British Columbia is particularly suited for pioneer species to develop.

【Paragraph 4】An adaptation that is well developed in colonizing species is a high degree of variation in germination (the beginning of a seed’s growth). Seeds of a given species exhibit a wide range of germination dates, increasing the probability that at least some of the seeds will germinate during a period of favorable environmental conditions. This is particularly important for species that colonize an environment where there is no existing vegetation to ameliorate climatic extremes and in which there may be great climatic diversity.

10. According to paragraph 4, how do plants manage to germinate in areas with great climatic diversity and climatic extremes?

○ By producing seeds only during favorable climatic conditions

○ By generating large numbers of seeds

○ By colonizing only those areas where other plants have survived

○ By producing seeds that have a wide range of germination dates

【Paragraph 5】Species succession in plant communities, i.e., the temporal sequence of appearance and disappearance of species is dependent on events occurring at different stages in the life history of a species. Variation in rates of invasion and growth plays an important role in determining patterns of succession, especially secondary succession. The species that are first to colonize a site are those that produce abundant seed that is distributed successfully to new sites.Such species generally grow rapidly and quickly dominate new sites, excluding other species with lower invasion and growth rates. The first community that occupies a disturbed area therefore may be composed of specie with the highest rate of invasion, whereas the community of the subsequent stage may consist or plants with similar survival rates but lower invasion rates.

11. The word “abundant” in the passage is closest in meaning to

○ new

○ improved

○ suitable

○ Plentiful

12. According to paragraph 5, which of the following determines the sequence in which plant species will colonize a site?

○ The extent of growth of a species on a prior site before it begins to colonize a secondary site

○ The differences in invasion and growth rates across species

○ The degree of fertility of a site

○ The kind of disturbance that the site has undergone

■They were able to do so because of our second consideration. ■They were relatively freer than they had been half a century earlier. ■Over the course of the Fifth Reign (1868-1910), the ties that bound rural people to the aristocracy and local ruling elites were greatly reduced. Peasants now paid a tax on individuals instead of being required to render labor service to the government. ■Under these conditions, it made good sense to thousands of peasant families to in effect work full-time at what they had been able to do only part-time previously because of the requirement to work for the government: grow rice for the marketplace.

13. Look at the four squares〔■〕that indicate where the following sentence could be added to the passage.

And yet, how is it that the peasants were able to choose to expand their economic activity in response to the market opportunities?

Where does the sentence best fit?

14. Prose Summary

The ecology of a site is changed through its colonization by new plants that arrive and grow there.

Answer Choices:

○The species that first colonize a disturbed site are typically ones that produce a large number of efficiently dispersed seeds.

○ Plants that cannot successfully compete with other species can invade and colonize a site only if it is fertile and moist, such as a plowed field.

○ Pioneer species arrive at a site first but have lower survival rates than do species that arrive later.

○ Producing seeds that germinate at various time over long periods allows some plants to colonize sites that only occasionally present the right conditions for growth.

○Large, long-lived seeds tend to result in large seed bank with short germination periods requiring favorable environmental conditions for development.

○ The successive appearance and disappearance of species on a site is a result of variation in species’ rates of invasion, growth, and survival.

参考答案：

1. A

2. A

3. C

4. C

5. B

6. B

7. D

8. A

9. C

10. D

11. D

12. B

13. C

14. ADF

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：植物定居**

定居是植物改变某个地点生态环境的方式之一。定居过程包括两个阶段：入侵和存活。

一个地点被植物定居的速度取决于个体生物（种子、孢子、不成熟或成熟的个体）到达该地点并成功存活下来的速度。定居的成功很大程度上取决于有一个合适的定居地点——一个安全的地点中，因为火或伐树造成的干扰移除了竞争物种，或者将竞争和其他消极作用降低到了入侵物种能够定居的水平。对于一个既定的入侵速度，在潮湿的、富饶的地点定居比在干燥的、贫瘠的地点定居要快得多，因为在后者上存活率很低。一块富饶的、耕耘过的田地会很快地被一大批种子入侵，然而临近一个土壤被压实了或暴露在粗糙贫瘠的基质上的建筑工地，可能几个月甚至几年都寸草不生，尽管得到了和耕作田地一样的种子。

不同植物种类的入侵速度和灭绝速度都有很大不同。先锋物种——那些只出现在定居最早期阶段的物种——倾向于拥有高的入侵速度，因为它们能够产生大量的繁殖体（种子、孢子等），而且有高效的传播方式（通常是风）。

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如果定居植物产生的是寿命短的繁殖体，它们必须大量生产，除非它们有一个有效的传播方式到达新的适宜的栖息地。许多植物依靠风来传播种子；它们产生大量小的、相对短命的种子，以弥补一个事实：风不总是可靠的到达适当栖息地的方式。有些植物则进化出了另外的策略，例如有些植物产生数量较少却较大的种子，这些种子依靠鸟类或小型哺乳动物来被传播合适的地点，又如有些植物产生寿命长的种子。许多森林植物似乎都展示了后一种适应性，在森林的地面上能发现大量先锋物种有繁殖力的种子。例如，在英国哥伦比亚海岸有100年历史的道格拉斯冷杉/西部铁杉森林里，每平方米能找到1125粒有繁殖力的种子。这个种子库里的几乎所有发芽的种子都是先锋物种留下的。这些地点在扰乱后被快速定居，毫无疑问在一定程度上反映了林地里大量种子库的存在。 在定居物种中得到很好发展的一种适应机制是萌芽期（即种子生长的开始）的很大差别。某个物种的种子在萌芽时间上会表现出较大的范围，以此来增加至少有一些种子可以在最适宜的条件下萌发的可能性。这一点对于在没有现存的植被改善极端气候以及气候非常多变的环境中定居的物种尤其重要。

植物群落中的物种演替，即物种出现和消失的时间顺序，取决于在某一物种生活史不同阶段所发生的事件。入侵和生长速度的不同在决定演替模式中发挥了重要作用，特别是在次生演替中。在一个地点初次定居的物种是那些产生大量种子并成功传播的物种。这些物种一般长得快，并很快控制新的领地，阻止其他入侵和生长速度低的物种的进入。因此，第一个占领受干扰地区的群落可能包含入侵速度最快的物种，然而下一个阶段的群落可能包含具有相似存活率但较低入侵速度的物种。

## **Siam, 1851 – 1910**

In the late nineteenth century, political and social changes were occurring rapidly in Siam (now Thailand). The old ruling families were being displaced by an evolving centralized government. These families were pensioned off (given a sum of money to live on) or simply had their revenues taken away or restricted; their sons were enticed away to schools for district officers, later to be posted in some faraway province; and the old patron-client relations that had bound together local societies simply disintegrated. Local rulers could no longer protect their relatives and attendants in legal cases , and with the ending in 1905 of the practice of forcing peasant farmers to work part-time for local rulers, the rulers no longer had a regular base for relations with rural populations. The old local ruling families, then, were severed from their traditional social context.

The same situation viewed from the perspective of the rural population is even more complex. According to the government’s first census of the rural population, taken in 1905, there were about thirty thousand villages in Siam. This was probably a large increase over the figure even two or three decades earlier, during the late 1800s. It is difficult to imagine it now, but Siam’s Central Plain in the late 1800s was nowhere near as densely settled as it is today. There were still forests closely surrounding Bangkok into the last of the nineteenth century, and even at century’s end there were wild elephants and tigers roaming the countryside only twenty or thirty miles away.

Much population movement involved the opening up of new lands for rice cultivation. Two things made this possible and encouraged it to happen. First, the opening of the kingdom to the full force of international trade by the Boring Treaty (1855) rapidly encouraged economic specialization in the growing of rice, mainly to feed the rice-deficient portionsof Asia (India and china in particular).The average annual volume of rice exported from Siam grew from under 60 million kilograms per year in the late 1850s to more than 660 million kilograms per year at the turn of the century; and over the same period the average price per kilogram doubled. During the same period, the area planted in rice increased from about 230,000 acres to more than350, 000 acres. This growth was achieved as the result of the collective decisions of thousands of peasants families to expand the amount of land they cultivated, clear and plant new land, or adopt more intensive methods of agriculture.

They were able to do so because of our second consideration. They were relatively freer than they had been half a century earlier. Over the course of the Fifth Reign (1868-1910), the ties that bound rural people to the aristocracy and local ruling elites were greatly reduced. Peasants now paid a tax on individuals instead of being required to render labor service to the government. Under these conditions, it made good sense to thousands of peasant families to in effect work full-time at what they had been able to do only part-time previously because of the requirement to work for the government: grow rice for the marketplace.

Numerous changes accompanied these developments. The rural population both dispersed and grew, and was probably less homogeneous and more mobile than it had been a generation earlier. The villages became more vulnerable to arbitrary treatment by government bureaucrats as local elites now had less control over them. By the early twentieth century, as government modernization in a sense caught up with what had been happening in the countryside since the 1870s, the government bureaucracy intruded more and more into village life. Provincial police began to appear, along with district officers and cattle registration and land deeds and registration forcompulsory military service. Village handicrafts diminished or died out completely as people bought imported consumer goods, like cloth and tools, instead of making them themselves. More economic variation took shape in rural villages, as some grew prosperous from farming while others did not. As well as can be measured, rural standards of living improved in the Fifth Reign. But the statistical averages mean little when measured against the harsh realities of peasant life.

【Paragraph 1】In the late nineteenth century, political and social changes were occurring rapidly in Siam (now Thailand). The old ruling families were being displaced by an evolving centralized government. These families were pensioned off (given a sum of money to live on) or simply had their revenues taken away or restricted; their sons were enticed away to schools for district officers, later to be posted in some faraway province; and the old patron-client relations that had bound together local societies simply disintegrated. Local rulers could no longer protect their relatives and attendants in legal cases, and with the ending in 1905 of the practice of forcing peasant farmers to work part-time for local rulers, the rulers no longer had a regular base for relations with rural populations. The old local ruling families, then, were severed from their traditional social context.

1. The word “severed” in the passage is closest in meaning to

○cut off

○ viewed

○ protected

○ rescued

2. According to paragraph 1, the situation for Siam’s old ruling families changed in all of the following ways EXCEPT:

○ Their incomes were reduced.

○ Their sons were posted as district officers in distant provinces.

○ They could sell lands that had traditionally belonged to them.

○They had less control over the rural populations.

【Paragraph 2】The same situation viewed from the perspective of the rural population is even more complex. According to the government’s first census of the rural population, taken in 1905, there were about thirty thousand villages in Siam. This was probably a large increase over the figure even two or three decades earlier, during the late 1800s. It is difficult to imagine it now, but Siam’s Central Plain in the late 1800s was nowhere near as densely settled as it is today. There were still forests closely surrounding Bangkok into the last of the nineteenth century, and even at century’s end there were wild elephants and tigers roaming the countryside only twenty or thirty miles away.

3. According to paragraph 2, which of the following was true of Siam in 1905?

○Its urban population began to migrate out of the cities and into the country.

○ Its Central Plain was almost as densely populated as it is today.

○ It was so rural that wild elephants and tigers sometimes roamed Bangkok.

○ It had many more villages than it did in the late 1800s.

【Paragraph 3】Much population movement involved the opening up of new lands for rice cultivation. Two things made this possible and encouraged it to happen. First, the opening of the kingdom to the full force of international trade by the Boring Treaty (1855) rapidly encouraged economic specialization in the growing of rice, mainly to feed the rice-deficient portions of Asia (India and china in particular).The average annual volume of rice exported from Siam grew from under 60 million kilograms per year in the late 1850s to more than 660 million kilograms per year at the turn of the century; and over the same period the average price per kilogram doubled. During the same period, the area planted in rice increased from about 230,000 acres to more than350, 000 acres. This growth was achieved as the result of the collective decisions of thousands of peasants families to expand the amount of land they cultivated, clear and plant new land, or adopt more intensive methods of agriculture.

4. The phrase “rice-deficient portions” in the passage is closest in closest in meaning to

○the parts that consume rice

○ the parts that do not have enough rice

○the parts where rice is grown

○The parts that depend primarily on rice

5. Paragraph 3 mentions all of the following as signs of economic growth in Siam EXCEPT

○ an increase in the price or rice

○ an increase in the amount of rice leaving Siam

○ an increase in the nutritional quality of the rice grown

○ an increase in the amount of land used for rice production

6. According to paragraph 3, farming families increased the amount of rice they grew in part by

○growing varieties of rice that produced greater yields

○ forming collective farms by joining together with other farm families

○planting rice in areas that had previously remained unplanted

○ hiring laborers to help them tend their fields

【Paragraph 4】They were able to do so because of our second consideration. They were relatively freer than they had been half a century earlier. Over the course of the Fifth Reign (1868-1910), the ties that bound rural people to the aristocracy and local ruling elites were greatly reduced. Peasants now paid a tax on individuals instead of being required to render labor service to the government. Under these conditions, it made good sense to thousands of peasant families to in effect work full-time at what they had been able to do only part-time previously because of the requirement to work for the government: grow rice for the marketplace.

7. According to paragraph 4, what happened after the government ended the practice of requiring rural people to perform labor for it?

○Rural people became more closely connected to the aristocracy.

○ Rural people spent more time growing rice for profit.

○ The government began to pay the laborers who grew rice for it.

○ The government introduced a special tax on rice.

8. Which of the following best describes the relationship between paragraphs 3 and 4 in the passage?

○ Paragraph 4 provides further evidence of the economic growth of Siam discussed in paragraph 3.

○ Paragraph 4 continues the discussion begun in paragraph 3 of farming improvements that led to economic growth.

○ Paragraph 4 examines a particular effect of the Bowring Treaty mentioned in paragraph 3.

○Paragraph 4 discusses the second of two factors that contributed to the expansion of rice farming mentioned on paragraph 3.

【paragraph 5】Numerous changes accompanied these developments. The rural population both dispersed and grew, and was probably less homogeneous and more mobile than it had been a generation earlier. The villages became more vulnerable to arbitrary treatment by government bureaucrats as local elites now had less control over them. By the early twentieth century, as government modernization in a sense caught up with what had been happening in the countryside since the 1870s, the government bureaucracy intruded more and more into village life. Provincial police began to appear, along with district officers and cattle registration and land deeds and registration for compulsory military service. Village handicrafts diminished or died out completely as people bought imported consumer goods, like cloth and tools, instead of making them themselves. More economic variation took shape in rural villages, as some grew prosperous from farming while others did not. As well as can be measured, rural standards of living improved in the Fifth Reign. But the statistical averages mean little when measured against the harsh realities of peasant life.

9. The word “dispersed” in the passage is closest in meaning to

○ spread out

○ gained power

○ adapted

○ specialized

10. The word “compulsory” in passage is closest in meaning to

○ foreign

○formal

○required

○ preferred

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11. According to paragraph 5, which of the following was true of Siam’s rural people during the Fifth Reign?

○They were forced to spend most of the profits from rice growing on registrations required by the government.

○ Their lives remained very difficult even though statistics suggest that their quality of life improved.

○ The non-farmers among them were helped by the government more than the farmers among them were.

○ They were more prosperous when they were ruled by local elites than when they were ruled by the more modern government of the Fifth Reign.

12. According to paragraph 5, the government bureaucracy intruded in village life by

○ requiring the people to register their cattle and land

○ requiring the people to buy certain kinds of imported goods

○ discouraging the people from making handicrafts and tools

○ encouraging more people to take up farming

13. Look at the four squares〔 〕that indicate where the following sentence could be added to the passage.

And yet, how is it that the peasants were able to choose to expand their economic activity in response to the market opportunities?

Where does the sentence best fit?

14. Prose Summary

During the late nineteenth century, changes in Siam’s power structure had important economic consequences.

Answer Choices:

○ Population movement occurred and rice cultivation intensified because Siam became more actively involved in international trade.

○Changes in taxation and the ending of the requirement that people work part-time for the rulers allowed farmers to produce more rice for the marketplace.

○ Population increases occurred in part because Siam’s farmers were able to produce more rice to feed the population.

○ Land became so valuable that villagers had to pay the government for the land that they worked on.

○ Although rural living standards may have improved somewhat, prosperity varied from village to village and government bureaucracy played a greater role in village life.

○ Government modernization in the early twentieth century resulted in the loss of some freedoms that the rural population had gained from the traditional ruling classes.

参考答案：

1 ○ 1

2 ○ 3

3 ○ 4

4 ○ 2

5 ○ 3

6 ○ 3

7 ○ 2

8 ○ 4

9 ○ 1

10 ○ 3

11 ○ 2

12 ○ 1

13 ○ 1

14. Population movement…

Changes in taxation…

Although rural living…

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## **参考译文：暹罗， 1851-1910**

十九世纪晚期，暹罗（现在的泰国）发生了政治和社会剧变。旧的统治家族被逐渐演变的中央政府所取代。这些家族被发抚恤金（给一笔钱维持生活），或简单地被剥夺或限制税收；他们的儿子被怂恿去上培养地方官员的学校，后来被派遣到一些偏远的省份；将旧式的地方社会结合在一起的保护人-委托人关系分崩离析。地方统治者在法律案件中不能再保护他们的亲属和随从，并且随着强迫贫穷农民为地方统治者做兼职的行为在1905年被废除，地方统治者与农村人口不再有稳定关系基础。于是旧式地方统治家族与他们传统的社会环境切断了联系。

同样的情况从农村人口的角度看要更加复杂。根据政府1905年对农村人口的做的第一次普查，暹罗大约有30,000个村庄。这个数字比二三十年前，1800年代后期的数字有了一个大的增长。尽管现在很难想象，但暹罗中央平原在1800年代后期的定居人口远不及现在密集。直到十九世纪末期曼谷周边仍然有森林环绕，野生大象和老虎漫步在二三十公里外的乡村。

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大多数人口迁移都涉及开垦新的土地用于种植水稻，两个因素使之成为可能并促进了它的发展。首先，通过博林条约，王国的国际贸易全面开放，迅速促进了水稻种植业经济的专门化，主要供给以水稻供给不足的亚洲国家（尤其是印度和中国）。暹罗水稻平均年出口量在十九世纪50年代末不足6千万千克/年，到世纪之交已经增长到6.6多亿千克/年，与此同时每千克水稻的平均价格翻倍了。同一时期，水稻种植面积从230,000英亩增长到超过350，000英亩。这个增长是成千上万的农民家庭集体决定扩张耕种土地数量，开垦种植新的土地，或是采用更高效耕作方式的结果。

农民们能够这样做还有第二个原因。他们比半个世纪以前相对更自由了。在第五朝代（1868-1910）统治时期，贵族及地方统治势力对农民的束缚减轻了。农民现在可以以个人身份缴税，而不必为政府服劳役。在这种情况下，广大农民家庭可以全职地从事农业生产，种植水稻去卖，而不像以前那样因为要服劳役而只能兼职生产。

这些发展带来了很多改变。农村人口在增长的同时更加分散，且与上一代相比均匀性更低，而移动性更大。村庄更容易受到政府官僚的专制对待，因为地方势力现在的控制力降低了。到20世纪初，因为政府的现代化在某种意义上已经赶上了自十九世纪七十年代以来在农村所发生的一切，政府官僚主义对乡村生活的影响越来越深入。乡下警察开始出现，伴随出现的还有地方官员，牲畜登记和土地契约，注册服兵役。农村手工艺减少甚至完全消失了，因为人们购买进口的商品，像布匹和工具，而不用自己制作了。更多的经济变化在农村形成，因为有些人通过种地变得富裕而有些人没有。另一个可以测量的指标是，农村生活水平在在第五朝代期间提高了。但与艰难的农民现实生活相比，统计学平均值说明不了什么。

## **Distributions of Tropical Bee Colonies**

In 1977 ecologists Stephen Hubbell and Leslie Johnson recorded a dramatic example of how social interactions can produce and enforce regular spacing in a population. They studied competition and nest spacing in populations of stingless bees in tropical dry forests in Costa Rica. Though these bees do no sting, rivalcolonies of some species fight fiercely over potential nesting sites.

Stingless bees are abundant in tropical and subtropical environments, where they gather nectar and pollen from a wide variety of flowers. They generally nest in trees and live in colonies made up of hundreds to thousands of workers. Hubbell and Johnson observed that some species of stingless bees are highly aggressive to members of their species from other colonies, while other species are not. Aggressive species usually forage in groups and feed mainly on flowers that occur in high-density clumps. Nonaggressive species feed singly or in small groups and on more widely distributed flowers.

Hubbell and Johnson studied several species of stingless bees to determine whether there is a relationship between aggressiveness and patterns of colony distribution. They predicted that the colonies of aggressive species would show regular distributions, while those of nonaggressive species would show random or closely grouped (clumped) distribution. They concentrated their studies on a thirteen-hectare tract of tropical dry forest that contained numerous nests of nine species of stingless bees.

Though Hubbell and Johnson were interested in how bee behavior might affect colony distributions, they recognized that the availability of potential nest sites for colonies could also affect distributions. So as one of the first steps in their study, they mapped the distributions of trees suitable for nesting. They found that potential nest trees were distributed randomly through the study area. They also found that the number of potential nest sites was much greater than the number of bee colonies. What did these measurements show the researchers? The number of colonies in the study area was not limited by availability of suitable trees, and a clumped or regular distribution of colonies was not due to an underlying clumped or regular distribution of potential nest sites.

Hubbell and Johnson mapped the nests of five of the nine species of stingless bees accurately, and the nests of four of these species were distributed regularly. All four species with regular nest distributions were highly aggressive to bees from other colonies of their own species. The fifth species was not aggressive, and its nests were randomly distributed over the study area.

The researchers also studied the process by which the aggressive species establish new colonies. Their observations provideinsights into the mechanisms that establish and maintain the regular nest distribution of these species. Aggressive species apparently mark prospective nest sites with pheromones, chemical substances secreted by some animals for communication with other members of their species. The pheromone secreted by these stingless bees attracts and aggregates members of their colony to the prospective nest site; however, it also attracts workers from other nests.

If workers from two different colonies arrive at the prospective nest at the same time, they may fight for possession. Fights may byescalatedinto protracted battles. The researchers observed battles over a nest tree that lasted for two weeks. Each dawn, fifteen to thirty workers from two competing colonies arrived at the contested nest site. The workers from the two colonies faced off in two swarms and displayed and fought with each other. In the displays, pairs of bees faced each other, slowly flew vertically to a height of about three meters, and then grappled each other to the ground. When the two bees hit the ground, they separated, faced off, and performed another aerial display. Bees did not appear to be injured in these fights, which were apparently ritualized. The two swarms abandoned the battle at about 8 or 9 A.M. each morning, only to re-form and begin again the next day just after dawn, While this contest over an unoccupied nest site produced noobvious mortality, fights over occupied nests sometimes kill over 1, 000 bees in a single battle.

【Paragraph 1】In 1977 ecologists Stephen Hubbell and Leslie Johnson recorded a dramatic example of how social interactions can produce and enforce regular spacing in a population. They studied competition and nest spacing in populations of stingless bees in tropical dry forests in Costa Rica. Though these bees do no sting, rival colonies of some species fight fiercely over potential nesting sites.

1. The word “rival” in the passage is closest in leaning to

○established

○competing

○nearby

○different

【Paragraph 2】Stingless bees are abundant in tropical and subtropical environments, where they gather nectar and pollen from a wide variety of flowers. They generally nest in trees and live in colonies made up of hundreds to thousands of workers. Hubbell and Johnson observed that some species of stingless bees are highly aggressive to members of their species from other colonies, while other species are not. Aggressive species usually forage in groups and feed mainly on flowers that occur in high-density clumps. Nonaggressive species feed singly or in small groups and on more widely distributed flowers.

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2. According to paragraph 2, some species of stingless bees are aggressive mainly toward

○Nonaggressive bees that forage on the same flowers

○Aggressive bees of other species

○Bees from their own colony

○Bees of their own species from different colonies

【Paragraph 3】Hubbell and Johnson studied several species of stingless bees to determine whether there is a relationship between aggressiveness and patterns of colony distribution. They predicted that the colonies of aggressive species would show regular distributions, while those of nonaggressive species would show random or closely grouped (clumped) distribution. They concentrated their studies on a thirteen-hectare tract of tropical dry forest that contained numerous nests of nine species of stingless bees.

3. According to paragraph 3, Hubbell and Johnson hypothesized that

○The distribution pattern of bee colonies determines the degree of aggressiveness the bees display

○Nests of nonaggressive bees have either a random or a clumped distribution, while nests of aggressive bees have a regular distribution

○nests of nonaggressive bees are generally both closer together and more regularly distributed than those of aggressive bees

○nests of aggressive bees tend to be more regular in shape than those of nonaggressive bees

【Paragraph 4】Though Hubbell and Johnson were interested in how bee behavior might affect colony distributions, they recognized that the availability of potential nest sites for colonies could also affect distributions. So as one of the first steps in their study, they mapped the distributions of trees suitable for nesting. They found that potential nest trees were distributed randomly through the study area. They also found that the number of potential nest sites was much greater than the number of bee colonies. What did these measurements show the researchers? The number of colonies in the study area was not limited by availability of suitable trees, and a clumped or regular distribution of colonies was not due to an underlying clumped or regular distribution of potential nest sites.

4.According to paragraph 4, why did Hubbell and Johnson begin their study by mapping all the potential nest sites?

○To determine whether the availability of potential nest sites played a role in the distribution of bee colonies

○To know exactly where in the study area the colonies of all the different bee species were located

○To be sure that suitable nesting sites were equally available in all parts of study area

○To find out whether different species of bees preferred different types of trees as potential nest sites

5.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The limited number of colonies was not due to the distribution or availability of potential nesting sites.

○There was no lack of suitable trees or potential nesting sites in the study area.

○The number of nests was directly related to the number or the distribution of suitable trees.

○Neither the number nor the distribution of colonies could be explained by the availability of suitable nest sites.

【Paragraph 5】Hubbell and Johnson mapped the nests of five of the nine species of stingless bees accurately, and the nests of four of these species were distributed regularly. All four species with regular nest distributions were highly aggressive to bees from other colonies of their own species. The fifth species was not aggressive, and its nests were randomly distributed over the study area.

6.According to paragraph 5, Hubbell and Johnson determined

○ the order in which the colonies in the study area had been established

○ the level of aggressiveness of each of the nine species

○ the distribution pattern of the nests of five of the nine species

○ the number of colonies of each of the nine species

7.Why does the author indicate that “The fifth species was not aggressive, and its nests were randomly distributed over the study area”?

○To identify research results that contradicted Hubbell and Johnson’s original hypothesis

○To indicate that research results confirmed that nest distribution was related to aggressiveness

○To introduce the hypothesis that, within the same species, not all colonies are aggressive

○To point out that both aggressive and nonaggressive species are equally successful at finding nest sites

【Paragraph 6】The researchers also studied the process by which the aggressive species establish new colonies. Their observations provide insights into the mechanisms that establish and maintain the regular nest distribution of these species. Aggressive species apparently mark prospective nest sites with pheromones, chemical substances secreted by some animals for communication with other members of their species. The pheromone secreted by these stingless bees attracts and aggregates members of their colony to the prospective nest site; however, it also attracts workers from other nests.

8.The phrase “insights into” in the passage is closest in meaning to

○tools to study

○opportunities for

○evidence of

○an understanding of

9.According to paragraph 6, what is one result of using pheromones to mark nest sites?

○The use of pheromones tends to result in nest clumping.

○ Pheromones attract animals other than bees to prospective nest sites.

○Pheromones tend to make bees aggressive.

○Pheromones secreted by bees of one colony also attract bees of other colonies.

【Paragraph 7】If workers from two different colonies arrive at the prospective nest at the same time, they may fight for possession. Fights may by escalated into protracted battles. The researchers observed battles over a nest tree that lasted for two weeks. Each dawn, fifteen to thirty workers from two competing colonies arrived at the contested nest site. The workers from the two colonies faced off in two swarms and displayed and fought with each other. In the displays, pairs of bees faced each other, slowly flew vertically to a height of about three meters, and then grappled each other to the ground. When the two bees hit the ground, they separated, faced off, and performed another aerial display. Bees did not appear to be injured in these fights, which were apparently ritualized. The two swarms abandoned the battle at about 8 or 9 A.M. each morning, only to re-form and begin again the next day just after dawn, While this contest over an unoccupied nest site produced noobvious mortality, fights over occupied nests sometimes kill over 1, 000 bees in a single battle.

10.The word “escalated” I the passage is closest in meaning to

○Intensified

○transformed

○combined

○lengthened

11.Paragraph 7 supports which of the following ideas about fights over occupied nests?

○They are more violent than battles over unoccupied nest sites.

○They mostly occur between colonies over unoccupied sites.

○They are more frequent than battles over unoccupied sites.

○They last longer than battles over unoccupied sites do.

12. Though Hubbell and Johnson were interested in how bee behavior might affect colony distributions, they recognized that the availability of potential nest sites for colonies could also affect distributions. ■So as one of the first steps in their study, they mapped the distributions of trees suitable for nesting. ■They found that potential nest trees were distributed randomly through the study area. ■They also found that the number of potential nest sites was much greater than the number of bee colonies. ■What did these measurements show the researchers? The number of colonies in the study area was not limited by availability of suitable trees, and a clumped or regular distribution of colonies was not due to an underlying clumped or regular distribution of potential nest sites.

Look at the four squares〔■〕that indicate where the following sentence be added to the passage.

For example, a clumped distribution of nests might simply reflect a clumped distribution of suitable nesting sites.

Where does the sentence best fit?

13.Select from the seven sentences below the three sentences that correctly characterize aggressive species of stingless bees and the two sentences that correctly characterize nonaggressive species.

|  |  |
| --- | --- |
| Aggressive Stingless Bees | Nonaggressive Stingless Bees |
| ● ● ● | ● ● |

Answer Choices

○ Nests are regularly distributed

○ Nests are sometimes located together

○ Nests always occur in large clumps

○ Colonies are generally made up of fewer than 100 workers

○ Members of a colony feed alone or in small groups

○ Bees feed mainly on flowers that grow in high-density clumps

○ Nest spacing is maintained by fighting

参考答案：

1. ○ 2
2. ○ 4
3. ○ 2
4. ○ 1
5. ○ 4
6. ○ 3
7. ○ 2
8. ○ 4
9. ○ 4
10. ○ 1
11. ○ 1
12. ○ 1

Nests are regularly…

Bees feed mainly…

Nest spacing is…

Nests are sometimes…

Members of a…

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## **参考译文：热带蜂群的分布**

1977年，生态学家Stephen Hubbell和Leslie Johnson记录了一个有关社会交互作用如何能在种群中产生并维持一个规则的空间分布。他们在Costa Rica的热带旱地森林中研究了无刺蜜蜂种群中的竞争关系和巢穴间距。尽管这些蜜蜂不叮人，一些种类的敌对群体间会为了潜在筑巢位置激烈斗争。

无刺蜜蜂在热带和亚热带环境中广泛存在。它们从各种各样的花上收集花蜜和花粉。它们一般栖居在树上，群居生活，群体由几百到几千工蜂组成。Hubbell和Johnson观察到，一些种类的无刺蜜蜂对于来自其他群体的本物种蜜蜂具体很强的攻击性，但其他种类的蜜蜂则不然。攻击性物种通常集体出动觅食，主要以密集的花丛为食。无攻击性的物种通常单独觅食，或以小团体形式觅食，它们主要以分散的花为食。

Hubbell和Johnson研究了几种无刺蜜蜂来确定攻击性和群体分布之间是否存在联系。他们预测攻击性物种的群体将呈现规则分布，而无攻击性物种的群体将呈现随机分布或集群分布。他们把研究集中于热带旱地森林中一个13公顷的地带，这个地带中包含了9种无刺蜜蜂众多的巢穴。

尽管Hubbell和Johnson对蜜蜂的行为怎样影响群体分布很感兴趣，他们意识到潜在筑巢位置的可获得性也会影响群体的分布。因此在他们研究的第一步，他们绘制了适合筑巢的树的分布图。他们发现潜在筑巢的树在研究区域内是随机分布的。他们还发现潜在筑巢位置的数量比蜜蜂群体的数量要多得多。这些测量结果说明什么呢？研究区域的蜜蜂群体数量并不受可获得的适宜的树的限制，蜂群集群分布或规则分布不是由于潜在筑巢位置的集群分布或规则分布。

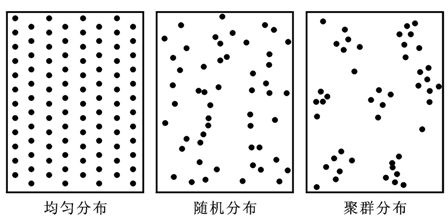
Hubbell和Johnson精确绘制了9种无刺蜜蜂中5种蜜蜂的巢穴，其中4种蜜蜂的巢穴是规则分布的。这4种巢穴规则分布的物种都对来自其他群体的本物种蜜蜂具有高度攻击性。第五个物种不具有攻击性，它们的巢穴在研究区域是随机分布的。

研究者们也研究了攻击性物种建立新群体的过程。他们的观察洞悉了这些物种建立和维持巢穴规则分布的机制。攻击性物种显然是利用信息素来标记可能的巢穴地点，信息素是一些动物分泌出来用于和同种类其他成员交换信息的化学物质。这些无刺蜜蜂分泌的信息素吸引并召集同群的成员前往可能的筑巢地点，然而，信息素也会吸引其他群体的工蜂。

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如果两个来自不同群体的工蜂在同一时刻到达可能筑巢地点，它们会为争夺占有权而开战。战斗可能会升级为持久战。研究者曾观察到围绕一棵筑巢树的战争持续了两周。每天黎明时分，来自竞争双方的15-30只工蜂到达争夺巢穴的地点，分成两拨，互相斗殴。在对阵过程中，成对的蜜蜂面对面，慢慢垂直飞到3米左右的高度，然后互相扭打落到地上。当两只蜜蜂掉到地上后，它们会分开，重新对峙，再次表演一遍空中炫耀行为。蜜蜂们在这样的争斗中并没有受伤，这些争斗显然只是形式化的。对阵双方在每天上午8点或9点偃旗息鼓 ，第二天破晓时卷土重来。尽管这种对未被占领的巢穴的争夺不会造成明显的伤亡，但对已占领巢穴的争夺有时在单场战争中就死掉1000多只蜜蜂。

注-背景知识：生态学中种群的分布有三种基本形式，及文中提到的：规则分布（regular），随机分布(random)，集群分布(clumped)），规则分布又叫均匀分布。见如下示意图。



TPO-33

## **The First Civilizations**

Evidence suggests that an important stimulus behind the rise of early civilizations was the development of settled agriculture, which unleashed a series of changes in the organization of human communities that culminated in the rise of large ancient empires.

The exact time and place that crops were first cultivated successfully is uncertain. Many prehistorians believe that farming may have emerged in dependently in several different areas of the world when small communities, driven by increasing population and a decline in available food resources, began to plant seeds in the ground in an effort to guarantee their survival. The first farmers, who may have lived as long as 10,000 years ago, undoubtedly used simple techniques and still relied primarily on other forms of food production, such as hunting, foraging, or pastoralism. The real breakthrough took place when farmers began to cultivate crops along the floodplains of river systems. The advantage was that crops grown in such areas were not as dependent on rainfall and therefore produced a more reliable harvest. An additional benefit was that the sediment carried by the river waters deposited nutrients in the soil, thus enabling the farmer to cultivate a single plot of ground for many years without moving to a new location. Thus, the first truly sedentary (that is, nonmigratory) societies were born. As time went on, such communities gradually learned how to direct the flow of water to enhance the productive capacity of the land, while the introduction of the iron plow eventually led to the cultivation of heavy soils not previously susceptible to agriculture.

The spread of this river valley agriculture in various parts of Asia and Africa was the decisive factor in the rise of the first civilizations. The increase in food production in these regions led to a significant growth in population, while efforts to control the flow of water to maximize the irrigation of cultivated areas and to protect the local inhabitants from hostile forces outside the community provoked the first steps toward cooperative activities on a large scale. The need to oversee the entire process brought about the emergence of an elite that was eventually transformed into a government.

The first clear steps in the rise of the first civilizations took place in the fourth and third millennia B.C. in Mesopotamia, northern Africa, India, and China. How the first governments took shape in these areas is not certain, but anthropologists studying the evolution of human communities in various parts of the world have discovered that one common stage in the process is the emergence of what are called “big men” within a single village or a collection of villages. By means of their military prowess, dominant personalities, or political talents, these people gradually emerge as the leaders of that community. In time, the “big men” become formal symbols of authority and pass on that authority to others within their own family. As the communities continue to grow in size and material wealth, the “big men” assume hereditary status, and their allies and family members are transformed into a hereditary monarchy.

The appearance of these sedentary societies had a major impact on the social organizations, religious beliefs, and way of life of the peoples living within their boundaries.With the increase in population and the development of centralized authority came the emergence of the cities.While some of these urban centers were identified with a particular economic function, such as proximity to gold or iron deposits or a strategic location on a major trade route, others served primarily as administrative centers or the site of temples for the official cult or other ritual observances.Within these cities, new forms of livelihood appeared to satisfy the growing need for social services and consumer goods.Some people became artisans or merchants, while others became warriors, scholars, or priests. In some cases, the physical division within the first cities reflected the strict hierarchical character of the society as a whole, with a royal palace surrounded by an imposing wall and separate from the remainder of the urban population. In other instances, such as the Indus River Valley, the cities lacked a royal precinct and the ostentatious palaces that marked their contemporaries elsewhere.

【Paragraph 1】 Evidence suggests that an important stimulus behind the rise of early civilizations was the development of settled agriculture, which unleashed a series of changes in the organization of human communities that culminated in the rise of large ancient empires.

1. The phrase “culminated in” in the passage is closest in meaning to

○reached a high point with

○logically followed from

○partly contributed to

○marked

【Paragraph 2】 The exact time and place that crops were first cultivated successfully is uncertain. Many prehistorians believe that farming may have emerged in dependently in several different areas of the world when small communities, driven by increasing population and a decline in available food resources, began to plant seeds in the ground in an effort to guarantee their survival. The first farmers, who may have lived as long as 10,000 years ago, undoubtedly used simple techniques and still relied primarily on other forms of food production, such as hunting, foraging, or pastoralism. The real breakthrough took place when farmers began to cultivate crops along the floodplains of river systems. The advantage was that crops grown in such areas were not as dependent on rainfall and therefore produced a more reliable harvest. An additional benefit was that the sediment carried by the river waters deposited nutrients in the soil, thus enabling the farmer to cultivate a single plot of ground for many years without moving to a new location. Thus, the first truly sedentary (that is, nonmigratory) societies were born. As time went on, such communities gradually learned how to direct the flow of water to enhance the productive capacity of the land, while the introduction of the iron plow eventually led to the cultivation of heavy soils not previously susceptible to agriculture.

2. According to paragraph 2, which of the following statements is true of early farmers?

○They used farming to supplement other food sources.

○They were driven out of small communities.

○They were victims of flooding.

○They farmed several plots of land at once.

3. The word “undoubtedly” in the passage is closest in meaning to

○increasingly

○certainly

○in general

○apparently

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4. According to paragraph 2, what are TWO reasons why farmers chose river valleys for cultivation? To receive credit you must select TWO answer choices.

○The soils in river valleys were rich in nutrients.

○The crops grown in river valleys were not completely dependent on rainwater.

○Farming techniques could not be easily applied to soils far from rivers.

○The heavier weight of river soil resulted in more reliable harvests.

5. The word “enhance” in the passage is closest in meaning to

○serve

○improve

○control

○protect

【Paragraph 3】 The spread of this river valley agriculture in various parts of Asia and Africa was the decisive factor in the rise of the first civilizations. The increase in food production in these regions led to a significant growth in population, while efforts to control the flow of water to maximize the irrigation of cultivated areas and to protect the local inhabitants from hostile forces outside the community provoked the first steps toward cooperative activities on a large scale. The need to oversee the entire process brought about the emergence of an elite that was eventually transformed into a government.

6. The word “provoked” in the passage is closest in meaning to

○secured

○coordinated

○modeled

○brought about

7. According to paragraph 3, which of the following is NOT a reason why governments first arose among agricultural communities?

○A significant increase in population

○The desire to control water resources for irrigation

○The need for protection from outside forces

○The demand for organized communication with other communities

【Paragraph 3】 The spread of this river valley agriculture in various parts of Asia and Africa was the decisive factor in the rise of the first civilizations. The increase in food production in these regions led to a significant growth in population, while efforts to control the flow of water to maximize the irrigation of cultivated areas and to protect the local inhabitants from hostile forces outside the community provoked the first steps toward cooperative activities on a large scale. The need to oversee the entire process brought about the emergence of an elite that was eventually transformed into a government.

【Paragraph 4】 The first clear steps in the rise of the first civilizations took place in the fourth and third millennia B.C. in Mesopotamia, northern Africa, India, and China. How the first governments took shape in these areas is not certain, but anthropologists studying the evolution of human communities in various parts of the world have discovered that one common stage in the process is the emergence of what are called “big men” within a single village or a collection of villages. By means of their military prowess, dominant personalities, or political talents, these people gradually emerge as the leaders of that community. In time, the “big men” become formal symbols of authority and pass on that authority to others within their own family. As the communities continue to grow in size and material wealth, the “big men” assume hereditary status, and their allies and family members are transformed into a hereditary monarchy.

8. According to paragraph 4, what is not known about the rise of the first civilizations?

○Where the first steps toward civilization took place

○Who was allowed to replace “big men” after the “big men” died

○Why some individuals became recognized as leaders

○How governments emerged

9. What is the relationship between paragraphs 3 and 4 in the passage?

○Paragraph 3 explains why a need for leadership arose in early civilizations, and paragraph 4 describes how thatleadership developed.

○Paragraph 3 suggests that agriculture was first practiced in Asia and Africa, and paragraph 4 discusses how it might have later spread to the rest of the world.

○Paragraph 3 describes several methods of early government, and paragraph 4 gives an extended example of one of them.

○Paragraph 3 discusses a cause of the spread of river valley agriculture in early civilizations, and paragraph 4 discusses an effect.

【Paragraph 5】 The appearance of these sedentary societies had a major impact on the social organizations, religious beliefs, and way of life of the peoples living within their boundaries.With the increase in population and the development of centralized authority came the emergence of the cities.While some of these urban centers were identified with a particular economic function, such as proximity to gold or iron deposits or a strategic location on a major trade route, others served primarily as administrative centers or the site of temples for the official cult or other ritual observances.Within these cities, new forms of livelihood appeared to satisfy the growing need for social services and consumer goods.Some people became artisans or merchants, while others became warriors, scholars, or priests. In some cases, the physical division within the first cities reflected the strict hierarchical character of the society as a whole, with a royal palace surrounded by an imposing wall and separate from the remainder of the urban population. In other instances, such as the Indus River Valley, the cities lacked a royal precinct and the ostentatious palaces that marked their contemporaries elsewhere.

10. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○Some cities were associated with economic activities, while others were government or religious centers.

○Emerging cities generally served strategic administrative, economic, and religious purposes.

○The creation of an economic or administrative activity led to the emergence of a city for its proper supervision.

○Some cities emerged as economic centers and later became the sites of administrative or religious activities.

11. Paragraph 5 suggests that which of the following was a consequence of the emergence of cities?

○The decentralization of authority

○An increase in religious activity

○The emergence of service- and production-related jobs

○A decreased reliance on mineral resources

12. According to paragraph 5, why were huge walls built around early royal palaces?

○To protect the inhabitants from invaders

○To mark the urban areas

○To separate the ruling class from the rest of the population

○To represent the prosperity of a city

The appearance of these sedentary societies had a major impact on the social organizations, religious beliefs, and way of life of the peoples living within their boundaries. ■ With the increase in population and the development of centralized authority came the emergence of the cities. ■ While some of these urban centers were identified with a particular economic function, such as proximity to gold or iron deposits or a strategic location on a major trade route, others served primarily as administrative centers or the site of temples for the official cult or other ritual observances. ■ Within these cities, new forms of livelihood appeared to satisfy the growing need for social services and consumer goods. ■ Some people became artisans or merchants, while others became warriors, scholars, or priests. In some cases, the physical division within the first cities reflected the strict hierarchical character of the society as a whole, with a royal palace surrounded by an imposing wall and separate from the remainder of the urban population. In other instances, such as the Indus River Valley, the cities lacked a royal precinct and the ostentatious palaces that marked their contemporaries elsewhere.

13. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

This was accompanied by increased professional specialization.

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage

14. 【Directions】An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

The practice of settled agriculture in some areas of Asia and Africa was crucial to the development of early civilizations.

●

●

●

Answer Choices

○Prehistorians disagree as to whether early farmers first cultivated crops along floodplains or first tried cultivating crops in less successful environments.

○Cultivation in fertile river valleys resulted in predictable harvests, which meant that farmers no longer needed to migrate constantly in search of food.

○Because crops could be cultivated more successfully where farmers were not completely dependent on rainfall, hostilities between groups arose over control of the river systems.

○The need to organize the effort to ensure the food supply and defend the land led to the formation of elite supervising groups that eventually became the first governments.

○Increasingly centralized forms of administration resulted in the emergence of social classes and in the development of cities as trade, administration, or religious centers.

○ Unlike other early civilizations, those that developed in the Indus River Valley did not have any spectacular palaces or areas for exclusive use by the authorities.

参考答案：

1. ○1

2. ○1

3. ○2

4. ○12

5. ○2

6. ○4

7. ○4

8. ○4

9. ○1

10. ○1

11. ○3

12. ○3

13. ○4

14. Cultivation in fertile river valleys…

The need to organize…

Increasingly centralized…

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## **参考译文：最早的文明**

证据指出早期文明崛起的重要原因是定居农业的发展。农业的发展引发了人类社群组织结构的一系列变化并在古代帝国的崛起中发展到顶点。

虽然农作物首次成功培植的准确时间和地点还未确定，但是很多史前学家相信农业有可能是在世界不同地方独立发展起来的。因为人口增加，食物资源匮乏，一些小社群开始在土地上播下种子以确保它们的存活。最早的农民有可能生活在一万年前。可以确定的是他们使用简单的耕作技术，并且仍然主要依赖其他形式获得食物，比如说打猎、采集或放牧。当农民开始沿着河流的泛滥平原耕作的时候，农业史上才取得了真正的突破性进展。其优势在于，在这些地方种植的农作物不会那么依赖降水，因此收成更加有保障。另外一个优势在于，河水带来的沉积物给土壤增加了养料，因此农民可以很多年在同一块土地上耕作，从而不需要转移到新地方。这样一来，第一批真正意义上的农耕社会诞生了。再接下来，这些社群逐渐学会如何改变水的流向以提高土地的生产力，而铁犁的使用最终使农作物得以在原来不适宜耕种的粘重土壤上耕作。

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这种河谷农业在亚洲和非洲各个地方的传播是最早文明崛起的关键因素。在这些地方食物产量增加导致人口显著增长。与此同时，社群努力控制水流，以便最大程度上确保耕作区的灌溉；社群还努力保护当地居民不受到社群外敌对力量的伤害。这些努力引发了社群内部更大规模的合作活动。对合作活动的监管产生了精英阶层，这些精英们最终转变成政府组织。

最早文明崛起中的第一步明显的发生在公元前4世纪和3世纪的美索不达米亚，北非，印度和中国。最早的政府在这些地方是如何形成的不得而知，但是研究世界各地人类社群发展演变的人类学家已经发现在政府形成过程中都存在一个共同的阶段，那就是在一个或几个村落中都出现了 “大个子”。“大个子”通过他们的军事力量，霸道的性格，或政治天赋，逐渐成为了那个群体的领导者。最终，“大个子”正式成为权威的象征并且能把权威传给他们家族的其他人。随着社群进一步发展繁荣，“大个子”就具有了世袭地位，他们的支持者和家庭成员也具有了世袭权利。

这些农耕社会的出现对社会组织、宗教信仰和社群内部的人们生活方式有重大的影响。因为人口增长和中央集权的发展，伴随而来的是城市的出现。某些城市中心具有特定的经济功能，比如说接近金矿或铁矿或处于主要贸易路线的战略地位。还有一些城市是主要是行政中心或是用来官方敬拜的寺庙或举行庆祝仪式的地方。在这些城市，新的谋生手段开始出现，以满足日益增长的对社会服务和消费品的需求：有些人成了工匠和商人，有些人成了战士，学者或牧师。在一些情况下，早期城市的地理区域划分反映了社会整体的严格等级制度，一堵威风凛凛的墙把皇宫和其余的城市居民隔开。然而，在另外一些地方，比如说印度河流域，城市则缺乏专门的皇家区和豪华的宫殿。

## **Railroads and Commercial Agriculture in Nineteenth-Century United States**

By 1850 the United States possessed roughly 9,000 miles of railroad track; then years later it had over 30,000 miles, more than the rest of the world combined. Much of the new construction during the 1850s occurred west of the Appalachian Mountains – over 2,000 miles in the states of Ohio and Illinois alone.

The effect of the new railroad lines rippled outward through the economy. Farmers along the tracks began to specialize in crops that they could market in distant locations. With their profits they purchased manufactured goods that earlier they might have made at home. Before the railroad reached Tennessee, the state produced about 25,000 bushels (or 640 tons) of wheat, which sold for less than 50 cents a bushel. Once the railroad came, farmers in the same counties grew 400,000 bushels (over 10,000 tons) and sold their crop at a dollar a bushel.

The new railroad networks shifted the direction of western trade.In 1840 most northwestern grain was shipped south down the Mississippi River to the bustling port of New Orleans.But low water made steamboat travel hazardous in summer, and ice shut down traffic in winter.Products such as lard, tallow, and cheese quickly spoiled if stored in New Orleans’ hot and humid warehouses. Increasingly, traffic from the Midwest flowed west to east, over the new rail lines. Chicago became the region’s hub, linking the farms of the upper Midwest to New York and other eastern cities by more than 2,000 miles of track in 1855. Thus while the value of goods shipped by river to New Orleans continued to increase, the South’s overall share of western trade dropped dramatically.

A sharp rise in demand for grain abroad also encouraged farmers in the Northeast and Midwest to become more commercially oriented. Wheat, which in 1845 commanded $1.08 a bushel in New York City, fetched $2.46 in 1855; in similar fashion the price of corn nearly doubled. Farmers responded by specializing in cash crops, borrowing to purchase more land, and investing in equipment to increase productivity.

As railroad lines fanned out from Chicago, farmers began to acquire open prairie land in Illinois and then Iowa, putting the fertile, deep black soil into production. Commercial agriculture transformed this remarkable treeless environment. To settlers accustomed to eastern woodlands, the thousands of square miles of tall grass were an awesome sight. Indian grass, Canada wild rye, and native big bluestem all grew higher than a person. Because eastern plows could not penetrate the densely tangled roots of prairie grass, the earliest settlers erected farms along the boundary separating the forest from the prairie. In 1837, however, John Deere patented a sharp-cutting steel plow that sliced through the sod without soil sticking to the blade. Cyrus McCormick refined a mechanical reaper that harvested fourteen times more wheat with the same amount of labor. By the 1850s McCormick was selling 1,000 reapers a year and could not keep up with demand, while Deere turned out 10,000 plows annually.

The new commercial farming fundamentally altered the Midwestern landscape and the environment. Native Americans had grown corn in the region for years, but never in such large fields as did later settlers who became farmers, whose surpluses were shipped east. Prairie farmers also introduced new crops that were not part of the earlier ecological system, notably wheat, along with fruits and vegetables.

Native grasses were replaced by a small number of plants cultivated as commodities. Corn had the best yields, but it was primarily used to feed livestock. Because bread played a key role in the American and European diet, wheat became the major cash crop. Tame grasses replaced native grasses in pastures for making hay.

Western farmers altered the landscape by reducing the annual fires that had kept the prairie free from trees. In the absence of these fires, trees reappeared on land not in cultivation and, if undisturbed, eventually formed woodlots. The earlier unbroken landscape gave way to independent farms, each fenced off in a precise checkerboard pattern. It was an artificial ecosystem of animals, woodlots, and crops, whose large, uniform layout made western farms more efficient than the more-irregular farms in the East.

【Paragraph 1】 By 1850 the United States possessed roughly 9,000 miles of railroad track; then years later it had over 30,000 miles, more than the rest of the world combined. Much of the new construction during the 1850s occurred west of the Appalachian Mountains – over 2,000 miles in the states of Ohio and Illinois alone.

1. According to paragraph 1, each of the following is true about railroad track in the United States EXCEPT:

○In 1850 the United State had less than 10,000 miles of railroad track.

○By the end of the 1850s, Ohio and lllinois contained more railroad track than any other state in the country.

○Much of the railroad track built in the United States during the 1850s was located west of the Appalachian Mountain.

○By 1860 there were more miles of railroad track in the United States than in any other country.

【Paragraph 2】 The effect of the new railroad lines rippled outward through the economy. Farmers along the tracks began to specialize in corps that they could market in distant locations. With their profits they purchased manufactured goods that earlier they might have made at home. Before the railroad reached Tennessee, the state produced about 25,000 bushels (or 640 tons) of wheat, which sold for less than 50 cents a bushel. Once the railroad came, farmers in the same counties grew 400,000 bushels (over 10,000 tons) and sold their crop at a dollar a bushel.

2. It can be inferred from paragraph 2 that the new railroads had which of the following effects on farm communities?

○Most new farms were located along the tracks.

○Farmers began to grow wheat as a commercial corp.

○Many farmer decided to grow a wider variety of crops.

○Demand for manufactured goods increased among famers.

【Paragraph 3】 The new railroad networks shifted the direction of western trade.In 1840 most northwestern grain was shipped south down the Mississippi River to the bustling port of New Orleans.But low water made steamboat travel hazardous in summer, and ice shut down traffic in winter.Products such as lard, tallow, and cheese quickly spoiled if stored in New Orleans’ hot and humid warehouses. Increasingly, traffic from the Midwest flowed west to east, over the new rail lines. Chicago became the region’s hub, linking the farms of the upper Midwest to New York and other eastern cities by more than 2,000 miles of track in 1855. Thus while the value of goods shipped by river to New Orleans continued to increase, the South’s overall share of western trade dropped dramatically.

3. The word “bustling” in the passage is closest in meaning to

○ famous

○ important

○ growing

○ busy

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4. According to paragraph 3, in what way did the new rail networks change western trade?

○Northwestern farmers almost completely stopped shipping goods by steamboat.

○Many western goods began to be shipped east by way of Chicago rather than south to New Orleans.

○Chicago largely replaced New York and other eastern cities as the final market for goods for the West.

○The value of goods shipped west soon became greater than the value of goods shipped east.

5. According to paragraph 3, what was a disadvantage of shipping goods from northwestern areas to New Orleans?

○There was no reliable way to get goods from New Orleans to eastern cities.

○The cost of shipping goods by river to New Orleans continued to increase.

○Goods sipped from New Orleans’ neighboring areas had a significant competitive advantage because of their lower transportation costs.

○the temperatures and humidity.

【Paragraph 4】 A sharp rise in demand for grain abroad also encouraged farmers in the Northeast and Midwest to become more commercially oriented. Wheat, which in 1845 commanded $1.08 a bushel in New York City, fetched $2.46 in 1855; in similar fashion the price of corn nearly doubled. Farmers responded by specializing in cash crops, borrowing to purchase more land, and investing in equipment to increase productivity.

6. Paragraph 4 supports the idea that the price of wheat more than doubled between 1845 and 1855 because

○the price of corn nearly doubled during that same period

○demand for grain increased sharply outside the United States

○farmers in the Northeast and Midwest began to specialize in cash crops

○many farmers had borrowed heavily to purchase land and equipment for raising wheat

【Paragraph 5】 As railroad lines fanned out from Chicago, farmers began to acquire open prairie land in Illinois and then Iowa, putting the fertile, deep black soil into production. Commercial agriculture transformed this remarkable treeless environment. To settlers accustomed to eastern woodlands, the thousands of square miles of tall grass were an awesome sight. Indian grass, Canada wild rye, and native big bluestem all grew higher than a person. Because eastern plows could not penetrate the densely tangled roots of prairie grass, the earliest settlers erected farms along the boundary separating the forest from the prairie. In 1837, however, John Deere patented a sharp-cutting steel plow that sliced through the sod without soil sticking to the blade. Cyrus McCormick refined a mechanical reaper that harvested fourteen times more wheat with the same amount of labor. By the 1850s McCormick was selling 1,000 reapers a year and could not keep up with demand, while Deere turned out 10,000 plows annually.

7. The word “transformed” in the passage is closest in meaning to

○dominated

○changed

○improved

○created

8. The word “erected” in the passage is closest in meaning to

○ looked for

○ lived on

○ preferred

○ built

9. Why does author point out that “Indian grass, Canada wild rye, and native big bluestem all grew higher than a person”?

○To provide a reason why people from the eastern woodlands of the United States were impressed when they saw the prairie

○To identify an obstacles to the development of the railroad lines fanning out from Chicago

○To explain why the transformation of the prairies by commercial agriculture was so remarkable

○To provide evidence supporting the claim that the prairies had fertile, deep black soil

10. According to paragraph 5, the first settlers generally did not farm open prairie land because

○ they could not plow it effectively with the tools that were available

○ prairie land was usually very expensive to buy

○ the soil along boundaries between the forest and the prairie was more fertile than the soil of the open prairie

○ the railroad lines had not yet reached the open prairie when the first settlers arrived

【Paragraph 6】The new commercial farming fundamentally altered the Midwestern landscape and the environment. Native Americans had grown corn in the region for years, but never in such large fields as did later settlers who became farmers, whose surpluses were shipped east. Prairie farmers also introduced new crops that were not part of the earlier ecological system, notably wheat, along with fruits and vegetables.

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11. The word “surpluses” in the passage is closest in meaning to

○extra goods

○commercial goods

○unprocessed goods

○transportable goods

【Paragraph 8】Western farmers altered the landscape by reducing the annual fires that had kept the prairie free from trees. In the absence of these fires, trees reappeared on land not in cultivation and, if undisturbed, eventually formed woodlots. The earlier unbroken landscape gave way to independent farms, each fenced off in a precise checkerboard pattern. It was an artificial ecosystem of animals, woodlots, and crops, whose large, uniform layout made western farms more efficient than the more-irregular farms in the East.

12. According to paragraph 8, prairie farmers changed the landscape by doing all of the following EXCEPT:

○Reducing annual fires

○Dividing the land into large, regularly-shaped lots

○Planting trees that eventually formed woodlots

○Fencing off their farms

The new railroad networks shifted the direction of western trade.■ In 1840 most northwestern grain was shipped south down the Mississippi River to the bustling port of New Orleans.■ But low water made steamboat travel hazardous in summer, and ice shut down traffic in winter.■ Products such as lard, tallow, and cheese quickly spoiled if stored in New Orleans’ hot and humid warehouses.■ Increasingly, traffic from the Midwest flowed west to east, over the new rail lines. Chicago became the region’s hub, linking the farms of the upper Midwest to New York and other eastern cities by more than 2,000 miles of track in 1855. Thus while the value of goods shipped by river to New Orleans continued to increase, the South’s overall share of western trade dropped dramatically.

13. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

The problems were not limited to routes of transport.

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage

14.【Directions】 An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summery because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

The huge expansion of rail lines in Midwestern United States during the 1850s had major economic and environmental effects.

●

●

●

Answer Choices

○ Construction of new rail lines into the Midwest had been effectively stopped by the Appalachian Mountains, but by 1850 improved construction technology had made further advances possible.

○ Rail lines to Chicago and on to the East made it easier to get Midwestern goods to distant markets, while growing demand encouraged crop specialization and led to higher crop prices.

○ Because of the growing volume of traffic coming by rail from the Northeast and Midwest, the value of goods arriving in New Orleans for shipment to markets abroad increased dramatically.

○Access to rail lines combined with the development of more-efficient farming equipment allowed a fertile land of the open prairies to be used for large-scale commercial agriculture.

○Reduction of annual prairie fires allowed trees to reappear, and native grasses were replaced by a few commercially grown plants as previously unbroken grasslands were divided into large fenced fields.

○Native Americans had grown corn on the prairies for years but had not produced large surpluses because the varieties they planted had far poorer yields than those introduced by commercial farmers.

参考答案:

1. ○ 2

2. ○ 4

3. ○ 4

4. ○ 2

5. ○ 4

6. ○ 2

7. ○ 2

8. ○ 4

9. ○1

10. ○ 1

11. ○ 1

12. ○ 3

13. ○ 3

14. Rail lines to Chicago…

Access to rail lines combined…

Reduction of annual prairie…

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## **参考译文：十九世纪美国的铁路和商品农业**

在1850年之前美国有约9，000英里铁轨，几年之后铁轨的长度增加到30,000多英里，比世界上其他地方的总和还要多。在19世纪50年代大部分新建的铁轨在阿巴拉契亚以西，有2，000多英里在俄亥俄州和伊利诺斯州。

新的铁路线带动了经济发展向外辐射。铁路沿线的农民开始从事农作物专业化生产，并在遥远的市场上出售。他们用取得的利润购买制成品。而在这之前，他们都是在家里制作自己所需物品。在田纳西州开通铁路之前，它能出产25,000蒲式耳（或640吨）的小麦，每蒲式耳只出售不到50美分。开通铁路之后，该州农民可出产400,000蒲式耳（超过10，000吨），并且每蒲式耳可出售一美元。

新的铁路网改变了西部贸易的方向。在1840年大部分西北部的粮食沿着密西西比河向南运输到新奥尔良繁忙的港口。但是密西西比河夏天水位低，蒸汽船运行有危险，而到了冬天，河上结冰又封锁了交通。像猪油、牛油和奶酪一类的货物如果储存在新奥尔良湿热的仓库里就会很快变质。然而，从中西部到达东部的铁路逐渐打通。在1885年，通过2，000多英里的铁路线，芝加哥成为了连通上中西部地区和纽约及其他东部城市的中心。因此，当经由水路运输到新奥尔良的货物价值继续增加的时候，南部地区所占的西部贸易份额就大大下降了。

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国外对粮食需求的急剧增加同时也鼓励东北部和中西部的农民变得越来越商业化。小麦在1845年纽约城里只能卖到1.08美元每蒲式耳，在1855年就卖到了2.46美元每蒲式耳。玉米的价格同样的也将近增加了一倍。农民因此专们种植经济作物，借款购买更多的土地，并且投入设备增加生产率。

随着铁路线从芝加哥呈扇形向外扩展，农民开始在伊利诺斯州和爱荷华州购买开阔的草原土地，利用肥沃的土壤进行种植。商品农业改变了这种不长树的荒芜环境。对于适应了东部林地的定居者来说，成千上万平方英里的茂盛草丛令人惊叹。印度草，加拿大野麦和当地的大须芒草长得比人还要高。因为东部的耕犁不能穿透到浓密草丛错综复杂的根部，所以最早的定居者只是在森林和草原的边界上修建农场。然而，到了1837年，约翰 迪尔取得了锋利铁犁的专利权。这种铁犁可以切开草皮同时土壤不会黏在犁刃上。赛勒斯 麦考密克改良了机械收割机，使得收割速度提高到劳力生产的14倍。到19世纪50年代之前，麦考密克每年能出售1，000台收割机并且供不应求。迪尔每年售出的铁犁也高达10，000台。

新兴的商品农业从本质上改变了中西部地区的地理环境。虽然美洲原住民数年来一直在此种植玉米，但是只有后来的定居者（后来变成农民）才第一次在如此广阔的土地上从事农业生产。他们把剩余农产品运往东部。这些农民还引进了不属于原有生态系统的新的农作物，主要是小麦，还有水果和蔬菜。

作为商品来种植的几种植物取代了当地的草类。玉米产量最多，主要用于喂养牲畜。因为面包是美国和欧洲饮食中的主食，小麦成了主要的经济作物。为了制作饲料，栽培牧草取代了当地草类。

大火曾经用来使草原上不长树，（农业商品化之后）西部农民减少了焚烧由此改变了地貌。没有了大火，树木在没有耕作的土地上重新生长出来，如果没有干扰，最终会长成林地。早期完好无损的地貌成了独立的农场，每个农场四周用围栏围起来，组成精确的棋盘状的图案。通过这些人为活动，形成了动物、林地和农作物的人造生态系统。其庞大和统一的布局使得西部农场比不规则的东部农场更加高效。

## **Extinction Episodes of the Past**

It was not until the Cambrian period, beginning about 600 million years ago, that a great proliferation of macroscopic species occurred on Earth and produced a fossil record that allows us to track the rise and fall of biodiversity. Since the Cambrian period, biodiversity has generally risen, but there have been some notable exceptions. Biodiversity collapsed dramatically during at least five periods because of mass extinctions around the globe. The five major mass extinctions receive most of the attention, but they are only one end of a spectrum of extinction events. Collectively, more species went extinct during smaller events that were less dramatic but more frequent. The best known of the five major extinction events, the one that saw the demise of the dinosaurs, is the Cretaceous-Tertiary extinction.

Starting about 280 million years ago, reptiles were the dominant large animals in terrestrial environments. In popular language this was the era “when dinosaurs ruled Earth,” when a wide variety of reptile species occupying many ecological niches. However, no group or species can maintain its dominance indefinitely, and when, after over 200 million years, the age of dinosaurs came to a dramatic end about 65 million years ago, mammals began to flourish, evolving from relatively few types of small terrestrial animals into the myriad of diverse species, including bats and whales, that we know today. Paleontologists label this point in Earth’s history as the end of the Cretaceous period and the beginning of the Tertiary period, often abbreviated as the K-T boundary. This time was also marked by changes in many other types of organisms. Overall, about 38 percent of the families of marine animals were lost, with percentages much higher in some groups Ammonoid mollusks went from being very diverse and abundant to being extinct. An extremely abundant set of planktonic marine animals called foraminifera largely disappeared, although they rebounded later. Among plants, the K-T boundary saw a sharp but brief rise in the abundance of primitive vascular plants such as ferns, club mosses, horsetails, and conifers and other gymnosperms. The number of flowering plants (angiosperms) was reduced at this time, but they then began to increase dramatically.

What caused these changes? For many years scientists assumed that a cooling of the climate was responsible, with dinosaurs being particularly vulnerable because, like modern reptiles, they were ectothermic (dependent on environmental heat, or cold-blooded). It is now widely believed that at least some species of dinosaurs had a metabolic rate high enough for them to be endotherms (animals that maintain a relatively consistent body temperature by generating heat internally). Nevertheless, climatic explanations for the K-T extinction are not really challenged by the ideas that dinosaurs may have been endothermic, because even endotherms can be affected by a significant change in the climate.

Explanations for the K-T extinction were revolutionized in 1980 when a group of physical scientists led by Luis Alvarez proposed that 65 million years ago Earth was stuck by a 10-kilometer-wide meteorite traveling at 90,000 kilometers per hour. They believed that this impact generated a thick cloud of dust that enveloped Earth, shutting out much of the incoming solar radiation and reducing plant photosynthesis to very low levels. Short-term effects might have included huge tidal waves and extensive fires. In other words, a series of events arising from a single cataclysmic event caused the massive extinctions.Initially, the meteorite theory was based on a single line of evidence.At locations around the globe, geologists had found an unusually high concentration of iridium in the layer of sedimentary rocks that was formed about 65 million years ago.Iridium is an element that is usually uncommon near Earth’s surface, but it is abundant in some meteorites.Therefore, Alvarez and his colleagues concluded that it was likely that the iridium in sedimentary rocks deposited at the K-T boundary had originated in a giant meteorite or asteroid. Most scientist came to accept the meteorite theory after evidence came to light that a circular formation, 180 kilometers in diameter in diameter and centered on the north coast of the Yucatan Peninsula, was created by a meteorite impact about 65 million years ago.

【Paragraph 1】It was not until the Cambrian period, beginning about 600 million years ago, that a great proliferation of macroscopic species occurred on Earth and produced a fossil record that allows us to track the rise and fall of biodiversity. Since the Cambrian period, biodiversity has generally risen, but there have been some notable exceptions. Biodiversity collapsed dramatically during at least five periods because of mass extinctions around the globe. The five major mass extinctions receive most of the attention, but they are only one end of a spectrum of extinction events. Collectively, more species went extinct during smaller events that were less dramatic but more frequent. The best known of the five major extinction events, the one that saw the demise of the dinosaurs, is the Cretaceous-Tertiary extinction.

1. The word “proliferation” in the passage is closest in meaning to

○decline

○extinction

○increase

○migration

2. Paragraph 1 supports which of the following statements about life on Earth before the Cambrian period?

○Biodiversity levels were steady, as indicated by the fossil record.

○Levels of biodiversity could not be tracked.

○The most dramatic extinction episode occurred.

○Few microscopic species existed.

【Paragraph 2】Starting about 280 million years ago, reptiles were the dominant large animals in terrestrial environments. In popular language this was the era “when dinosaurs ruled Earth,” when a wide variety of reptile species occupying many ecological niches. However, no group or species can maintain its dominance indefinitely, and when, after over 200 million years, the age of dinosaurs came to a dramatic end about 65 million years ago, mammals began to flourish, evolving from relatively few types of small terrestrial animals into the myriad of diverse species, including bats and whales, that we know today. Paleontologists label this point in Earth’s history as the end of the Cretaceous period and the beginning of the Tertiary period, often abbreviated as the K-T boundary. This time was also marked by changes in many other types of organisms. Overall, about 38 percent of the families of marine animals were lost, with percentages much higher in some groups Ammonoid mollusks went from being very diverse and abundant to being extinct. An extremely abundant set of planktonic marine animals called foraminifera largely disappeared, although they rebounded later. Among plants, the K-T boundary saw a sharp but brief rise in the abundance of primitive vascular plants such as ferns, club mosses, horsetails, and conifers and other gymnosperms. The number of flowering plants (angiosperms) was reduced at this time, but they then began to increase dramatically.

3. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○The dominance of dinosaurs came to an end 65 million years ago, at which time mammals began to flourish and diversify.

○Because no group of species can remain dominant forever, mammals became the dominant group when dinosaurs became extinct.

○After being the dominant group for more than 200 million years, the age of dinosaurs came to a dramatic end 65 million years ago.

○The diverse group of mammals that we know today, including bats and whales, evolved from small terrestrial forms that had been dominated by dinosaurs.

4. According to paragraph 2, why are dinosaurs popularly said to have “ruled Earth” during the Cretaceous period?

○Dinosaurs were the only species of reptile that existed during the whole of the Cretaceous period.

○Dinosaurs won the battle for food resources over mammals during the Cretaceous period.

○Dinosaurs survived extinction during the Cretaceous period, whereas many other animal species did not.

○Dinosaurs were the physically and ecologically dominant animals during the Cretaceous period.

5. According to paragraph 2, which of the following species initially increased in number at the K-T boundary?

○Dinosaurs

○Foraminifera

○Ferns

○Ammonoid mollusks

【Paragraph 3】What caused these changes? For many years scientists assumed that a cooling of the climate was responsible, with dinosaurs being particularly vulnerable because, like modern reptiles, they were ectothermic (dependent on environmental heat, or cold-blooded). It is now widely believed that at least some species of dinosaurs had a metabolic rate high enough for them to be endotherms (animals that maintain a relatively consistent body temperature by generating heat internally). Nevertheless, climatic explanations for the K-T extinction are not really challenged by the ideas that dinosaurs may have been endothermic, because even endotherms can be affected by a significant change in the climate.

6. Why does the author note that “even endotherms can be affected by a significant change in the climate”?

○To argue that there was a significant climate at the time that endothermic dinosaurs became extinct

○To argue that climate change caused some dinosaurs to evolve as endotherms

○To support the view that at least some of the dinosaurs that became extinct were endotherms

○To defend climate change as possible explanation for the extinction of dinosaurs

【Paragraph 4】Explanations for the K-T extinction were revolutionized in 1980 when a group of physical scientists led by Luis Alvarez proposed that 65 million years ago Earth was stuck by a 10-kilometer-wide meteorite traveling at 90,000 kilometers per hour. They believed that this impact generated a thick cloud of dust that enveloped Earth, shutting out much of the incoming solar radiation and reducing plant photosynthesis to very low levels. Short-term effects might have included huge tidal waves and extensive fires. In other words, a series of events arising from a single cataclysmic event caused the massive extinctions.Initially, the meteorite theory was based on a single line of evidence.At locations around the globe, geologists had found an unusually high concentration of iridium in the layer of sedimentary rocks that was formed about 65 million years ago.Iridium is an element that is usually uncommon near Earth’s surface, but it is abundant in some meteorites.Therefore, Alvarez and his colleagues concluded that it was likely that the iridium in sedimentary rocks deposited at the K-T boundary had originated in a giant meteorite or asteroid. Most scientist came to accept the meteorite theory after evidence came to light that a circular formation, 180 kilometers in diameter in diameter and centered on the north coast of the Yucatan Peninsula, was created by a meteorite impact about 65 million years ago.

7. The word “generated” in the passage is closest in meaning to

○collected

○produced

○spread

○added

8. The word “extensive” in the passage is closest in meaning to

○widespread

○sudden

○numerous

○subsequent

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9. According to paragraph 4, all of the following contributed to the massive extinctions of the K-T period EXCEPT:

○tidal waves

○fires

○insufficient solar radiation

○iridium

10. According to paragraph 4, which of the following statements explains the importance of the discovery of high levels of iridium rocks?

○It provided evidence that overexposure to solar radiation led to the K-T extinction.

○It showed that more than one cataclysmic event was responsible for the K-T extinction.

○It suggested that the cause of the K-T extinction may have been a meteorite striking Earth.

○It provided evidence that the K-T extinction occurred 65 million years ago.

11. According to paragraph 4, which of the following is true about the Yucatan Peninsula?

○The circular formation there was caused by a meteorite impact 65 million years ago.

○Sedimentary rocks from that area have the lowest iridium concentration of any rocks on Earth.

○There is evidence that a huge tidal wave occurred there 65 million years ago.

○Evidence found there challenged the meteorite impact theory.

12. Which of the following can be inferred from paragraph 4 about the meteorite theory?

○The data originally presented as evidence for the theory were eventually rejected.

○Many scientists did not accept it when it was first proposed.

○It has not been widely accepted as an explanation for the K-T extinction.

○Alvarez subsequently revised it after a circular formation was found in the Yucatan Peninsula.

Explanations for the K-T extinction were revolutionized in 1980 when a group of physical scientists led by Luis Alvarez proposed that 65 million years ago Earth was stuck by a 10-kilometer-wide meteorite traveling at 90,000 kilometers per hour. They believed that this impact generated a thick cloud of dust that enveloped Earth, shutting out much of the incoming solar radiation and reducing plant photosynthesis to very low levels. Short-term effects might have included huge tidal waves and extensive fires. In other words, a series of events arising from a single cataclysmic event caused the massive extinctions. ■ Initially, the meteorite theory was based on a single line of evidence. ■ At locations around the globe, geologists had found an unusually high concentration of iridium in the layer of sedimentary rocks that was formed about 65 million years ago.■ Iridium is an element that is usually uncommon near Earth’s surface, but it is abundant in some meteorites. ■ Therefore, Alvarez and his colleagues concluded that it was likely that the iridium in sedimentary rocks deposited at the K-T boundary had originated in a giant meteorite or asteroid. Most scientist came to accept the meteorite theory after evidence came to light that a circular formation, 180 kilometers in diameter in diameter and centered on the north coast of the Yucatan Peninsula, was created by a meteorite impact about 65 million years ago.

13. Look at the four squares [■] that indicate where the following sentence can be added to the passage.

This focused on the chemical composition of ancient rocks.

Where would the sentence best fit?

Click on a square [■] to insert the sentence in the passage

14. 【Directions】 An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

The K-t extinction 65 million years ago is the best known of the five major extinction episodes since the Cambrian period.

●

●

●

Answer Choices

○Collectively, the five major extinction episodes resulted in the elimination of a larger number of species than did all the minor extinction events.

○The K-T extinction eliminated the dinosaurs and ammonoid mollusks but was followed by the diversification of mammals and gymnospermous plants.

○An extreme cooling of the climate could not have caused the K-T extinction of dinosaurs, because, while most dinosaurs depended on environmental heat, some did not.

○The K-T extinction of the dinosaurs is the only mass extinction that has been explained by the impact of a meteorite.

○In1980 Luis Alvarez proposed that the K-T extinction was caused by ecological disasters brought about by the impact of a meteorite striking Earth.

○A high concentration of iridium in sedimentary rocks at the K-T boundary and a large impact crater in the Yucatan Peninsula from 65 million years ago strongly support Alvarez’ hypothesis.

参考答案:

1. ○ 3

2. ○ 2

3. ○ 2

4. ○ 4

5. ○ 3

6. ○ 4

7. ○ 2

8. ○ 1

9. ○ 4

10. ○ 3

11. ○ 1

12. ○ 2

13. ○ 2

14. The K-T extinction eliminated…

In1980 Luis Alvarez proposed…

A high concentration of iridium…

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## **参考译文：过去的灭绝事件**

直到六亿年前的寒武纪，肉眼可看的物种才在地球上兴起。多亏了化石的帮助，我们现在可以了解到物种的兴衰。自从寒武纪，生物开始变得多样化，但是也有些例外。因为在世界范围内的灭绝事件中，至少五次有物种大规模减少的情况。虽然我们最关注这五次大灭绝，但是它们只是一系列灭绝事件中的冰山一角。总体来说，很多较小的灭绝事件虽然不够引人注目，但是它们更为频繁，大部分物种就是因此而灭绝的。在五次大灭绝中，见证恐龙灭绝的是发生在白垩—第三纪的灭绝。

二亿八千万年前，爬行动物成为陆上的主宰。通俗来说这是一个“恐龙统治地球”的时代。各类爬行动物占据了不同的生态环境。然而，没有哪一类生物可以永久保持主宰地位，在二亿年后，大约是六千五百万年前恐龙时代最终结束，哺乳动物开始繁盛，从最初的少数几种小型陆生动物逐渐发展到无数的各类物种，包括我们现在所知的蝙蝠和鲸鱼。古生物学家把地球历史上这个时间点作为白垩纪的末期和第三纪的初期，简称为K-T边界。很多K-T边界时期的其他生物也发生了重大变化。总的来说，大约38%的海洋生物消失了，更多的菊石软体动物也濒临灭绝。曾经尤为繁盛的海洋浮游生物-有孔虫也几乎消失了，尽管后来它们的数量有所回升。对植物来说，短时期突然出现了大量的原始维管植物，比如说蕨类植物，石松类植物，木贼类植物，松柏类植物和其他裸子植物。在此期间，开花植物（被子植物）的数量减少，但是接着又显著增加了。

这些变化的原因是什么呢？很多年来，科学家认为气候变冷是罪魁祸首，因为恐龙，和很多现代爬行动物一样是变温动物（依赖于环境温度，或冷血动物），面对气候变化非常脆弱。现在人们普遍相信至少有些恐龙具有足够高的新陈代谢速度，是恒温动物（动物通过在身体内部产生热量来维持相对不变的体温）。尽管如此，恐龙有可能是恒温动物这一论断未真正挑战K-T灭绝的气候变化原因。这是因为一些恒温动物仍然会受到气候显著变化的影响。

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然而，在 1980年，路易斯·阿尔瓦雷茨带领的一组物理学家提出，在六千五百万年前，有一个10公里宽的陨星以每小时九万公里的速度撞击了地球，这使K-T灭绝成因发生革命性变化。他们认为：撞击产生了一层厚厚的灰尘云，笼罩了地球，阻断了太阳辐射，并使光合作用降到最低。短期内还有可能造成了巨大的海啸和广泛的火灾。也就是说，这次灾难性的撞击引发了一系列连锁反应并最终导致了大灭绝。最初，陨石理论是在一系列证据上发展起来的。在世界各地的很多地方，地质学家发现铱元素在六千五百万年前的沉积岩层中含量异常丰富。铱元素在地球表面很不常见，但在陨石中含量丰富。因此，阿尔瓦雷茨和同事推测在K-T边界沉积岩沉淀的铱元素来自于巨型陨星或小行星。科学家们逐渐接受了陨星理论，因为他们看到了六千五百万年前陨星撞击产生的圆形构造的证据。该圆形构造直径为180公里，围绕在尤卡坦半岛的西北岸。

TPO-34

## **Islamic Art and the Book**

The arts of the Islamic book, such as calligraphy and decorative drawing, developed during A.D. 900 to 1500, and luxury books are some of the most characteristic examples of Islamic art produced in this period. This came about from two major developments: paper became common, replacing parchment as the major medium for writing, and rounded scripts were regularized and perfected so that they replaced the angular scripts of the previous period, which because of their angularity were uneven in height. Books became major vehicles for artistic expression, and the artists who produced them, notably calligraphers and painters, enjoyed high status, and their workshops were often sponsored by princes and their courts. Before A.D. 900, manuscripts of the Koran (the book containing the teachings of the Islamic religion) seem to have been the most common type of book produced and decorated, but after that date a wide range of books were produced for a broad spectrum of patrons. These continued to include, of course, manuscripts of the Koran, which every Muslim wanted to read, but scientific works, histories, romances, and epic and lyric poetry were also copied in fine handwriting and decorated with beautiful illustrations. Most were made for sale on the open market, and cities boasted special souks (markets) where books were bought and sold. The mosque of Marrakech in Morocco is known as the Kutubiyya, or Booksellers’ Mosque, after the adjacent market. Some of the most luxurious books were specific commissions made at the order of a particular prince and signed by the calligrapher and decorator.

Papermaking had been introduced to the Islamic lands from China in the eighth century. It has been said that Chinese papermakers were among the prisoners captured in a battle fought near Samarqand between the Chinese and the Muslims in 751, and the technique of papermaking - in which cellulose pulp extracted from any of several plants is first suspended in water, caught on a fine screen, and then dried into flexible sheets - slowly spread westward. Within fifty years, the government in Baghdad was using paper for documents. Writing in ink on paper, unlike parchment, could not easily be erased, and therefore paper had the advantage that it was difficult to alter what was written on it. Papermaking spread quickly to Egypt - and eventually to Sicily and Spain - but it was several centuries before paper supplanted parchment for copies of the Koran, probably because of the conservative nature of religious art and its practitioners. In western Islamic lands, parchment continued to be used for manuscripts of the Koran throughout this period.

The introduction of paper spurred a conceptual revolution whose consequences have barely been explored. Although paper was never as cheap as it has become today, it was far less expensive than parchment, and therefore more people could afford to buy books, Paper is thinner than parchment, so more pages could be enclosed within a single volume. At first, paper was made in relatively small sheets that were pasted together, but by the beginning of the fourteenth century, very large sheets - as much as a meter across - were available.

These large sheets meant that calligraphers and artists had more space on which to work. Paintings became more complicated, giving the artist greater opportunities to depict space or emotion. The increased availability of paper, particularly after 1250, encouraged people to develop systems of representation, such as architectural plans and drawings. This in turn allowed the easy transfer of artistic ideas and motifs over great distances from one medium to another, and in a different scale in ways that had been difficult, if not impossible, in the previous period.Rounded styles of Arabic handwriting had long been used for correspondence and documents alongside the formal angular scripts used for inscriptions and manuscripts of the Koran. Around the year 900, Ibn Muqla, who was a secretary and vizier at the Abbasid court in Baghdad, developed a system of proportioned writing. He standardized the length of alif, the first letter of the Arabic alphabet, and then determined what the size and shape of all other letters should be, based on the alif. Eventually, six round forms of handwriting, composed of three pairs of big and little scripts known collectively as the Six Pens, became the standard repertory of every calligrapher.

【Paragraph 1】The arts of the Islamic book, such as calligraphy and decorative drawing, developed during A.D. 900 to 1500, and luxury books are some of the most characteristic examples of Islamic art produced in this period. This came about from two major developments: paper became common, replacing parchment as the major medium for writing, and rounded scripts were regularized and perfected so that they replaced the angular scripts of the previous period, which because of their angularity were uneven in height. Books became major vehicles for artistic expression, and the artists who produced them, notably calligraphers and painters, enjoyed high status, and their workshops were often sponsored by princes and their courts. Before A.D. 900, manuscripts of the Koran (the book containing the teachings of the Islamic religion) seem to have been the most common type of book produced and decorated, but after that date a wide range of books were produced for a broad spectrum of patrons. These continued to include, of course, manuscripts of the Koran, which every Muslim wanted to read, but scientific works, histories, romances, and epic and lyric poetry were also copied in fine handwriting and decorated with beautiful illustrations. Most were made for sale on the open market, and cities boasted special souks (markets) where books were bought and sold. The mosque of Marrakech in Morocco is known as the Kutubiyya, or Booksellers’ Mosque, after the adjacent market. Some of the most luxurious books were specific commissions made at the order of a particular prince and signed by the calligrapher and decorator.

1. Paragraph 1 makes all of the following points about Islamic books EXCEPT:

○ Books were an important form of artistic expression.

○ A wide variety of books with different styles and topics became available.

○ They were sold primarily near mosques.

○ Most books were intended for sale on the open market.

2. The word “sponsored” in the passage is closest in meaning to

○ visited

○ owned

○ praised

○ supported

3. The word “adjacent” in the passage is closest in meaning to

○ major

○ nearby

○ ancient

○ well-known

4. According to paragraph 1, before A.D. 900, books in the Islamic world

○ included a wide range of subjects

○ did not contain any calligraphy or decoration

○ used rounded scripts

○ were usually written on parchment

5. In paragraph 1, why does the author mention the fact that the mosque in Marrakech, Morocco, is known asthe Booksellers’ Mosque

○ To cast doubt on the importance of souks in making books available to common people

○ To provide an example of a place where books were made at the order of a particular prince

○ To emphasize how influential and well known the book markets were

○ To demonstrate the need for religious texts in Islamic lands

【Paragraph 2】Papermaking had been introduced to the Islamic lands from China in the eighth century. It has been said that Chinese papermakers were among the prisoners captured in a battle fought near Samarqand between the Chinese and the Muslims in 751, and the technique of papermaking - in which cellulose pulp extracted from any of several plants is first suspended in water, caught on a fine screen, and then dried into flexible sheets” - slowly spread westward. Within fifty years, the government in Baghdad was using paper for documents. Writing in ink on paper, unlike parchment, could not easily be erased, and therefore paper had the advantage that it was difficult to alter what was written on it. Papermaking spread quickly to Egypt - and eventually to Sicily and Spain - but it was several centuries before paper supplanted parchment for copies of the Koran, probably because of the conservative nature of religious art and its practitioners. In western Islamic lands, parchment continued to be used for manuscripts of the Koran throughout this period.

【Paragraph 3】The introduction of paper spurred a conceptual revolution whose consequences have barely been explored. Although paper was never as cheap as it has become today, it was far less expensive than parchment, and therefore more people could afford to buy books, Paper is thinner than parchment, so more pages could be enclosed within a single volume. At first, paper was made in relatively small sheets that were pasted together, but by the beginning of the fourteenth century, very large sheets ¨— as much as a meter across ¨— were available.

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6. The phrase “extracted from” in the passage is closest in meaning to

○ taken out of

○ produced using

○ discovered in

○ combined with

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ It was several centuries before papermaking techniques spread to faraway areas where parchment was popular and used widely in art.

○ Although papermaking came to Egypt quickly, it took much longer for paper to be used when copying the Koran, probably because of the conservative nature of religious art.

○ Papermaking spread beyond Egypt, Sicily, and Spain, but it was not widely used by artists for centuries, probably because of the conservative nature of art in those countries.

○ Paper replaced parchment in copies of the Koran, probably at the request of conservative practitioners in areas like Egypt, Sicily, and Spain.

8. In paragraphs 2 and 3, which of the following is NOT mentioned as an advantage of paper over parchment?

○ It was harder to erase or change what was written on paper.

○ More pages of paper could be bound in a single volume.

○ Paper could be produced in sheets of varying weights and thicknesses.

○ More people could buy books made of paper because it was cheaper.

9. Why does the author include the following information: “At first, paper was made in relatively small sheets that were pasted together, but by the beginning of the fourteenth century, very large sheets - as much as a meter across - were available.”

○ To provide evidence that the development of papermaking techniques was very slow

○ To explain why paper was never as cheap as it has become today

○ To make the point that paper allowed artists to develop paintings that were more expressive and complex

○ To prove that paper was more popular with artists who used large sheets, than it was with book printers, who used smaller sheets

10. According to paragraph 3, the increased availability of paper and the development of systems of representation

○ encourage more people to make their own drawings

○ made the transfer of artistic ideas to distant people and places much easier

○ made architectural plans more complex and therefore harder to read

○ allowed artists to create paintings that were smaller in scale

【Paragraph 4】These large sheets meant that calligraphers and artists had more space on which to work. Paintings became more complicated, giving the artist greater opportunities to depict space or emotion. The increased availability of paper, particularly after 1250, encouraged people to develop systems of representation, such as architectural plans and drawings. This in turn allowed the easy transfer of artistic ideas and motifs over great distances from one medium to another, and in a different scale in ways that had been difficult, if not impossible, in the previous period.Rounded styles of Arabic handwriting had long been used for correspondence anddocuments alongside the formal angular scripts used for inscriptions and manuscripts of the Koran. Around the year 900, Ibn Muqla, who was a secretary and vizier at the Abbasid court in Baghdad, developed a system of proportioned writing. He standardized the length of alif, the first letter of the Arabic alphabet, and then determined what the size and shape of all other letters should be, based on the alif. Eventually, six round forms of handwriting, composed of three pairs of big and little scripts known collectively as the Six Pens, became

the standard repertory of every calligrapher.

11. According to paragraph 4, what did Ibn Muqla achieve around the year 900?

○ He modified a set of formal scripts known as the Six Pens into rounded scripts appropriate

for correspondence.

○ He created a standardized set of rounded scripts proportional to the size of the first letter of the alphabet.

○ He promoted calligraphy as an art form and encouraged the use of rounded letters in religious texts.

○ He persuaded the court in Baghdad to use rounded styles instead of more angular scripts in their documents.

12. The phrase “composed of” in the passage is closest in meaning to

○ made up of

○ developed from

○ in addition to

○ similar to

Papermaking had been introduced to the Islamic lands from China in the eighth century. ■ It has been said that Chinese papermakers were among the prisoners captured in a battle fought near Samarqand between the Chinese and the Muslims in 751, and the technique of papermaking - in which cellulose pulp extracted from any of several plants is first suspended in water, caught on a fine screen, and then dried into flexible sheets - slowly spread westward. ■ Within fifty years, the government in Baghdad was using paper for documents. ■ Writing in ink on paper, unlike parchment, could not easily be erased, and therefore paper had the advantage that it was difficult to alter what was written on it. ■ Papermaking spread quickly to Egypt - and eventually to Sicily and Spain - but it was several centuries before paper supplanted parchment for copies of the Koran, probably because of the conservative nature of religious art and its practitioners. In western Islamic lands, parchment continued to be used for manuscripts of the Koran throughout this period.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

This change occurred for good reason.

Where does the sentence best fit?

14. 【Directions】An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

Islamic books from A.D. 900 to 1500 reflect major changes from the past and important innovations.

●

●

●

Answer Choices

○ Books became major vehicle of artistic expression for calligraphers and painters, and the subjects of books expanded to include more and more kinds of works.

○ The growing luxuriousness of books meant that the market for them was increasingly dominated by the wealthy and powerful patrons who could afford them.

○ After it was learned from Chinese prisoners, the technique of papermaking spread throughout Islamic lands, where paper gradually replaced parchment.

○ The high status enjoyed by calligraphers and artists made books extremely popular in the cities where books were bought and sold.

○ The popularity of books led to major advances in the development and transfer of new artistic ideas.

○ Around the year 900, a set of rounded styles of Arabic handwriting began replacing angular scripts in copying the manuscripts of the Koran.

参考答案：

1. ○ 3

2. ○ 4

3. ○ 2

4. ○ 2

5. ○ 3

6. ○ 1

7. ○ 2

8. ○ 3

9. ○ 3

10. ○ 2

11. ○ 2

12. ○ 1

13. ○ 3

14. ○ 135

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## **参考译文：伊斯兰艺术和书籍**

在公元900至1500年，伊斯兰书籍的艺术造诣，如书法和装饰绘画，得到很大发展。奢侈书籍成为这个时期伊斯兰艺术的最典型代表。这主要源于两大主要发展：一是纸变得随处可见，取代羊皮纸成为主要的书写工具。二是规范完善了圆形字体以取代之前的方形字体，因为方形字体的尖角高度不平均。书成为艺术表达的主要工具；制作书籍的艺术家，通常是书法家和绘画家，享有很高的地位。他们的作坊得到王子和宫廷的资助。公元900年之前，古兰经（写着伊斯兰教义的书籍）的手稿是最常见的印刷和装饰书籍。但是之后，各类资助人资助制作了各式各样的书籍。这些书籍不仅有每个穆斯林都想诵读的古兰经的手稿，还有科学作品，历史书，冒险故事书，史诗书，和诗歌书，它们都印有清晰的字迹和美丽的插图。大部分书籍都在市场上出售，城市设有书籍交易的特殊市场。摩洛哥马拉喀什的清真寺被称为库图比亚清真寺，也叫做书商的清真寺。最奢侈昂贵的书是受某王子特别委托制作出来并有书法家和装饰者亲笔签名的作品。

造纸术在8世纪由中国传到伊斯兰。据说是因为751年中国和穆斯林在撒马尔罕附近的一场战役中，中国的造纸工匠被虏成为囚犯，造纸术才逐渐向西传播。造纸术这项技术是首先是将从植物中提取的纤维素纸浆悬浮在水中，然后用筛选设备过滤，再烘干成柔软的纸张。在不到50年的时间里，巴格达政府就已经在使用纸记录文件。和羊皮纸不同，使用纸张的优势在于：用墨汁在纸上写的东西不易擦除，所以写在纸上的东西很难改变。造纸术很快传播到埃及，最终传到西西里岛和西班牙。但是纸张取代羊皮纸用来印刷古兰经则较晚出现，或许因为宗教艺术和从业者们的保守性。因此，在整个8世纪，西伊斯兰仍然使用羊皮纸书写古兰经。

纸张的引进催生了一次概念革命，其影响几乎还未被探索。尽管当时的纸没有现在廉价，但是它比羊皮纸便宜多了，所以更多人可以买得起书。因为纸比羊皮纸薄，所以在一册中装订的页数也更多。最开始，人们把相对小的纸张粘在一起，但是到了14世纪早期，出现了宽达一米的大型纸张。

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这些大型纸张意味着书法家和艺术家有更多的创作空间。绘画变得更复杂，艺术家有更多机会去描绘空间表达情感。特别是在1250年以后，纸张可用性增加鼓励人们发展了模型系统，比如说建筑平面图和绘画。这反过来使得艺术思想和理念更容易从一种媒介跨越远距离转移到另外一种媒介。而在这之前，艺术思想和理念的传播，如果有可能的话，其规模和方式也远远不及现在。这一时期，通信和文件中使用阿拉伯书法的圆形风格，而碑文及古兰经手稿中则使用正式楷体。大约在900年，伊本穆格来，巴格达阿巴斯法院的秘书和大臣，发明了一套匀称的书写体系。他规范了alif（阿拉伯字母表的第一个字母）的长度，然后在alif长度的基础上，确定了所有其他字母的大小和形状。最终，书写的六个圆形符号，包括三组大小写法，伊本穆格来被称为Six Pens，成为了每个书法家的标准配置。

## **The Development of Steam Power**

By the eighteenth century, Britain was experiencing a severe shortage of energy. Because of the growth of population, most of the great forests of medieval Britain had long ago been replaced by fields of grain and hay. Wood was in ever-shorter supply, yet it remained tremendously important. It served as the primary source of heat for all homes and industries and as a basic raw material. Processed wood (charcoal) was the fuel that was mixed with iron ore in the blast furnace to produce pig iron (raw iron). The iron industry’s appetite for wood was enormous, and by 1740 the British iron industry was stagnating. Vast forests enabled Russia to become the world’s leading producer of iron, much of which was exported to Britain. But Russia’s potential for growth was limited too, and in a few decades Russia would reach the barrier of inadequate energy that was already holding England back.

As this early energy crisis grew worse, Britain looked toward its abundant and widely scattered reserves of coal as an alternative to its vanishing wood. Coal was first used in Britain in the late Middle Ages as a source of heat. By 1640 most homes in London were heated with it, and it also provided heat for making beer, glass, soap, and other products. Coal was not used, however, to produce mechanical energy or to power machinery. It was there that coal’s potential wad enormous.

As more coal was produced, mines were dug deeper and deeper and were constantly filling with water. Mechanical pumps, usually powered by hundreds of horses waling in circles at the surface, had to be installed. Such power was expensive and bothersome. In an attempt to overcome these disadvantages, Thomas Savery in 1698 and Thomas Newcomen in 1705 invented the first primitive steam engines. Both engines were extremely inefficient. Both burned coal to produce steam, which was then used to operate a pump. However, by the early 1770s, many of the Savery engines and hundreds of the Newcomen engines were operating successfully, though inefficiently, in English and Scottish mines.

In the early 1760s, a gifted young Scot named James Watt was drawn to a critical study of the steam engine. Watt was employed at the time by the University of Glasgow as a skilled crafts worker making scientific instruments. In 1763, Watt was called on to repair a Newcomen engine being used in a physics course. After a series of observations, Watt saw that the New comen’s waste of energy could be reduced by adding a separate condenser. This splendid invention, patented in 1769, greatly increased the efficiency of the steam engine. The steam engine of Watt and his followers was the technological advance that gave people, at least for a while, unlimited power and allowed the invention and use of all kinds of power equipment.

The steam engine was quickly put to use in several industries in Britain. It drained mines and made possible the production of ever more coal to feed steam engines elsewhere. The steam power plant began to replace waterpower in the cotton-spinning mills as well as other industries during the 1780s, contributing to a phenomenal rise in industrialization. The British iron industry was radically transformed. The use of powerful, steam-driven bellows in blast furnaces helped iron makers switch over rapidly from limited charcoal to unlimited coke (which is made from coal) in the smelting of pig iron (the process of refining impure iron) after 1770 in the 1780s, Henry Cort developed the puddling furnace, which allowed pig iron to be refined in turn with coke. Cort also developed heavy-duty, steam-powered rolling mills, which were capable of producing finished iron in every shape and form.

The economic consequence of these technical innovations in steam power was a great boom in the British iron industry. In 1740 annual British iron production was only 17,000 tons, but by 1844, with the spread of coke smelting and the impact of Cort’s inventions, it had increased to 3,000,000 tons. This was a truly amazing expansion. Once scarce and expensive, iron became cheap, basic, and indispensable to the economy.

【Paragraph 1】By the eighteenth century, Britain was experiencing a severe shortage of energy. Because of the growth of population, most of the great forests of medieval Britain had long ago been replaced by fields of grain and hay. Wood was in ever-shorter supply, yet it remained tremendously important. It served as the primary source of heat for all homes and industries and as a basic raw material. Processed wood (charcoal) was the fuel that was mixed with iron ore in the blast furnace to produce pig iron (raw iron). The iron industry’s appetite for wood was enormous, and by 1740 the British iron industry was stagnating. Vast forests enabled Russia to become the world’s leading producer of iron, much of which was exported to Britain. But Russia’s potential for growth was limited too, and in a few decades Russia would reach the barrier of inadequate energy that was already holding England back.

1. What can be inferred from paragraph 1 about Britain’s short supply of wood in the eighteenth century?

○ Wood from Britain’s great forests was being exported to other countries for profit.

○ A growing population had required cutting down forests to increase available land for farming.

○ Larger families required the construction of larger homes made from wood.

○ What was left of the great forests after the medieval period was being strictly protected.

【Paragraph 2】As this early energy crisis grew worse, Britain looked toward its abundant and widely scattered reserves of coal as an alternative to its vanishing wood. Coal was first used in Britain in the late Middle Ages as a source of heat. By 1640 most homes in London were heated with it, and it also provided heat for making beer, glass, soap, and other products. Coal was not used, however, to produce mechanical energy or to power machinery. It was there that coal’s potential wad enormous.

2. Select TWO answer choices that, according to paragraph 1, are true statements about Russia’s iron industry in the eighteenth century. To obtain credit, you must select TWO answer choices.

○ Russia reached its maximum production of iron at the same time as Britain.

○ Russia exported much of its iron production to Britain.

○ Russia’s appetite for iron increased rapidly after 1740.

○ Russia’s energy resources eventually became insufficient and limited the growth of its iron industry.

3. The word “abundant” in the passage is closest in meaning to

○ reliable

○ plentiful

○ well-preserved

○ existing

4. Why are “beer, glass, soap, and other products” mentioned in the discussion of Britain’s energy?

○ To help explain why the energy crisis was so severe

○ To show that despite the energy crisis and as early as 1640, London homes were advanced and well supplied

○ To emphasize that after 1640, British homes required energy for more than heat

○ To indicate that coal had been used for the production of certain products before the eighteenth century

【Paragraph 3】As more coal was produced, mines were dug deeper and deeper and were constantly filling with water. Mechanical pumps, usually powered by hundreds of horses waling in circles at the surface, had to be installed. Such power was expensive and bothersome. In an attempt to overcome these disadvantages, Thomas Savery in 1698 and Thomas Newcomen in 1705 invented the first primitive steam engines. Both engines were extremely inefficient. Both burned coal to produce steam, which was then used to operate a pump. However, by the early 1770s, many of the Savery engines and hundreds of the Newcomen engines were operating successfully, though inefficiently, in English and Scottish mines.

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5. According to paragraph 3, all of the following are ways in which the Savery and Newcomen engines were similar EXCEPT:

○ Both became relatively inexpensive after the 1770s.

○ Both produced steam by burning coal.

○ Both were used to operate pumps.

○ Both were very inefficient.

【Paragraph 4】 In the early 1760s, a gifted young Scot named James Watt was drawn to a critical study of the steam engine. Watt was employed at the time by the University of Glasgow as a skilled crafts worker making scientific instruments. In 1763, Watt was called on to repair a Newcomen engine being used in a physics course. After a series of observations, Watt saw that the New comen’s waste of energy could be reduced by adding a separate condenser. This splendid invention, patented in 1769, greatly increased the efficiency of the steam engine. The steam engine of Watt and his followers was the technological advance that gave people, at least for a while, unlimited power and allowed the invention and use of all kinds of power equipment.

6. The word “gifted” in the passage is closest in meaning to

○ independent

○ talented

○ famous

○ ambitious

7. According to paragraph 4, what was James Watt’s major achievement?

○ He was able to apply his understanding of physics to invent a variety of scientific instruments and tools for skilled crafts workers.

○ He taught university physics courses to outstanding students whose observations led to many patented inventions.

○ He improved the efficiency of Newcomen¡¯s engine by preventing energy from being lost.

○ He redesigned Newcomen¡¯s engine so that it no longer needed a separate condenser.

8. The word “splendid” in the passage is closest in meaning to

○ original

○ necessary

○ magnificent

○ popular

【Paragraph 5】 The steam engine was quickly put to use in several industries in Britain. It drained mines and made possible the production of ever more coal to feed steam engines elsewhere. The steam power plant began to replace waterpower in the cotton-spinning mills as well as other industries during the 1780s, contributing to a phenomenal rise in industrialization. The British iron industry was radically transformed. The use of powerful, steam-driven bellows in blast furnaces helped iron makers switch over rapidly from limited charcoal to unlimited coke (which is made from coal) in the smelting of pig iron (the process of refining impure iron) after 1770 in the 1780s, Henry Cort developed the puddling furnace, which allowed pig iron to be refined in turn with coke. Cort also developed heavy-duty, steam-powered rolling mills, which were capable of producing finished iron in every shape and form.

9. Which of the following is NOT mentioned in paragraph 5 as a development that greatly changed the production of iron?

○ The use of coke in the smelting of pig iron

○ The invention of a furnace that used coke to refine iron

○ The discovery of a method for increasing the production of charcoal

○ The invention of powerful machinery that could shape, form, and finish iron

【Paragraph 6】The economic consequence of these technical innovations in steam power was a great boom in the British iron industry. In 1740 annual British iron production was only 17,000 tons, but by 1844, with the spread of coke smelting and the impact of Cort’s inventions, it had increased to 3,000,000 tons. This was a truly amazing expansion. Once scarce and expensive, iron became cheap, basic, and indispensable to the economy.

10. In paragraph 6, why does the author compare British iron production in 1740 with that of 1844?

○ To contrast the amounts of iron needed in Britain in two different centuries

○ To illustrate how easy it was to make money using Cort’s invention

○ To demonstrate the tremendous growth of the iron industry in Britain

○ To demonstrate how inexpensive coal had become

11. The word “indispensable” in the passage is closest in meaning to

○ advantageous

○ essential

○ less costly

○ highly stimulating

12. According to the passage, which of the following is true about the development of steam power?

○ The steam engine’s basic technology can be traced back to medieval Britain when steam-powered machinery was being tried in farming activities.

○ Although Russia and Britain developed steam-power technology simultaneously, Britain was first to try it in a large-scale industry due to a greater need for iron.

○ Steam-power technology was largely the result of improvements developed to increase the supply of coal as a primary source of energy.

○ Adaptations to steam engines required for their use in cotton-spinning mills led to radical developments in machinery used in the iron industry.

By the eighteenth century, Britain was experiencing a severe shortage of energy. ■ Because of the growth of population, most of the great forests of medieval Britain had long ago been replaced by fields of grain and hay. ■ Wood was in ever-shorter supply, yet it remained tremendously important. ■ It served as the primary source of heat for all homes and industries and as a basic raw material. ■ Processed wood (charcoal) was the fuel that was mixed with iron ore in the blast furnace to produce pig iron (raw iron). The iron industry’s appetite for wood was enormous, and by 1740 the British iron industry was stagnating. Vast forests enabled Russia to become the world’s leading producer of iron, much of which was exported to Britain. But Russia’s potential for growth was limited too, and in a few decades Russia would reach the barrier of inadequate energy that was already holding England back.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

Energy had not been a problem for Britain in the past because it relied on a rich source of energy: its vast forests.

Where does the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

By the eighteenth century, Britain was experiencing a severe shortage of energy.

●

●

●

Answer Choices

○ The development of blast furnaces for the manufacture of pig iron made the Britain less dependent on wood.

○ After the medieval period, both Russia and Britain began to look for alternative sources of energy, such as steam power, in order to maintain the growth of their iron industries.

○ Two inventors designed the first steam engines in order to overcome the disadvantages of relying on horses to power the pumps used in mining coal.

○ James Watt was able to improve upon the efficiency of the steam engine and make it useful to several industries.

○ The puddling furnace increased the availability of charcoal to a variety of industries from cotton to iron production.

○ Steam power increased coal production, which in turn allowed extraordinary growth of the iron industry and the British economy.

参考答案：

1. ○ 2

2. ○ 24

3. ○ 2

4. ○ 4

5. ○ 1

6. ○ 2

7. ○ 3

8. ○ 3

9. ○ 3

10. ○ 3

11. ○ 2

12. ○ 3

13. ○ 1

14. ○ 346

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## **参考译文：蒸汽机的发展**

在18世纪之前，英国正在经历一次严重的能源短缺。因为人口增长，英国在中世纪时大部分森林已经被农田和牧草代替，因此木材更加缺乏，但是它却一直都很重要。木材不仅是家庭和工业取暖的主要来源并且还是基本的原材料。加工过的木材（木炭）作为燃料和铁矿混合，经过高炉加温形成生铁。炼铁业对木材的需求是巨大的，到1740年之前，英国的炼铁业处于停滞状态。相比之下，得益于广阔的森林，俄国成为世界上主要的铁制造商，其大部分铁出口到英国。但是俄国的增长潜力也受到了限制，在接下来的几十年里俄国和英国一样，也遇到了能源短缺的障碍。

随着这种早期能源危机愈演愈烈，英国转而使用数量丰富且分布广泛的煤炭作为即将消失的木材的替代品。英国在中世纪晚期首次使用煤炭来供热。到了1640年之前，伦敦的大部分家庭开始使用煤炭取暖，并且还把它作为制造啤酒，玻璃，肥皂和其他产品的热量来源。然而，这个时候，煤还未被用来生产机械能或驱动机器。而这正是煤的无穷潜力。

随着产煤量的增加，煤矿被挖的越来越深。然而煤矿深处，不断有水灌注进来。人们通常在地表安装由成千上百只马转圈拉动的机械水泵。但是这种动力不仅造价昂贵，而且费时费力。为了克服这些弊端，托马斯萨瓦瑞在 1698 汤姆斯纽克门 在1705分别发明了第一批最早的蒸汽机。早期的蒸汽机效率极其低下，它们燃煤来产生蒸汽，被用于驱动水泵。然而，到了18世纪70年代早期，萨瓦瑞和纽克门发明的成千上百的蒸汽机已经成功运行在英国和苏格兰的煤矿中，尽管效率还有待于提高。

在18世纪60年代早期，一个满腹才华的年轻苏格兰人詹姆斯瓦特开始认真研究蒸汽机。瓦特当时受雇于格拉斯哥大学，是学校制作科学工具的熟练技工。1763年，学校要求瓦特去修理物理课上使用的一台纽科门蒸汽机。在观察之后，瓦特发现增加一个分离的冷凝器可以提高纽科门蒸汽机的效率。这项杰出的发明，在1769年取得专利权，大大提高了蒸汽机的效率。瓦特和其同事的蒸汽机是巨大的技术进步，给于人们，至少在一段时间内，无限的动力，并且催生了各种发明和动力设备。

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蒸汽机很快被用于英国的各行各业。它帮助人们抽干煤矿的水，从而挖掘更多的煤炭来带动其他地方的蒸汽机。在18世80年代，蒸汽动力取代水力用于棉花纺织工业和其他工业，这促进了工业化现象的崛起。英国的炼铁业从根本上发生了变革。1770年之后，因为高炉中使用动力十足、蒸汽驱动的风箱，铁制造商们在铸造生铁（提炼铁的过程）时，很快不再使用数量有限的木炭，转而使用无限的焦炭（由煤制作而成）。在18世纪80年代，亨利科特发明了搅铁炉，这一发明可轮流提炼生铁和焦炭。科特也发明了蒸汽驱动的重型轧钢厂，能把炼过的铁轧成各种形状。

这些技术革新的经济影响是促进了英国炼铁产业的巨大繁荣。在1740年，英国年产铁量只有17,000吨，但是到1844年之前，随着焦炭熔铸法和科特搅铁炉的广泛应用，英国年产铁量增加到3,000,000吨。这的确是令人惊异的增长。曾经稀少昂贵的铁，变得廉价、基础，成为了经济发展的不可缺少的一部分。

## **Protection of Plants by Insects**

Many plants - one or more species of at least 68 different families - can secrete nectar even when they have no blossoms, because they bear extrafloral nectaries (structures that produce nectar) on stems, leaves, leaf stems, or other structures. These plants usually occur where ants are abundant, most in the tropics but some in temperate areas. Among those of northeastern North America are various plums, cherries, roses, hawthorns, poplars, and oaks. Like floral nectar, extrafloral nectar consists mainly of water with a high content of dissolved sugars and, in some plants, small amounts of amino acids. The extrafloral nectaries of some plants are known to attract ants and other insects, but the evolutionary history of most plants with these nectaries is unknown. Nevertheless, most ecologists believe that all extrafloral nectaries attract insects that will defend the plant.

Ants are portably the most frequent and certainly the most persistent defenders of plants. Since the highly active worker ants require a great deal of energy, plants exploit this need by providing extrafloral nectar that supplies ants with abundant energy. To return this favor, ants guard the nectaries, driving away or killing intruding insects that might compete with ants for nectar. Many of these intruders are herbivorous and would eat the leaves of the plants.

Biologists once thought that secretion of extrafloral nectar has some purely internal physiological function, and that ants provide no benefit whatsoever to the plants that secrete it. This view and the opposing “protectionist” hypothesis that ants defend plants had been disputed for over a hundred years when, in 1910, a skeptical William Morton Wheeler commented on the controversy. He called for proof of the protectionist view: that visitations of the ants confer protection on the plants and that in the absence of the insects a much greater number would perish or fail to produce flowers or seeds than when the insects are present. That we now have an abundance of the proof that was called for was established when Barbara Bentley reviewed the relevant evidence in 1977, and since then many more observations and experiments have provided still further proof that ants benefit plants.

One example shows how ants attracted to extrafloral nectaries protect morning glories against attacking insects. The principal insect enemies of the North American morning glory feed mainly on its flowers or fruits rather than its leaves. Grasshoppers feeding on flowers indirectly block pollination and the production of seeds by destroying the corolla or the stigma, which receives the pollen grains and on which the pollen germinates. Without their colorful corolla, flowers do not attract pollinators and are not fertilized. An adult grasshopper can consume a large corolla, about 2.5 inches long, in an hour. Caterpillars and seed beetles affect seed production directly. Caterpillars devour the ovaries, where the seeds are produced, and seed beetle larvae eat seeds as they burrow in developing fruits.

Extrafloral nectaries at the base of each sepal attract several kinds of insects, but 96 percent of them are ants, several different species of them. When buds are still small, less than a quarter of an inch long, the sepal nectaries are already present and producing nectar. They continue to do so as the flower develops and while the fruit matures. Observations leave little doubt that ants protect morning glory flowers and fruits from the combined enemy force of grasshoppers, caterpillars, and seed beetles. Bentley compares the seed production of six plants that grew where there were no ants with that of seventeen plants that were occupied by ants. Unprotected plants bore only 45 seeds per plant, but plants occupied by ants bore 211 seeds per plant. Although ants are not big enough to kill or seriously injure grasshoppers, they drive them away by nipping at their feet. Seed beetles are more vulnerable because they are much smaller than grasshoppers. The ants prey on the adult beetles, disturb females as they lay their eggs on developing fruits, and eat many of the eggs they do manage to lay.

【Paragraph 1】Many plants - one or more species of at least 68 different families - can secrete nectar even when they have no blossoms, because they bear extrafloral nectaries (structures that produce nectar) on stems, leaves, leaf stems, or other structures. These plants usually occur where ants are abundant, most in the tropics but some in temperate areas. Among those of northeastern North America are various plums, cherries, roses, hawthorns, poplars, and oaks. Like floral nectar, extrafloral nectar consists mainly of water with a high content of dissolved sugars and, in some plants, small amounts of amino acids. The extrafloral nectaries of some plants are known to attract ants and other insects, but the evolutionary history of most plants with these nectaries is unknown. Nevertheless, most ecologists believe that all extrafloral nectaries attract insects that will defend the plant.

1. According to paragraph 1, floral nectar and extrafloral nectar are alike in that

○ they are likely to be produced by the same plants

○ they basically consist of the same chemical components

○ they attract only insects that will defend the plant

○ they are produced by the same parts of the plant

【Paragraph 2】Ants are portably the most frequent and certainly the most persistent defenders of plants. Since the highly active worker ants require a great deal of energy, plants exploit this need by providing extrafloral nectar that supplies ants with abundant energy. To return this favor, ants guard the nectaries, driving away or killing intruding insects that might compete with ants for nectar. Many of these intruders are herbivorous and would eat the leaves of the plants.

2. To say that ants are “persistent” defenders of plants means that

○ they defend plants against a wide variety of threats

○ they continue to defend plants for as long as the plants are threatened

○ they are successful defenders of plants

○ they are easily observable defenders of plants

3. What can be inferred from paragraph 2 about the ants that are attracted to the extrafloral nectaries?

○ They do not eat the leaves of the plants that produce extrafloral nectar.

○ They live almost entirely on extrafloral nectar.

○ They spend most of their energy guarding extrafloral nectaries.

○ They frequently fight among themselves over extrafloral nectar.

【Paragraph 3】Biologists once thought that secretion of extrafloral nectar has some purely internal physiological function, and that ants provide no benefit whatsoever to the plants that secrete it. This view and the opposing “protectionist” hypothesis that ants defend plants had been disputed for over a hundred years when, in 1910, a skeptical William Morton Wheeler commented on the controversy. He called for proof of the protectionist view: that visitations of the ants confer protection on the plants and that in the absence of the insects a much greater number would perish or fail to produce flowers or seeds than when the insects are present. That we now have an abundance of the proof that was called for was established when Barbara Bentley reviewed the relevant evidence in 1977, and since then many more observations and experiments have provided still further proof that ants benefit plants.

4. According to paragraph 3, what was the position of the opponents of the “protectionist” hypothesis?

○ Extrafloral nectar provides plants with a direct defense against attack by insects.

○ Ants substantially benefit plants that secrete extrafloral nectar.

○ The secretion of extrafloral nectar plays a role in the plant’s internal functioning.

○ Ants visit plants that secrete extrafloral nectar as often as they visit plants that do not.

5. The word “skeptical” in the passage is closest in meaning to

○ curious

○ doubtful

○ open-minded

○ practical

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6. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

○ We now have ample proof that ants benefit plants.

○ Barbara Bentley has called for additional proof that ants benefit plants.

○ In 1977 Barbara Bentley conducted research that proved that all prior studies were wrong.

○ Proof that ants benefit plants will require many more observations and experiments.

【Paragraph 4】One example shows how ants attracted to extrafloral nectaries protect morning glories against attacking insects. The principal insect enemies of the North American morning glory feed mainly on its flowers or fruits rather than its leaves. Grasshoppers feeding on flowers indirectly block pollination and the production of seeds by destroying the corolla or the stigma, which receives the pollen grains and on which the pollen germinates. Without their colorful corolla, flowers do not attract pollinators and are not fertilized. An adult grasshopper can consume a large corolla, about 2.5 inches long, in an hour. Caterpillars and seed beetles affect seed production directly. Caterpillars devour the ovaries, where the seeds are produced, and seed beetle larvae eat seeds as they burrow in developing fruits.

7. According to paragraph 4, what effect does the destruction of the corolla have on plants?

○ It leaves the seeds exposed and unprotected.

○ It prevents the stigma from developing.

○ It keeps pollen grains from attaching properly.

○ It prevents the flower from attracting pollinators.

8. The word “devour” in the passage is closest in meaning to

○ attack

○ eat

○ damage

○ prefer

【Paragraph 5】Extrafloral nectaries at the base of each sepal attract several kinds of insects, but 96 percent of them are ants, several different species of them. When buds are still small, less than a quarter of an inch long, the sepal nectaries are already present and producing nectar. They continue to do so as the flower develops and while the fruit matures. Observations leave little doubt that ants protect morning glory flowers and fruits from the combined enemy force of grasshoppers, caterpillars, and seed beetles. Bentley compares the seed production of six plants that grew where there were no ants with that of seventeen plants that were occupied by ants. Unprotected plants bore only 45 seeds per plant, but plants occupied by ants bore 211 seeds per plant. Although ants are not big enough to kill or seriously injure grasshoppers, they drive them away by nipping at their feet. Seed beetles are more vulnerable because they are much smaller than grasshoppers. The ants prey on the adult beetles, disturb females as they lay their eggs on developing fruits, and eat many of the eggs they do manage to lay.

9. What role does paragraph 5 play in the passage?

○ It offers various kinds of evidence for the protectionist view.

○ It presents the study that first proved that ants benefit plants.

○ It explains how insects find sources of nectar.

○ It presents information that partly contradicts the protectionist view.

10. The word “vulnerable” in the passage is closest in meaning to

○ numerous

○ harmful

○ open to attack

○ difficult to locate

11. According to paragraph 5, what did Bentley’s comparative study show?

○ Many more plants grew in places where ants were present than where they were absent.

○ The ants preferred plants with low seed production to plants with high seed production.

○ The plants occupied by ants produced many more seeds than those that were not occupied by ants.

○ The plants that grew in places without ants were much smaller and weaker than those that grew in places where ants were present.

12. According to paragraph 5, ants defend morning glory plants from seed beetles in each of the following ways EXCEPT

○ driving adult beetles off the plants by nipping at their feet

○ catching and eating adult beetles

○ eating beetle eggs they find on developing fruits

○ making it difficult for beetles to lay eggs on developing fruits

Ants are portably the most frequent and certainly the most persistent defenders of plants.■ Since the highly active worker ants require a great deal of energy, plants exploit this need by providing extrafloral nectar that supplies ants with abundant energy.■ To return this favor, ants guard the nectaries, driving away or killing intruding insects that might compete with ants for nectar.■ Many of these intruders are herbivorous and would eat the leaves of the plants. ■

13. Look at the four squares [■] that indicate where the following sentence could be added

to the passage.

Sometimes they capture the insects to feed their protein-hungry larvae.

Where does the sentence best fit?

14.【Directions】An introductory sentence for a brief summary of the passage of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This questions is worth 2 points.

Many plants have extrafloral nectaries that produce nectar even during periods in which the plant is not flowering.

●

●

●

Answer Choices

○ Evolutionary history shows that plants that produce extrafloral nectar originated in the tropics.

○ Extrafloral nectar has a higher concentration of sugar than floral nectar and is more attractive to ants and other insects.

○ The protectionist hypothesis is that extrafloral nextar attracts ants, and that the ants, in order to preserve this energy-rich food source, attack insects that might harm the plant.

○ Evidence accumulated during the twentieth century proved that ants provide significant benefits for plants with extrafloral nectaries.

○ Research has shown that American morning glory plants that are protected by ants produce significantly more seeds than morning glory plants that are not protected by ants.

○ Ants generally ignore small insects, but they will eat the adults of large insect species as well as their eggs and larvae.

参考答案：

1. ○ 2

2. ○ 2

3. ○ 1

4. ○ 4

5. ○ 1

6. ○ 1

7. ○ 4

8. ○ 2

9. ○ 2

10. ○ 3

11. ○ 3

12. ○ 1

13. ○ 3

14. ○ 345

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## **参考译文：昆虫对植物的保护**

即使不开花，很多植物也能分泌花蜜（在至少68个不同的植物科里就有一种或多种分泌花蜜的植物）。这是因为它们在茎，叶子，叶茎或其他结构上有花外蜜腺（保护花蜜的结构）。这些植物通常生长在大量蚁群存在的地方，因此大多数生长在热带地方，但也有一些生长在温带地区。在北美东北部地区就有这类植物，包括各种各样的李子，樱桃，蔷薇，山楂树，白杨树和橡树。像花蜜一样，花外花蜜主要包括水，高浓度的溶解糖，在某些植物里，还有少量的氨基酸。人们已经知道某些植物的花外蜜腺是为了吸引蚂蚁和昆虫，但是目前大部分带有花外蜜腺的植物的进化史人们还不得而知。尽管如此，大多数生态学家相信所有的花外蜜腺都是为了吸引昆虫以便防御自身。

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蚂蚁或许是植物的最常见也无疑是最执著的保护者了。因为高度活跃的工蚁需要很多能量，而植物正好可以利用这一需求，为蚂蚁提供花外蜜以满足它们的能量需求。为了回报植物，蚂蚁会保卫蜜腺，赶走或杀死入侵的昆虫，因为它们会和蚂蚁争夺蜜腺。很多入侵者是食草动物，会吃掉植物的叶子。

生物学家曾经认为分泌花外蜜只产生内部生理功能，蚂蚁对分泌花蜜的植物没有任何益处。人们就该观点及其反方观点争执了很多年。反方观点坚持“保护主义者”假说，认为蚂蚁能够保护植物。1910年，怀疑论者威廉莫尔顿惠勒对这一争议做出了评论。他要求为“保护主义者”观点提供证据：蚂蚁能为植物提供保护；如果没有昆虫，更多植物将会消失，或者不能开花或结种。我们现在已经有充分证据表明昆虫的确有益于植物，因为在1977年巴巴拉宾利就已经研究了相关证据，并且自那以后，更多的观察和实验也提供了更多的证据。

有一个例子向我们展示了被花外蜜腺吸引的蚂蚁如何保护牵牛花不被昆虫伤害的。北美牵牛花的头号天敌昆虫主要吸食牵牛花的花朵和果实而不是叶子。因为草蜢吸食花朵，破坏牵牛花的花冠或柱头，而这正是接收花粉粒和花粉生长的地方，所以间接阻断了授粉和制造种子。一旦花冠被破坏，花朵不能再吸引传份昆虫，因此不能受精。一个成年草蜢可以在不到一个小时消耗一个2.5英寸的大型花冠。相比之下，毛毛虫和象鼻虫则是直接影响种子的形成。毛毛虫毁坏子房，这是生产种子的地方。在果实成熟过程中，象鼻虫的幼虫进入果实内部蚕食种子。

每个花萼底部的花外蜜腺可以吸引几种不同的昆虫，不过96%都是蚂蚁，尽管种类会有所不同。当蓓蕾还小时，已经有不到四分之一长的花萼蜜腺分泌花蜜了。随着花朵的发育和果实变得成熟，花萼蜜腺仍然继续分泌花蜜。通过观察可以确定蚂蚁保护牵牛花的花朵和果实不会受到草蜢、毛毛虫和象鼻虫的联合侵袭。宾利对比了六株生长在没有蚂蚁地域的植物结出的果实和17株生长在有蚂蚁地域的植物结出的果实。结果发现：不受蚂蚁保护的植物每株只结出45个种子，而有蚂蚁保护的植物每株结出了211个种子。尽管蚂蚁不够强大，不能杀死或严重伤害草蜢，但是蚂蚁可以通过啃咬草蜢的脚驱赶它们。而比草蜢更小的象鼻虫则更容易受到蚂蚁的攻击。蚂蚁以象鼻虫为食，干扰在果实上产卵的磁性象鼻虫，还能吃掉象鼻虫的卵虫。

**TPO-40**

## Ancient Athens

One of the most important changes in Greece during the period from 800 B.C. to 500 B.C. was the rise of the polis, or city-state, and each polis developed a system of government that was appropriate to its circumstances. The problems that were faced and solved in Athens were the sharing of political power between the established aristocracy and the emerging other classes, and the adjustment of aristocratic ways of life to the ways of life of the new polis. It was the harmonious blending of all of these elements that was to produce the classical culture of Athens.

Entering the polis age, Athens had the traditional institutions of other Greek protodemocratic states: an assembly of adult males, an aristocratic council, and annually elected officials. Within this traditional framework the Athenians, between 600 B.C. and 450 B. C., evolved what Greeks regarded as a fully fledged democratic constitution, though the right to vote was given to fewer groups of people than is seen in modem times.

The first steps toward change were taken by Solon in 594 B. C., when he broke the aristocracy's stranglehold on elected offices by establishing wealth rather than birth as the basis of office holding, abolishing the economic obligations of ordinary Athenians to the aristocracy, and allowing the assembly (of which all citizens were equal members) to overrule the decisions of local courts in certain cases. The strength of the Athenian aristocracy was further weakened during the rest of the century by therise of a type of government known as a tyranny, which is a form of interim rule by a popular strongman (not rule by a ruthless dictator as the modern use of the term suggests to us). The Peisistratids, as the succession of tyrants were called (after the founder of the dynasty, Peisistratos), strengthened Athenian central administration at the expense of the aristocracy by appointing judges throughout the region, producing Athens’ first national coinage, and adding and embellishing festivals that tended to focus attention on Athens rather than on local villages of the surrounding region. By the end of the century, the time was ripe for more change: the tyrants were driven out, and in 508 B C a new reformer, Cleisthenes, gave final form to the developments reducing aristocratic control already under way.

Cleisthenes' principal contribution to the creation of democracy at Athens was to complete the long process of weakening family and clan structures, especially among the aristocrats, and to set in their place locality-based corporations called demes, which became the point of entry for all civic and most religious life in Athens. Out of the demes were created 10 artificial tribes of roughly equal population. From the demes, by either election or selection, came 500 members of a new council, 6,000 jurors for the courts, 10 generals, and hundreds of commissioners. The assembly was sovereign in all matters but in practice delegated its power to subordinate bodies such as the council, which prepared the agenda for the meetings of the assembly, and courts, which took care of most judicial matters. Various committees acted as an executive branch, implementing policies of the assembly and supervising, for instance, the food and water supplies and public buildings. This wide-scale participation by the citizenry in the government distinguished the democratic form of the Athenian polis from other, less liberal forms.

The effect of Cleisthenes’ reforms was to establish the superiority of the Athenian community as a whole over local institutions without destroying them. National politics rather than local or deme politics became the focal point. At the same time, entry into national politics began at the deme level and gave local loyalty a new focus: Athens itself. Over the next two centuries the implications of Cleisthenes’ reforms were fully exploited.

During the fifth century B. C. the council of 500 was extremely influential in shaping policy. ■ In the next century, however, it was the mature assembly that took on decision-making responsibility. ■By any measure other than that of the aristocrats, who had been upstaged by the supposedly inferior "people," the Athenian democracy was a stunning success. Never before, or since, have so many people been involved in the serious business of self-governance. ■It was precisely this opportunity to participate in public life that provided a stimulus for the brilliant unfolding of classical Greek culture. ■

P1：One of the most important changes in Greece during the period from 800 B.C. to 500 B.C. was the rise of the polis, or city-state, and each polis developed a system of government that was appropriate to its circumstances. The problems that were faced and solved in Athens were the sharing of political power between the established aristocracy and the emerging other classes, and the adjustment of aristocratic ways of life to the ways of life of the new polis. It was the harmonious blending of all of these elements that was to produce the classical culture of Athens.

1. Paragraph 1 supports which of the following statements about the Greek city- states?

A. Most city-states followed the model provided by Athens.

B. Most city-states were based on aristocratic rule.

C. Different types of government and organization were used by different city- states.

D. By 500 B C. the city-states were no longer powerful.

P2：Entering the polis age, Athens had the traditional institutions of other Greek protodemocratic states: an assembly of adult males, an aristocratic council, and annually elected officials. Within this traditional framework the Athenians, between 600 B.C. and 450 B. C., evolved what Greeks regarded as a fully fledged democratic constitution, though the right to vote was given to fewer groups of people than is seen in modem times.

2. According to paragraph 2, Athens had all of the following before becoming a city- state EXCEPT

A. a council made up of aristocrats

B. an assembly made up of men

C. a constitution that was fully democratic

D. officials who were elected yearly

P3：The first steps toward change were taken by Solon in 594 B. C., when he broke the aristocracy's stranglehold on elected offices by establishing wealth rather than birth as the basis of office holding, abolishing the economics of ordinary Athenians to the aristocracy, and allowing the assembly (of which all citizens were equal members) to overrule the decisions of local courts in certain cases. The strength of the Athenian aristocracy was further weakened during the rest of the century by therise of a type of government known as a tyranny, which is a form of interim rule by a popular strongman (not rule by a ruthless dictator as the modern use of the term suggests to us). The Peisistratids, as the succession of tyrants were called (after the founder of the dynasty, Peisistratos), strengthened Athenian central administration at the expense of the aristocracy by appointing judges throughout the region, producing Athens’ first national coinage, and adding and embellishing festivals that tended to focus attention on Athens rather than on local villages of the surrounding region. By the end of the century, the time was ripe for more change: the tyrants were driven out, and in 508 B C a new reformer, Cleisthenes, gave final form to the developments reducing aristocratic control already under way.

3. According to paragraph 3, an important effect of making wealth the basis of office holding was to

A. make fewer people qualified to be members of the assembly

B. make it possible for non-aristocrats to hold office

C. help the aristocrats maintain power

D. Increase economic opportunities for all Athenian citizens

4. The word “abolishing” in the passage is closest in meaning to

A. limiting

B. eliminating

C. revising

D. supervising

5. In paragraph 3, the author's explanation of the word “tyranny” indicates that

A. most Athenians were opposed to rule by the Peisistratids

B. the word had a somewhat different meaning for the Athenians than it does for people today

C. the tyrants were supported by the aristocracy

D. the word can be applied only to ruthless dictators

6. According to paragraph 3, all of the following were true of the Peisistratids' rule EXCEPT:

A. A national system of coins was created.

B. Judges were appointed across the region.

C. New festivals were added.

D. Increased attention was focused on local villages.

7. The word “embellishing” in the passage is closest in meaning to

A. making more attractive

B. providing support for

C. duplicating

D. controlling

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8. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Cleisthenes, a reformer who recognized that aristocratic control had been decreasing since the end of the previous century, finally drove the tyrants out of Athens in 508 B. C.

B. The tyrants were driven out, and in 508 B.C. Cleisthenes put in place the structures that completed the weakening of the aristocracy.

C. By driving out the tyrants, Cleisthenes enabled the reforms that had been under way since the end of the century to reach their final form in 508 B. C.

D. Toward the end of the century, the tyrants were driven out, and in 508 B. C. Cleisthenes saw that it was time to change the structures that had reduced aristocratic control

P4：Cleisthenes' principal contribution to the creation of democracy at Athens was to complete the long process of weakening family and clan structures, especially among the aristocrats, and to set in their place locality-based corporations called demes, which became the point of entry for all civic and most religious life in Athens. Out of the demes were created 10 artificial tribes of roughly equal population. From the demes, by either election or selection, came 500 members of a new council, 6,000 jurors for the courts, 10 generals, and hundreds of commissioners. The assembly was sovereign in all matters but in practice delegated its power to subordinate bodies such as the council, which prepared the agenda for the meetings of the assembly, and courts, which took care of most judicial matters. Various committees acted as an executive branch, implementing policies of the assembly and supervising, for instance, the food and water supplies and public buildings. This wide-scale participation by the citizenry in the government distinguished the democratic form of the Athenian polis from other, less liberal forms.

9. According to paragraph 4, one effect of making the demes the point of entry for civic life was to

A. ensure that every region had the same number of commissioners

B. distribute the population more equally throughout the Athens region

C. limit the number of aristocratic clans

D. reduce the importance of family connections

10. According to paragraph 4, one role of the new council was to

A. determine what issues came before the assembly

B. prepare the agenda for the courts

C. carry out the assembly’s policies

D. oversee the distribution of food and water

P5：The effect of Cleisthenes’ reforms was to establish the superiority of the Athenian community as a whole over local institutions without destroying them. National politics rather than local or deme politics became the focal point. At the same time, entry into national politics began at the deme level and gave local loyalty a new focus: Athens itself. Over the next two centuries the implications of Cleisthenes’ reforms were fully exploited.

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11. The word “exploited” in the passage is closest in meaning to

A. separated

B. understood

C. utilized

D. exported

12. The word “stunning” in the passage is closest in meaning to

A. popular

B. universal

C. impressive

D. Continuing

During the fifth century B. C. the council of 500 was extremely influential in shaping policy. ■ In the next century, however, it was the mature assembly that took on decision-making responsibility. ■By any measure other than that of the aristocrats, who had been upstaged by the supposedly inferior "people," the Athenian democracy was a stunning success. Never before, or since, have so many people been involved in the serious business of self-governance. ■It was precisely this opportunity to participate in public life that provided a stimulus for the brilliant unfolding of classical Greek culture. ■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Indeed, at the height of Athenian democracy there was no government separate from its citizenry.**

Where does the sentence best fit?

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selected THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Between 600 B.C. and 450 B.C., Athens changed the distribution of political power between the aristocracy and ordinary citizens.**

**Answer Choices**

A. The rise of the city-state put enormous pressure on the aristocracy to change its traditional way of life to make it appear more in harmony with the values of classical Athenian culture.

B. The aristocrats staged elaborate festivals that focused attention on Athens instead of the surrounding villages.

C. Cleisthenes' reforms reduced aristocratic power by reorganizing the citizen body and changing the entry points to civic life so that political power did not rely on traditional family and clan structures.

D. The aristocracy’s monopoly on political power ended with Solon’s reforms, and its political influence was further eroded by the centralization of administration under the tyrants.

E. Cleisthenes gave each tribe an equal number of council members, jurors, generals, and commissioners.

F. Over time, as the all-citizen assembly took on more and more of the actual exercise of political power, ordinary citizens participated in public life more fully than ever before.

参考答案：1-5: C C B B B 6-10: D A B D A 11-14: C C C CDF

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## **参考译文：古雅典**

从公元前800年到公元前500年，希腊最重要的变化之一是城邦的兴起，或者说城市的兴起。每个城邦也都形成了适合自身情况的政府制度。已存在的雅典贵族和新兴的其他阶层之间的政治权力分享，以及贵族们为适应新的城邦生活所做的调整，这些就是当时雅典所面对并解决了的问题。所有这些元素的和谐融合，造就了雅典的古典文化。

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进入城邦时代后，雅典有着其他希腊各州的传统组织，这些州是民主机构的原型：包括一个成年男性公民大会，一个贵族委员会，以及每年选出的官员。公元前600年到公元前450年之间，雅典人从这个传统框架中发展出一个希腊人认为完全成熟的民主宪法，尽管享有投票权的人群并没有现在的人多。

梭伦在公元前594年发起了改革的第一步。他打破了贵族对选举的束缚，将任职资格建立在财富而不是血统上，废除普通雅典民众对贵族的经济义务，并允许公民大会（其中所有公民都是平等的成员）在某些情况下驳回地方法院的决定。在公元前6世纪剩余的时间里，专制政府的兴起进一步削弱了雅典贵族的实力。专制政府指的是政府被一个铁腕人物暂时管理（不是我们现在意义上所说的由一个无情的独裁者统治）。庇西特拉替德，作为铁腕人物的继承者（由王朝创始人庇西特拉图而来），不惜牺牲雅典贵族的权利，加强了中央政府管理，在所有地区任命法官，创建雅典第一套国家货币制度，并且对于关注雅典，而非周边地区当地村庄的节日，增加数量并且注重装饰。到世纪末，改革时机更为成熟时，铁腕人物被驱逐，并在公元前508年，新的改革者克利斯提尼最终减少了贵族的控制。

克利斯提尼对于创造雅典民主的主要贡献，是他完成了弱化家族和宗族结构（尤其是贵族家族和宗族结构）的漫长历程，并且在他们所在地方设置基于位置的团体——称为群落，这成为了雅典所有公民和大多数宗教生活的切入点。群落外面还建有10个人口数量相当的人工部落。群落中，通过选举或评选产生一个由500名成员组成的新理事会，6000名法庭陪审员，10位将军，数百名委员。公民大会在所有问题上都是至高无上的，但在实际中其权力下放给了下属机构，如理事会为公民大会的会议制定会议议程，而法庭则是处理大多数司法事务的。各委员会作为一个执行部门，负责实施公民大会的各项政策，并监督诸如食品、供水和公共建筑的事情。这种公民大范围参与的政府，使得雅典城邦的民主形式与其他没那么自由的民主形式截然不同。

克利斯提尼改革的效果是使得雅典社会作为一个整体，比当地组织更优越但却没有摧毁它们。国家政治而非局部或群落政治成为了焦点。同时，群落层面也开始进入国家政治，国家政治也使得当地的忠诚转向了雅典本身。在接下来的两个世纪里，克利斯提尼改革的影响得到了充分利用。

在公元前第五世纪，这个500人的理事会在制定政策时影响极大。然而，在接下来的一个世纪，成熟的公民大会承担了决策制定的责任。除了那些被所谓的“下等人”抢了风头的贵族，雅典的民主政治无论以什么标准来衡量都可以说是惊人的成功。如此多的人参与了真正意义上的自我管理，可谓前无古人，后无来者。正是这种参与公共生活的机会激励了希腊古典文化开始走向辉煌。

## Latitude and Biodiversity

When we look at the way in which biodiversity (biological diversity) is distributed over the land surface of the planet, we find that it is far from even. The tropics contain many more species overall than an equivalent area at the higher latitudes. This seems to be true for many different groups of animals and plants. ■

Why is it that higher latitudes have lower diversities than the tropics? ■Perhaps it is simply a matter of land area.■The tropics contain a larger surface area of land than higher latitudes—a fact that is not always evident when we examine commonly used projections of Earth’s curved surface, since this tends to exaggerate the areas of land in the higher latitudes—and some biogeographers regard the differences in diversity as a reflection of this effect. ■But an analysis of the data by biologist Klaus Rohde does not support this explanation. Although area may contribute to biodiversity, it is certainly not the whole story; otherwise, large landmasses would always be richer in species.

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Productivity seems to be involved instead, though perhaps its influence is indirect. Where conditions are most suitable for plant growth—that is, where temperatures are relatively high and uniform and where there is an ample supply of water—one usually finds large masses of vegetation. This leads to a complex structure in the layers of plant material. In a tropical rain forest, for example, a very large quantity of plant material builds up above the surface of the ground .There is also a large mass of material, developed below ground as root tissues, but this is less apparent. Careful analysis of the above ground material reveals that it is arranged in a series of layers, the precise number of layers varying with age and the nature of the forest. The arrangement of the biological mass ("biomass") of the vegetation into layered forms is termed its “structure” (as opposed to its “composition,” which refers to the species of organisms forming the community). Structure is essentially the architecture of vegetation, and as in the case of tropical forests, it can be extremely complicated. In a mature floodplain tropical forest in the Amazon River basin, the canopy (the uppermost layers of a forest, formed by the crowns of trees) takes on a stratified structure. There are three clear peaks in leaf cover at heights of approximately 3, 6, and 30 meters above the ground; and the very highest layer, at 50 meters, corresponds to the very tall trees that stand free of the main canopy and form an open layer of their own. So, such a forest contains essentially four layers of canopy. Forests in temperate lands often have just two canopy layers, so they have much less complex architecture.

Structure has a strong influence on the animal life inhabiting a site. It forms the spatial environment within which an animal feeds, moves around shelters, lives, and breeds. It even affects the climate on a very local level (the "microclimate") by influencing light intensity, humidity, and both the range and extremes of temperature. An area of grassland vegetation with very simple structure, for example, has a very different microclimate at the ground level from that experienced in the upper canopy. Wind speeds are lower, temperatures are lower during the day (but warmer at night), and the relative humidity is much greater near the ground. The complexity of the microclimate is closely related to the complexity of structure in vegetation, and generally speaking, the more complex the structure of vegetation, the more species of animal are able to make a living there. The high plant biomass of the tropics leads to a greater spatial complexity in the environment, and this leads to a higher potential for diversity in the living things that can occupy a region. The climates of the higher latitudes are generally less favorable for the accumulation of large quantities of biomass; hence, the structure of vegetation is simpler and the animal diversity is consequently lower.

1. The word “distributed” in the passage is closest in meaning to

A. represented

B. collected

C. spread

D. managed

2. The word “overall” in the passage is closest in meaning to

A. considered as a whole

B. to some degree

C. possibly

D. evidently

3. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Some biogeographers believe that the tropics have larger surface areas than they actually do because of the distortions produced by projections of Earth’s curved surface

B. High levels of diversity in the tropics are sometimes attributed to the fact that the tropics have more surface area of land than the higher latitudes do, though distortions in commonly used projections may seem to suggest otherwise.

C. Because biogeographers disagree on whether or not the tropics are correctly represented in projections of Earth s surface, it is difficult to determine the relationship their surface area has to their diversity

D. Most biogeographers agree that the tropics contain a larger surface area of land than higher latitudes do，but they disagree on whether or not the tropics’ level of diversity is a reflection of that larger surface area.

4. Why does the author mention “Klaus Rohde” in the passage?

A. To support the argument that large landmasses are usually richer in species than smaller ones are

B. To introduce the argument that there are other factors contributing to species diversity besides land area

C. To cast doubt on whether the tropics actually contain higher species diversity than land at higher latitudes does

D. To emphasize that biogeographers and biologists differ in their approaches to biodiversity

5. Which of the following is NOT mentioned in paragraph 3 as a condition that benefits plant growth?

A. High temperatures

B. Steady temperatures

C. High latitude

D. Plentiful water

6. The word “precise” in the passage is closest in meaning to

A. exact

B. predicted

C. approximate

D. required

7. Paragraph 3 mentions which of the following as creating the structural complexity of a forest?

A. The height of the very tallest trees in the forest

B. The number of layers of canopy

C. The frequency of floods along the plain

D. The age of the root tissues below the ground

8. According to paragraph 3, which of the following statements best describes the difference between structure and composition?

A. “Structure” refers to the arrangement of plant material above the ground surface; “composition” refers to the arrangement of root tissues below the surface of the ground.

B. “Structure” refers to the age of the forest; “composition” refers to the forest's nature.

C. “Structure” refers to the arrangement of plant species in an area, “composition” refers to which plant species are present in the area.

D. “Structure” refers to the shape of the forest canopy; “composition” refers to the number of crowns forming the canopy.

9. Why does the author mention “mature floodplain tropical forest in the Amazon River basin” in the passage?

A. To dispute the idea that tropical forests are arranged in layers

B. To give an example of the complex architecture vegetation displays in a dense area

C. To suggest that the layers of canopy in some tropical forests can exceed the usual three or four

D. To emphasize that the layers of canopy in a tropical forest give evidence of the number of layers of root tissues below the ground

10. Which of the following is NOT mentioned in paragraph 4 as an aspect of microclimate?

A. Temperature range

B. Relative humidity

C. Light intensity

D. Seasonal variations

11. What can be inferred from paragraph 4 about a region with a high level of diversity of animal species?

A. It also has a high level of plant species diversity.

B. It has relatively few microclimates

C. It develops a less complex structure than does a region with a high plant species diversity.

D. It develops a biomass similar to that of higher latitudes

12. The word “consequently” in the passage is closest in meaning to

A. usually

B. obviously

C. however

D. therefore

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13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

One example of such tropical abundance is found in Panama, which has 667 species of breeding birds-three times the number found in Alaska.

Where does the sentence best fit?

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selected THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**A number of factors may help account for the difference in biodiversity between low and high latitudes.**

**Answer Choices**

A. Though land area may be related to a region's biodiversity, it is not a primary determining factor.

B. A structure of varying heights is found in both tropical and temperate forests.

C. The more complex the structure of the vegetation of a region, the more species it is able to support.

D. Regions possessing conditions that are favorable for plant growth tend to have abundant and diverse vegetation that supports a large number of species.

E. The difference in microclimate between a ground-level canopy and an upper-level canopy is responsible for the number of species that inhabit each canopy.

F. The temperature range of a region determines the number of animals that feed, move around, shelter themselves, live, and breed in that region.

**参考答案：**1-5: C A B B C 6-10: A B C B D 11-14: A D A ACD

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## **参考译文：纬度与生物多样性**

当我们在研究生物多样性在地球表面的分布方式时，我们发现这种分布是很不均匀的。总的来说，热带地区比高纬度地区同等面积要包含更多的物种。这对许多不同的动物和植物群体来说似乎如此。

为什么高纬度地区要比热带物种数量少？这也许仅仅是与土地面积有关。热带地区比高纬度地区土地面积更大——当我们在审视通常所用的地球曲面投影时，这一事实并不总是显而易见的，因为这往往夸大了高纬度的土地面积——一些生物地理学家认为物种多样性的差异反映了这一点。但生物学家克劳斯罗德的数据分析并不支持这样的解释。虽然面积可能影响生物多样性，这当然不是全部的影响因素；否则，面积大的陆块总会有更丰富的物种。

生产力似乎也有作用，但也许它的作用是间接的。那些条件最适合植物生长的地方，即温度相对比较高，温差小，有充足水源的地方，通常会有大量的植被。这就导致了一个复杂的植物体层级结构。例如，在一个热带雨林中，有大量的植物体生长在地面之上，也有大量的不显眼的根系组织位于地下。仔细分析地面以上的部分，发现它分成很了多层，层的具体数目随着森林的年龄和性质而变化。植被的生物量的分层形式被称为“结构”（区别于“组成”，指的是形成群落的各种物种）。结构基本上是植被的架构。对于热带森林来说，结构是非常复杂的。在一个成熟的亚马逊冲积平原的热带森林中，树冠（森林最上面的层，由树木的冠组成）就是一个分层结构。枯枝落叶层有三个明显的峰值，分别在距离地面3米、6米和30米的高度；在最高的那一层，约在距离地面50米高的地方，非常高大的树木并不属于主冠，而是形成自己的一层。所以，这样的森林本质上包含了四层树冠。温带的森林通常只有2个冠层，所以它们的结构没那么复杂。

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结构对栖息在一个地方的动物的生活有很大的影响。它构成了动物觅食、在周围活动、生活和繁殖的空间环境。它甚至会通过影响光照强度、湿度以及最高温度和最低温度来影响当地气候（“小气候”）。例如，结构简单的草地，它在地面的微气候就和上层的树冠层不同。接近地面的地方，风速较低，白天气温也低（但夜间比较高），相对湿度更大。小气候的复杂性与植被结构的复杂程度密切相关，一般而言，植被的结构越复杂，在此生活的动物种类就越多。热带地区庞大的生物量导致了环境的更大的空间复杂度，也就使得住在这个区域的生物的多样性可能更高。高纬度地区的气候条件一般不利于大量生物的集聚，因此，植被结构更简单些，动物的多样性也相应较低。

## Amphibian Thermoregulation

In contrast to mammals and birds, amphibians are unable to produce thermal energy through their metabolic activity, which would allow them to regulate their body temperature independent of the surrounding or ambient temperature. However, the idea that amphibians have no control whatsoever over their body temperature has been proven false because their body temperature does not always correspond to the surrounding temperature. While amphibians are poor thermoregulators, they do exercise control over their body temperature to a limited degree.

Physiological adaptations can assist amphibians in colonizing habitats where extreme conditions prevail. The tolerance range in body temperature represents the range of temperatures within which a species can survive. One species of North American newt is still active when temperatures drop to -2°C while one South American frog feels comfortable even when temperatures rise to 41°C—the highest body temperature measured in a free-ranging amphibian. ■Recently it has been shown that some North American frog and toad species can survive up to five days with a body temperature of -6°C with approximately one-third of their body fluids frozen. ■The other tissues are protected because they contain the frost-protective agents glycerin or glucose. ■Additionally, in many species the tolerance boundaries are flexible and can change as a result of acclimatization (long-term exposure to particular conditions). ■

Frog species that remain exposed to the sun despite high diurnal (daytime) temperatures exhibit some fascinating modifications in the skin structure that function as morphological adaptations. Most amphibian skin is fully water permeable and is therefore not a barrier against evaporation or solar radiation. The African savanna frog Hyperolius viridiflavus stores guanine crystals in its skin, which enable it to better reflect solar radiation, thus providing protection against overheating. The tree frog Phyllomedusa sauvagei responds to evaporative losses with gland secretions that provide a greasy film over its entire body that helps prevent desiccation (dehydration).

However, behavior is by far the most important factor in thermoregulation. The principal elements in behavioral thermoregulation are basking (heliothermy), heat exchange with substrates such as rock or earth (thigmothermy), and diurnal and annual avoidance behaviors, which include moving to shelter during the day for cooling and hibernating or estivating (reducing activity during cold or hot weather, respectively). Heliothermy is especially common among frogs and toads: it allows them to increase their body temperature by more than 10°C. The Andean toad Bufo spinulosus exposes itself immediately after sunrise on moist ground and attains its preferred body temperature by this means, long before either ground or air is correspondingly warmed. A positive side effect of this approach is that it accelerates the digestion of the prey consumed overnight, thus also accelerating growth. Thigmothermy is a behavior present in most amphibians, although pressing against the ground serves a dual purpose: heat absorption by conductivity and water absorption through the skin. The effect of thigmothermy is especially evident in the Andean toad during rainfall: its body temperature corresponds to the temperature of the warm earth and not to the much cooler air temperature.

Avoidance behavior occurs whenever physiological and morphological adaptations are insufficient to maintain body temperature within the vital range. Nocturnal activity in amphibians with low tolerance for high ambient temperatures is a typical thermoregulatory behavior of avoidance. Seasonal avoidance behavior is extremely important in many amphibians. Species whose habitat lies in the temperate latitudes are confronted by lethal low temperatures in winter, while species dwelling in semi- and regions are exposed to long dry, hot periods in summer.

In amphibians hibernation occurs in mud or deep holes away from frost. North of the Pyrenees Mountains, the natterjack toad offers a good example of hibernation, passing the winter dug deep into sandy ground. Conversely, natterjacks in southern Spain remain active during the mild winters common to the region and are instead forced into inactivity during the dry, hot summer season. Summer estivation also occurs by burrowing into the ground or hiding in cool, deep rock crevasses to avoid desiccation and lethal ambient temperature.Amphibians are therefore hardly at mercy of ambient temperature, since by means of the mechanisms described above they are more than) exercise some control over their body temperature.

1. According to paragraph 1, what indicates that amphibians have some control over their body temperature?

A. Amphibians can regulate their metabolic rates to generate energy.

B. Amphibians use the same means of thermoregulation as mammals and birds do.

C. The body temperature of amphibians sometimes differs from the temperature of their surroundings.

D. The body temperature of amphibians is independent of their metabolic activity.

2. Why does the author mention a “South American frog” species in the passage?

A. To make the point that an amphibian’s temperature tolerance depends on a number of factors.

B. To indicate how precise the range of body temperatures is for certain amphibians.

C. To contrast its ability to adapt to that of the North American newt.

D. To help illustrate the range of environmental conditions to which amphibians have adapted.

3. According to paragraph 2, what allows some North American frog and toad species to survive in ambient temperatures well below freezing?

A. Their internal body temperatures never fall below -6°C.

B. They do not remain at temperatures below freezing for very long periods of time.

C. Their tolerance boundaries are flexible.

D. Some of their body tissues contain substances that prevent freezing.

4. “Phyllomedusa sauvager ” is mentioned as an example of a frog with an adaptation that

A. protects its glandular system

B. helps reduce its secretions

C. increases the amount of solar radiation that its skin can reflect

D. modifies its skin structure to protect against the drying effects of the sun

5. Paragraph 4 mentions each of the following as an example of behavioral thermoregulation EXCEPT

A. pressing against the ground

B. speeding up of the metabolism

C. reducing activity during the summer

D. adjusting exposure to the sun

6. The “Andean toad Bufo spinulosus” illustrates which of the following behavioral modifications?

A. Heliothermy and thigmothermy

B. Diurnal avoidance behavior

C. Absorbing heat from the air

D. Moving to shelter during the summer

7. The word “attains” in the passage is closest in meaning to

A. raises

B. lowers

C. reaches

D. regulates

8. The phrase “this approach” in the passage refers to

A. gradually increasing body temperature by 10°C

B. basking as soon as the sun comes up

C. waiting for the ground and air to warm

D. keeping body temperature above the temperature of the air

9. According to paragraph 5, why is avoidance behavior important for some amphibians?

A. Amphibians’ habitats are areas where temperatures vary from day to day.

B. Amphibians have less tolerance for high ambient temperatures than for low ambient temperatures.

C. Amphibians lack adequate physiological adaptations for dealing with ambient temperatures.

D. Amphibians cannot protect themselves from the extreme summer heat by being active only at night.

10. The word “dwelling” in the passage is closest in meaning to

A. arriving

B. originating

C. evolving

D. living

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11. In paragraph 6, which of the following can be inferred from the discussion of the natterjack?

A. Amphibians have greater tolerance for heat than for cold.

B. Desiccation is not a threat to amphibians.

C. Both hibernation and estivation may serve as avoidance behaviors depending on the climate.

D. Some species of amphibians are active only in the spring and in the fall.

12. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Thus, although amphibians use the various mechanisms described above, they have hardly any control of their body temperature.

B. Thus, by the mechanisms described above, amphibians are quite capable of controlling their body temperature to survive extreme ambient temperatures.

C. Thus, unless they can use the mechanisms described above, amphibians are at the mercy of ambient temperatures.

D. Thus, the mechanisms described above give amphibians control over much more than just their body temperature.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**On the other hand, amphibians in very hot climates use secretions from the mucus glands to decrease their temperature through evaporative cooling on the skin.**

Where does the sentence best fit?

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selected THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**A number of factors may help account for the difference in biodiversity between low and high latitudes.**

**Answer Choices**

A. Frogs, which survive temperature ranges from as low as -2°C to as high as 41°C, are evidence that amphibians are independent of ambient temperatures

B. Amphibians can increase their body temperature by exposing themselves to the sun (heliothermy) and by pressing against the ground (thigmothermy).

C. Avoidance behaviors, such as sheltering from the sun, as well as estivation and hibernation，help amphibians control their body temperature.

D. Physical adaptations offer amphibians a number of ways to protect against extreme or dangerous climate conditions.

E. Sunrise is the time when some amphibian species have the greatest need for thermoregulatory mechanisms.

F. Hibernation always involves digging deep holes in mud or sand, whereas estivation sometimes involves nothing more than hiding in deep rock crevasses.

**参考答案：**1-5: C D D D B 6-10: A C B C D 11-14: C B C BCD

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## **参考译文：两栖类动物的体温调节**

与哺乳动物和鸟类相比，两栖类动物不能通过自身的代谢活动产生热能，这使得它们可以调节自身体温而不受周围环境温度的限制。然而，两栖类动物不能控制自己体温的说法已被证明是假的，因为它们的体温并不总是与周围环境的温度一致。尽管两栖类动物调节体温的能力差，但是还是有一定的控制能力的。

生理适应性可以帮助两栖动物在条件极端的栖息地生存。体温的耐受范围代表着一个物种可以生存的温度范围。当温度降到零下2°C时，北美蝾螈依然活跃；而即使温度上升到41°C——这是自由生长的两栖动物的最高体温，南美洲青蛙依然感觉舒适。最近证实，一些北美的青蛙和蟾蜍物种可以在体温零下6°C的情况下生存五天，而它们约三分之一的体液会冻结。其他组织会得到保护，因为它们含有抗冻保护剂甘油或葡萄糖。此外，有许多物种的容忍范围是多变的，可以为了适应环境而变化（长期暴露于特定的条件）。

在白天的高温下仍可以暴露在太阳下的青蛙物种在皮肤结构上有一些有趣的变化，这些变化是形态上的适应。大多数两栖动物的皮肤是完全透水性的，因此不能阻挡蒸发或太阳辐射。在非洲大草原的青蛙hyperolius viridiflavus皮肤中储存有鸟嘌呤晶体，这使它能够更好地反射太阳辐射，从而在过热时提供保护。树蛙phyllomedusa sauvagei的腺分泌物在其整个身体布满一层油脂薄膜以对抗水分蒸发，从而帮助防止出现干燥（脱水）。

然而，行为调节是迄今为止在体温调节中最重要的因素。行为温度调节主要包括晒太阳（日光浴），与岩石或土壤之类的基质的热交换（接触热源），以及每天或每年的躲避行为，这包括转移到遮蔽处去乘凉、冬眠或夏眠（分别在寒冷或炙热的天气减少活动）。日光浴在青蛙和蟾蜍中特别常见：这样它们能将自己的体温提高超过10°C。安第斯蟾蜍bufo spinulosus在太阳从潮湿的地面上升起后迅速出现，并以此方式达到想要的体温，而那时候地面或空气还没那么温暖。这种方法的一个积极的副作用是，它加速了夜间食用的猎物的消化，从而加速蟾蜍的生长。接触热源是会出现在大多数两栖动物中的行为，虽然压在地上有双重目的：通过热量传输来吸热，以及通过皮肤吸收水。对在安第斯蟾蜍来说，接触热源在降雨效果尤其明显：体温与温度较高的地面而不是温度较低的空气一致。

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生理和形态的适应不足以维持生存温度时，就会产生躲避行为。对高环境温度容忍性差的两栖动物会选择夜间活动，这就是一个典型的躲避行为。季节性躲避行为在许多两栖类动物中极为重要。栖息地在温带地区的物种在冬季会面临致命的低温，而半干旱地区的物种在夏季会暴露于干燥、炎热的环境中。

两栖动物冬眠发生在泥或没有霜冻的深洞。比利牛斯山脉以北的黄条蟾蜍冬眠便是一个很好的例子：它们挖向沙地的深处，在深入度过冬季。相反，西班牙南部的黄条蟾蜍在该地区常见的暖冬依然活跃，但却不得不在干燥炎热的夏季夏眠。这种夏眠也是要挖到地下或躲到凉爽幽深的岩体裂隙中来避免干燥和高温。因此，两栖类动物是很难受环境温度影响的，因为通过上述机制它们会控制自身的体温。

# TPO-41

## Navajo Art

The Navajo, a Native American people living in the southwestern United States, live in small scattered settlements. In many respects, such as education, occupation, and leisure activities, their life is like that of other groups that contribute to the diverse social fabric of North American culture in the twenty-first century. At the same time, they have retained some traditional cultural practices that are associated with particular art forms. For example, the most important traditional Navajo rituals include the production of large floor paintings. These are actually made by pouring thin, finely controlled streams of colored sands or pulverized vegetable and mineral substances, pollen, and flowers in precise patterns on the ground. The largest of these paintings may be up to 5.5 meters in diameter and cover the entire floor of a room. Working from the inside of the design outward, the Navajo artist and his assistants will sift the black, white, bluish-gray, orange, and red materials through their fingers to create the finely detailed imagery. ■ The paintings and chants used in the ceremonies are directed by well-trained artists and singers who enlist the aid of spirits who are impersonated by masked performers. ■ The twenty-four known Navajo chants can be represented by up to 500 sand paintings. ■These complex paintings serve as memory aids to guide the singers during the performance of the ritual songs, which can last up to nine days.■

The purpose and meaning of the sand paintings can be explained by examining one of the most basic ideals of Navajo society, embodied in their word **hozho** (beauty or harmony, goodness, and happiness). It coexists with **hochxo** ("ugliness," or "evil," and "disorder") in a world where opposing forces of dynamism and stability create constant change. When the world, which was created in beauty, becomes ugly and disorderly, the Navajo gather to perform rituals with songs and make sand paintings to restore beauty and harmony to the world. Some illness is itself regarded as a type of disharmony. Thus, the restoration of harmony through a ceremony can be part of a curing process.

Men make sand paintings that are accurate copies of paintings from the past. The songs sung over the paintings are also faithful renditions of songs from the past. By recreating these arts, which reflect the original beauty of creation, the Navajo bring beauty to the present world. As relative newcomers to the Southwest, a place where their climate, neighbors, and rulers could be equally inhospitable, the Navajo created these art forms to affect the world around them, not just through the recounting of the actions symbolized, but through the beauty and harmony of the artworks themselves. The paintings generally illustrate ideas and events from the life of a mythical hero, who, after being healed by the gods, gave gifts of songs and paintings. Working from memory, the artists re-create the traditional form of the image as accurately as possible.

The Navajo are also world-famous for the designs on their woven blankets. Navajo women own the family flocks, control the shearing of the sheep, the carding, the spinning, and dying of the thread, and the weaving of the fabrics. While the men who make faithful copies of sand paintings from the past represent the principle of stability in Navajo thought, women embody dynamism and create new designs for every weaving they make. Weaving is a paradigm of the creativity of a mythic ancestor named Spider, woman who wove the universe as a cosmic web that united earth and sky. It was she who, according to legend, taught Navajo women how to weave. As they prepare their materials and weave, Navajo women imitate the transformations that originally created the world.

Working on their looms, Navajo weavers create images through which they experience harmony with nature. It is their means of creating beauty and thereby contributing to the beauty, harmony, and healing of the world. Thus, weaving is a way of seeing the world and being part of it.

1. The word “precise” is closest in meaning to

A. colorful

B. exact

C. delicate

D. complex

2. The word “enlist" in the passage is closest in meaning to

A. assist

B. require

C. describe

D. recruit

3. What can be inferred from paragraph 1 about the Navajo ritual chants?

A. There is a large number of them.

B. Each of them corresponds to a particular sand painting.

C. They are difficult to remember.

D. They do not take long to perform.

4. According to paragraph 1, all of the following are true of many important Navajo rituals

EXCEPT:

A. They involve the creation of large, detailed images.

B. They include performers whose faces are covered.

C. They take place indoors.

D. They are performed without elaborate planning.

5. It can be inferred from the discussion of illness and curing in paragraph 2 that

A. the Navajo consider illness to always have a supernatural cause

B. rituals involving songs and sand paintings may be used to treat an illness

C. when a Navajo is ill, ugly and disorderly sand paintings are made

D. after a serious illness, a Navajo will take part in a ceremony

6. The word “faithful” in the passage is closest in meaning to

A. modern

B. accurate

C. wonderful

D. simplified

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7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. The Navajo used the symbolism and beauty of their works of art to improve their life in an often inhospitable environment.

B. The ideas the Navajo hold about symbolism and beauty were influenced by their inhospitable climate, neighbors, and rulers.

C. When they first arrived in the Southwest, the Navajo produced symbolic art forms that promoted harmony.

D. In their works of art, the Navajo emphasized beauty and harmony that can be found even under the most inhospitable circumstances.

8. According to paragraph 3, which of the following is often the subject of Navajo sand paintings?

A. The landscape of the Southwest

B. Traditional Navajo practices

C. Historical events that occurred in the Southwest

D. The lives of heroes in traditional Navajo stories

9. Paragraph 4 supports which of the following statements about Navajo weavers and weaving?

A. Navajo women oversee all aspects of wool production and weaving.

B. The wool used for blankets comes from different sheep than does the wool used for other purposes.

C. Navajo weavers have used some of the same designs for hundreds of years.

D. Weaving is done primarily for use in rituals.

10. The word “ancestor” in the passage is closest in meaning to

A. relative from an earlier generation

B. person who established a particular tradition in a society

C. hero from ancient times

D. person who once made important contributions to a social group or culture

11. Why does the author discuss “a mythic ancestor”?

A. To show how Navajo ideas of weaving have changed over time.

B. To explain why the Navajo principle of stability is more clearly represented in their weavings than in their sand paintings.

C. To emphasize the role of naturally occurring weaving materials in the creative weavings of the Navajo.

D. To help explain the significance of weaving in Navajo culture.

12. According to paragraph 4, Navajo weavers imitate

A. traditional weaving patterns

B. patterns used in sand paintings

C. the activities through which the world was created

D. images from nature

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Since this purpose is limited to the context of the ritual, the paintings are destroyed whenthe ritual is completed.**

Where would the sentence best fit?

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selected THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points**.

**Navajo art is fundamentally connected to aspects of Navajo ritual and belief.**

●

●

●

**Answer Choices**

A. Navajo sand paintings are an expression of the close relationship between nature and the spiritual world in Navajo culture

B. Sand paintings, which help participants in rituals recall traditional chants, are part of ceremonies designed to restore beauty and harmony.

C. Whereas Navajo sand paintings are associated with male deities. Navajo weaving involves representations of female figures such as Spider Woman.

D. Individual Navajo sand paintings typically embody the principles of harmony and disorder.

E. Sand paintings, which are created by Navajo men, are faithful re-creations of earlier works and as such represent the principle of stability.

F. In Navajo culture, weaving is a female art and is associated with creativity and change.

参考答案:1-5.B D C D B 6-10.B A D A A 11-13.D C D 14.BEF

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：纳瓦霍人的艺术**

纳瓦霍人是生活在美国西南部的美洲土著人，以小规模的散居为生活方式。在许多方面，如教育、职业和休闲活动，他们的生活就像其他群体一样，是二十一世纪北美文化的多元化的社会结构的一部分。同时，他们还保留了一些与特定艺术形式相关的传统文化习俗。例如，最重要的传统纳瓦霍仪式包括大型地板画创作。这些画实际上是把精心控制的细彩沙、蔬菜粉、矿物粉、花粉或花倒在地上的精确模型中制作而成。这些画中直径最大的可能有5.5米，可以覆盖整个房间的地板。面对设计模型，纳瓦霍艺术家和助手们用自己的手指由内向外撒下黑、白、蓝灰、橙、红色的材料来制作细致入微的图像。仪式所用的图画和圣歌由训练有素的艺术家和歌手们指定，他们借助了戴面具的表演者所扮演的圣灵。我们所知的二十四首纳瓦霍圣歌可由多达500幅的沙画来表现。这些复杂的绘画作为辅助记忆的手段，指导歌手在仪式中的演唱，这些演唱可以持续九天。

沙画的目的和意义可以通过审视纳瓦霍社会的其中一个最基本的理想来说明，这个理想体现在他们的“hozho”一词（“美”、“和谐”，“善良”、和“幸福”）。在一个活力和稳定的对立力量创造不断变化的世界里，它与“hochxo”（“丑”或“邪恶”和“无序”）并存。当初创时美丽的世界变得丑陋和无序时，纳瓦霍人便聚集到一起，举行仪式，通过唱圣歌和画沙画来恢复世界的美丽和谐。有些疾病本身就被认为是一种不和谐。因此，通过仪式恢复和谐也可以作为治疗的一部分。

男人做沙画，是准确地复制过去的画作。对着沙画演唱的歌曲也是过去歌曲的忠实再现。通过再现这些反映了创作的原始之美的艺术，纳瓦霍人将美丽带到现实世界来。作为美国西南部相对较新的人，面对西部荒凉的气候、冷漠的邻居和无情的统治，纳瓦霍人不只是通过重复这些象征性的行为，更是通过美和艺术品自身的和谐创造了这些艺术形式来影响他们周围的世界。这些沙画通常讲述神话英雄一生的思想和事迹，这些英雄在被神治愈后，将歌曲和绘画赠与人类。艺术家根据记忆尽可能准确地重新创造了画像的传统艺术形式。

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纳瓦霍人设计编织的毛毯也是世界闻名。纳瓦霍妇女掌管着自家的羊群，控制羊毛的剪取、梳理、纺纱和染色、以及面料织造的全过程。男性忠实复制过去的沙画代表着纳瓦霍思想的稳定性，而女性为每个编织做新的设计，体现的则是活力。编织是一种创造力的一种形式，是由一个叫蜘蛛女的神话人物将宇宙编织成一个联合天地的宇宙网而来。传说是她教纳瓦霍妇女编织的。妇女们准备材料和编织的过程，就是最初创造了世界的改变的模仿。

纳瓦霍织工在织布机上创造图像，体会人与自然的和谐。这是她们创造美，从而促进世界的美、和谐和治愈的方式。因此，编织是一种看世界的方式，也是世界的一部分。

## **Climate of Venus**

Earth has abundant water in its oceans but very little carbon dioxide in its relatively thin atmosphere. By contrast, Venus is very dry and its thick atmosphere is mostly carbon dioxide. The original atmospheres of both Venus and Earth were derived at least in part from gases spewed forth, or outgassed, by volcanoes. The gases that emanate from present-day volcanoes on Earth, such as Mount Saint Helens, are predominantly water vapor, carbon dioxide, and sulfur dioxide. These gases should therefore have been important parts of the original atmospheres of both Venus and Earth. Much of the water on both planets is also thought to have come from impacts from comets, icy bodies formed in the outer solar system.

In fact, water probably once dominated the Venusian atmosphere. Venus and Earth are similar in size and mass, so Venusian volcanoes may well have outgassed as much water vapor as on Earth, and both planets would have had about the same number of comets strike their surfaces. Studies of how stars evolve suggest that the early Sun was only about 70 percent as luminous as it is now, so the temperature in Venus’ early atmosphere must have been quite a bit lower. Thus water vapor would have been able to liquefy and form oceans on Venus. But if water vapor and carbon dioxide were once so common in the atmospheres of both Earth and Venus, what became of Earth’s carbon dioxide? And what happened to the water on Venus?

The answer to the first question is that carbon dioxide is still found in abundance on Earth, but now, instead of being in the form of atmospheric carbon dioxide, it is either dissolved in the oceans or chemically bound into carbonate rocks, such as the limestone and marble that formed in the oceans. If Earth became as hot as Venus, much of its carbon dioxide would be boiled out of the oceans and baked out of the crust. Our planet would soon develop a thick, oppressive carbon dioxide atmosphere much like that of Venus.

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To answer the question about Venus’ lack of water, we must return to the early history of the planet. Just as on present-day Earth, the oceans of Venus limited the amount of atmospheric carbon dioxide by dissolving it in the oceans and binding it up in carbonate rocks. But being closer to the Sun than Earth is, enough of the liquid water on Venus would have vaporized to create a thick cover of water vapor clouds. Since water vapor is a greenhouse gas, this humid atmosphere—perhaps denser than Earth’s present-day atmosphere, but far less dense than the atmosphere that envelops Venus today—would have efficiently trapped heat from the Sun. At first, this would have had little effect on the oceans of Venus. Although the temperature would have climbed above 100° C, the boiling point of water at sea level on Earth, the added atmospheric pressure from water vapor would have kept the water in Venus' oceans in the liquid state.

This hot and humid state of affairs may have persisted for several hundred million years. But as the Sun’s energy output slowly increased over time, the temperature at the surface would eventually have risen above 374°C. ■Above this temperature, no matter what the atmospheric pressure, Venus’ oceans would have begun to evaporate, and the added water vapor in the atmosphere would have increased the greenhouse effect. ■This would have made the temperature even higher and caused the oceans to evaporate faster, producing more water vapor. ■That, in turn, would have further intensified the greenhouse effect and made the temperature climb higher still.■

Once Venus’ oceans disappeared, so did the mechanism for removing carbon dioxide from the atmosphere. With no oceans to dissolve it, outgassed carbon dioxide began to accumulate in the atmosphere, intensifying the greenhouse effect even more. Temperatures eventually became high enough to "bake out" any carbon dioxide that was trapped in carbonate rocks. This liberated carbon dioxide formed the thick atmosphere of present-day Venus. Over time, the rising temperatures would have leveled off, solar ultraviolet radiation having broken down atmospheric water vapor molecules into hydrogen and oxygen. With all the water vapor gone, the greenhouse effect would no longer have accelerated.

1. According to paragraph 1, in what major respect are Venus and Earth different from each other?

A. Whether carbon dioxide was present in their original atmospheres

B. How thin their original atmospheres were

C. What their present-day atmospheres mainly consist of

D. How long ago they first developed an atmosphere

2. Why does the author mentions "present-day volcanoes on Earth"

A. To provide an example of an important difference between present-day Venus and present-day Earth.

B. To help explain why Earth’s atmosphere still contains traces of sulfur dioxide but Venus’ does not.

C. To indicate one source of information about the likely composition of the original atmospheres of Venus and Earth.

D. To account for the fact that Earth’s water supply no longer comes primarily from impacting comets.

3. According to paragraph 2, what is one reason for thinking that at one time, there were significant amounts of water on Venus?

A. Because of Venus’ size and mass, its volcanoes probably produced much more water vapor than volcanoes on Earth did.

B. The low temperature of Venus，early atmosphere can be explained only by the presence of water.

C. The presence of carbon dioxide in a planet's atmosphere is an indicator of water on that planet.

D. Venus probably was struck by roughly as many comets as Earth was.

4. The word "luminous' in the passage is closest in meaning to

A. dense

B. bright

C. large

D. active

5. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. The first question to be answered is how Earth’s atmospheric carbon dioxide either got dissolved in the oceans or got chemically bound into carbonate rocks.

B. The fact that Earth’s abundant carbon dioxide is more often found in carbonate rock than dissolved in the oceans is the answer to the first question.

C. Earth still has abundant carbon dioxide, but instead of being in the atmosphere it is now dissolved in the oceans or chemically bound into ocean rocks.

D. The formation of limestone and marble used up the carbon dioxide that was dissolved in Earth’s oceans so that only carbon dioxide in the atmospheric form remained.

6. According to paragraph 4, what is one factor that kept the amount of carbon dioxide in the atmosphere of early Venus relatively low?

A. The presence of water vapor clouds

B. The presence of oceans

C. Rapidly increasing temperatures at ground level

D. Low atmospheric pressures

7. The phrase "mechanism for" in the passage is closest in meaning to

A. means of

B. importance of

C. need for

D. benefits of

8. The word "persisted" in the passage is closest in meaning to

A. improved

B. continued

C. weakened

D. evolved

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9. According to paragraph 5, what happens when temperatures rise above 374°C?

A. Atmospheric pressure begins to decrease.

B. Water vapor disappears from the atmosphere.

C. Water evaporates regardless of atmospheric pressure.

D. More energy is required to evaporate a given volume of water.

10. According to paragraph 6, extremely high temperatures increased the amount of carbon dioxide in Venus'atmosphere by

A increasing the rate at which carbon dioxide was outgassed

B baking out carbon dioxide from carbonate rocks

C creating additional water vapor

D replacing the previous mechanisms for removing carbon dioxide with less effective ones

11. The passage supports the idea that the basic reason that Venus and Earth are now so different from each other is that

A. early Venus had more frequent volcanic outgassing than early Earth did

B. early Venus had far less liquid water than early Earth did

C. volcanic activity stopped relatively early on Venus but continued on Earth

D. Venus is closer to the Sun than Earth is

12. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This cycle of rising temperatures following an increase in greenhouse gases is known as the runaway greenhouse effect.**

Where would the sentence best fit?

13. **Directions:** Select from the seven phrases below the 2 phrases that correctly characterize early Venus and the 3 phrases that correctly characterize present-day Venus. Drag each phrase you select into the appropriate column of the table. Two of the phrases will NOT be used. **This question is worth 3 points.** Drag your answer choices to the spaces where they belong. To remove an answer choice, click on it.

|  |  |
| --- | --- |
| **Early Venus** | **Present-day Venus** |
|  |  |

**Answer Choices**

A. High percentage of water vapor in the atmosphere

B. Carbon dioxide present only in atmospheric form

C. an atmosphere quite similar to that of early Earth

D. Very dense but relatively cool atmosphere

E. Completely covered with water

F. Complete absence of surface water essentially stable temperatures

参考答案

1-5 C C D B C 6-10B A B C B 11-12 D C

1. Early Venus: C,D; Present-day Venus:A,B,F

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## **参考译文：金星的气候**

地球的海洋中有丰富的水，但在稀薄大气中二氧化碳含量极少。相比之下，金星是非常干燥的，它厚厚的大气中的大多是二氧化碳。金星和地球的原始大气至少部分是来自火山喷出或排出的气体。来自现如今地球上的火山（例如圣海伦斯火山）的气体主要是水蒸气、二氧化碳、和二氧化硫。因此，这些气体应该是金星和地球原始大气的重要部分。这两个行星上的大部分水也被认为来自在太阳系外形成的彗星和冰体的影响。

事实上，水蒸气可能曾经是金星大气层的主要成分。金星和地球的大小和质量都差不多，所以两个星球的火山排出的水蒸气可能是一样多的，而且撞击到两个星球的彗星数量也相当。恒星演化的研究表明，早期的太阳亮度只相当于现在的百分之七十，所以金星早期的大气中的温度肯定比现在要低一点。因此，水蒸气能液化并在金星上形成海洋。但是，如果水蒸气和二氧化碳在地球和金星的大气中曾经如此普遍，地球的二氧化碳去了哪里？金星上的水蒸气又发生了什么？

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第一个问题的答案是，地球上的二氧化碳仍然很多，但现在不是以大气中的二氧化碳的形式出现，而是溶解在海洋里或通过化学作用进入碳酸盐岩中，比如在海洋中形成的石灰石和大理石。如果地球变得像金星一样热，它大部分的二氧化碳就会被从海洋中沸腾出来，从地壳中烘烤出来，我们的星球很快就会形成一个厚重的二氧化碳大气层，就像金星的大气层一样。

要回答关于金星缺乏水的问题，我们必须回头看这个星球早期的历史。正如在现今的地球上一样，金星的海洋通过将二氧化碳溶解在海洋里、困在碳酸盐岩里来限制大气中二氧化碳的含量。但是金星比地球离太阳更近，很多液态水会蒸发，形成一层厚厚的水蒸气云。由于水蒸气是一种温室气体，这个潮湿的大气层——可能比地球现在的大气层厚，要比现在笼罩的金星的大气层薄得多——可以有效地留住来自太阳来的热量。起初，这对金星的海洋影响不大。尽管温度可能会上升到100°C，即地球海平面上的水的沸点，但水蒸气所增加的大气压力将使金星海洋中的水保持液态。

这种炎热潮湿的状态可能持续了好几百万年。但随着太阳能量输出渐渐增加，金星表面温度最终会上升到374°C以上。在此温度之上，无论大气压力有多大，金星的海洋都会开始蒸发，而大气中的水蒸气的增加将会加强温室效应。这会使温度更高，造成海洋蒸发更快，产生更多的水蒸气。反过来又会进一步加剧温室效应，使温度继续上升。

一旦金星的海洋消失，那么去除大气中二氧化碳的机制也会消失。没有了海洋溶解，那些排出来的二氧化碳开始积聚在大气中，进一步加剧温室效应。温度最终变得足以“烤出”任何困在碳酸盐岩中的二氧化碳。这些释放的二氧化碳形成了金星如今厚厚的大气层。随着时间的推移，温度上升会趋于平稳，太阳紫外线辐射会将大气中的水蒸气分子分解成氢和氧。所有水蒸气都消失了，温室效应也就不会加速了。

## Trade and Early State Formation

Bartering was a basic trade mechanism for many thousands of years; often sporadic and usually based on notions of reciprocity, it involved the mutual exchange of commodities or objects between individuals or groups. Redistribution of these goods through society lay in the hands of chiefs, religious leaders, or kin groups. Such redistribution was a basic element in chiefdoms. The change from redistribution to formal trade—often based on regulated commerce that perhaps involved fixed prices and even currency—was closely tied to growing political and social complexity and hence to the development of the state in the ancient world. In the 1970s, a number of archaeologists gave trade a primary role in the rise of ancient states.

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British archaeologist Colin Renfrew attributed the dramatic flowering of the Minoan civilization on Crete and through the Aegean to intensified trading contacts and to the impact of olive and vine cultivation on local communities. As agricultural economies became more diversified and local food supplies could be purchased both locally and over longer distances, a far-reaching economic interdependence resulted. Eventually, this led to redistribution systems for luxuries and basic commodities, systems that were organized and controlled by Minoan rulers from their palaces. As time went on, the self-sufficiency of communities was replaced by mutual dependence. Interest in long-distance trade brought about some cultural homogeneity from trade and gift exchange, and perhaps even led to piracy. Thus, intensified trade and interaction, and the flowering of specialist crafts, in a complex process of positive feedback, led to much more complex societies based on palaces, which were the economic hubs of a new Minoan civilization.

Renfrew’s model made some assumptions that are now discounted. For example, he argued that the introduction of domesticated vines and olives allowed a substantial expansion of land under cultivation and helped to power the emergence of complex society. Many archaeologists and paleobotanists now question this view, pointing out that the available evidence for cultivated vines and olives suggests that they were present only in the later Bronze Age. Trade, nevertheless, was probably one of many variables that led to the emergence of palace economies in Minoan Crete.

American archaeologist William Rathje developed a hypothesis that considered an explosion in long-distance exchange a fundamental cause of Mayan civilization in Mesoamerica. He suggested that the lowland Mayan environment was deficient in many vital resources, among them obsidian, salt, stone for grinding maize, and many luxury materials. All these could be obtained from the nearby highlands, from the Valley of Mexico, and from other regions, if the necessary trading networks came into being. Such connections, and the trading expeditions to maintain them, could not be organized by individual villages. The Maya lived in a relatively uniform environment, where every community suffered from the same resource deficiencies. Thus, argued Rathje, long- -distance trade networks were organized through local ceremonial centers and their leaders. In time, this organization became a state, and knowledge of its functioning was exportable, as were pottery, tropical bird feathers, specialized stone materials, and other local commodities.

Rathje’s hypothesis probably explains part of the complex process of Mayan state formation, but it suffers from the objection that suitable alternative raw materials can be found in the lowlands. It could be, too, that warfare became a competitive response to population growth and to the increasing scarcity of prime agricultural land, and that it played an important role in the emergence of the Mayan states.

Now that we know much more about ancient exchange and commerce, we know that, because no one aspect of trade was an overriding cause of cultural change or evolution in commercial practices, trade can never be looked on as a unifying factor or as a primary agent of ancient civilization. ■Many ever-changing variables affected ancient trade, among them the demand for goods. ■There were also the logistics of transportation, the extent of the trading network, and the social and political environment. ■Intricate market networks channeled supplies along well-defined routes. ■Authorities at both ends might regulate the profits fed back to the source, providing the incentive for further transactions. There may or may not have been a market organization. Extensive long-distance trade was a consequence rather than a cause of complex societies.

1. The word "notions" in the passage is closest in meaning to

A. ideas

B. rules

C. degrees

D. traditions

2. According to paragraph 1, what development occurred as political and social complexity increased?

A. The prices of most commodities rose.

B. Formal trade emerged.

C. Chiefs became more powerful

D. Bartering became the preferred means of trade.

3. The word “diversified” in the passage is closest in meaning to

A. organized

B. selective

C. varied

D. efficient

4. According to paragraph 2, which of the following controlled the systems of redistribution of goods in ancient Crete?

A. Local community leaders

B. Olive growers

C. Minoan rulers

D. Long-distance traders

5. According to paragraph 2, Renfrew believed that one effect of long-distance trade in the Aegean was

A. a greater effort to control piracy

B. greater cultural similarity throughout the region

C. a decline in local olive production

D. a decline in the use of luxuries for gift exchanges

6. According to paragraph 3, what was a major problem with Renfrew’s model?

A. He overlooked the fact that only the Minoan palaces had access to domesticated vines and olives.

B. He wrongly assumed that the introduction of domesticated vines and olives led to the cultivation of more land.

C. Trade in domesticated plants was much more important to the emergence of Minoan palace economies than he thought.

D. Domesticated vines and olives do not appear to have been available as early as he thought.

7. According to paragraph 4, which of the following was true about ancient Mayan communities?

A. They each created their own separate trading networks with communities in the nearby highlands.

B. They all had many luxury materials that they were able to trade for resources that they lacked.

C. They all needed to obtain a number of important materials through trade with other regions.

D. They all gradually reduced their trading activities with communities in the Valley of Mexico and developed trading networks with other regions.

8. What can be inferred from the fact that the Maya lived in a “relatively uniform environment”?

A. The communities could not obtain resources they lacked by trading with each other.

B. The communities’ ceremonial centers were all organized in much the same way.

C. Increased competition between the communities to export their local commodities expanded commercial networks beyond the nearby highlands.

D. Different communities tended to specialize in the production of different commodities.

9. The word “prime” in the passage is closest in meaning to

A. low-lying

B. easily accessible

C. unused

D. high-quality

10. What is the role of paragraph 5 in relation to paragraph 4?

A. It restates the hypothesis presented in paragraph 4 and reinforces it with further evidence.

B. It presents evidence that the hypothesis discussed in paragraph 4 confuses cause and effect.

C. It presents a critical assessment of the hypothesis presented in paragraph 4.

D. It explains how the hypothesis discussed in paragraph 4 was initially formulated.

11. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. We now know that ancient trade cannot be considered a main factor in the rise of civilization, because no one aspect of it caused change in culture or commercial practices.

B. We now know that the growth of civilization was an important factor in causing cultural change and in improving commercial practices.

C. We now know much more about how ancient trade and commerce led to cultural changes and the evolution of commercial practices.

D. We now know much more about the main factors and agents that led to ancient civilization, because we know what aspects of trade affected culture and commercial practices.

12. According to paragraph 6, all of the following statements about trade in ancient civilizations are true EXCEPT:

A. The spread of trade was influenced by many variables, none of which was the main cause.

B. Political conditions were more important than demand for goods in the development of trade.

C. Some markets had clearly established trading routes.

D. The regulation of profits provided incentives for future trade.

13. Look at the four squares **[**■**]** that indicate where the following sentence could be added to the passage.

**But demand for locally unobtainable resources was clearly only a part of the story.**

Where would the sentence best fit? Click on a square **[**■**]** to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Various attempts have been made to explore the role that trade played in the rise of ancient**

**states.**

**Answer Choices**

A. Barter, a basic trade mechanism that involved the direct exchange of goods or services, depended on a high degree of social complexity.

B. It was only in the 1970s that most archaeologists began to realize that the long-distance trade typical of Minoan communities varied significantly from that of lowland Mayan communities.

C. Renfrew and Rathje are recognized today for having correctly analyzed the basic relationship between trade and the emergence of states, even though they were wrong about many details.

D. Renfrew suggested that an organized state emerged in Minoan Crete because of intensified trade, but current views indicate that trade was probably only one of many variables.

E. Rathje's hypothesis that long-distance trade led to the emergence of a Mayan state has been objected to, and it is argued that other factors such as warfare may have played an important role too.

F. Current views indicate that trade was not the most important agent of ancient civilization and that long-distance trade was a result rather than a cause of complex societies.

参考答案

1-5.A B C C B 6-10.D C A D C 11-13.A B B 14.DEF

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：贸易和早期国家的形成**

物物交换是数千年来的基本交易机制；它是偶发的，并且通常是基于互惠这一概念，它包括个体或群体之间相互交换商品或物品的行为。这些商品的社会再分配由酋长、宗教领袖、或亲属团体掌控。这种再分配是酋长权力的一个基本要素。从再分配到正式贸易——通常是基于包括固定价格甚至是货币在内的有规划的商业模式——的变化与政治和社会越来越复杂息息相关，因此也与古代国家的发展有关。在20世纪70年代，许多考古学家认为贸易在古代国家的崛起中起了主要作用。

英国考古学家科林·伦福儒将克里特岛和爱琴海的米诺斯文明的蓬勃发展归因于更多的贸易接触和当地橄榄和葡萄栽培的影响。随着农业经济越来越多样化，当地粮食供应既可以在本地购买，也可以到远处购买，一种影响深远的相互依存的经济关系便形成了。最终，奢侈品和基本商品都有了重新分配系统，这些系统由宫殿里的米诺斯统治者控制。随着时间的推移，社区由自给自足变成相互依赖。远距离贸易带来的利益，使得文化在贸易和礼品交换变得同质化，甚至可能导致盗版。因此，频繁的贸易和互通以及专业工艺的蓬勃发展，在一个复杂的积极影响过程中，使得建立在皇权上的社会更加复杂。皇宫是新米诺斯文明的经济中心。

伦福儒的模型做了一些假设，这些假设在现在是不太可信的。例如，他认为，引进家种的葡萄和橄榄使得大量耕种土地扩张，并有利于推动更加复杂的社会的出现。许多考古学家和古植物学家现在质疑这一观点，指出现有的关于葡萄和橄榄种植的证据表明它们是在青铜时代后期才开始种植的。无论如何，贸易可能是众多导致克里特宫廷经济崛起的因素之一。

美国考古学家威廉·雷斯杰提出了一种假设，认为远距离贸易的激增是中美洲玛雅文明出现的一个根本原因。他认为地势低洼的玛雅缺乏很多重要的资源，如黑曜石、盐、磨玉米的石头和许多奢侈品。如果有一定的贸易网，所有这些都可以从附近的高地，墨西哥的山谷或其他地区获得。获得这些资源的这种联系和贸易旅途，不能由某个村子组织。而玛雅人生活在一个相对统一的环境中，每个团体都缺乏同样的资源。因此，雷斯杰认为，远距离贸易网是由当地的仪式中心和他们的领导人组织的。后来，这个组织发展成为一个国家，这种运作模式便可以输出了，当地的陶器、热带鸟的羽毛、专业的石材和其他本地物品也同样可以往外输送了。

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雷斯杰的假设可能解释了玛雅国家形成的复杂过程的一部分，但对这一解释的异议在于低洼地带也有可替代的原材料。也可能是，人口增长和日益稀缺的优质农业土地引发了战争，在玛雅国家的出现中发挥了重要作用。

由于我们对古代贸易和商业的了解越来越多，我们知道，因为贸易的任何一个方面都不足以成为商业实践的文化变革或演变的最重要因素，贸易也不能被当作是古代文明出现的唯一因素或主要动力。许多不断变化的变量，比如对商品的需求，影响着古代贸易。还有物流运输、贸易网络的广度，以及社会和政治环境。错综复杂的市场网络沿着既定的路线输送物资。买卖双方的领导人物可能会调节给供货商的利润，以此鼓励更多的交易。这中间可能有市场组织，也可能没有。广泛的远距离贸易是复杂社会的产物，而不是起因。

# TPO-42

## Geographic Isolation of Species

Biologist Ernst Mayr defined a species as “an actually or potentially interbreeding population that does not interbreed with other such populations when there is opportunity to do so.” A key event in the origin of many species is the separation of a population with its gene pool (all of the genes in a population at any one time) from other populations of the same species, thereby preventing population interbreeding. With its gene pool isolated, a separate population can follow its own evolutionary course. In the formation of many species, the initial isolation of a population seems to have been a geographic barrier. This mode of evolving new species is called allopatric speciation.

Many factors can isolate a population geographically. A mountain range may emerge and gradually split a population of organisms that can inhabit only lowland lakes, certain fish populations might become isolated in this way. Similarly, a creeping glacier may gradually divide a population, or a land bridge such as the Isthmus of Panama may form and separate the marine life in the ocean waters on either side.

How formidable must a geographic barrier be to keep populations apart? It depends on the ability of the organisms to move across barriers. Birds and coyotes can easily cross mountains and rivers. The passage of wind-blown tree pollen is also not hindered by such barriers, and the seeds of many plants may be carried back and forth on animals In contrast, small rodents may find a deep canyon or a wide river an effective barrier. For example, the Grand Canyon, in the southwestern United States, separate the range of the while-tailed antelope squirrel from that of the closely related Harris’ antelope squirrel. Smaller, with a shorter tail that is white underneath, the white-tailed antelope squirrel inhabits deserts north of the canyon and west of the Colorado River in southern California Hams' antelope squirrel has a more limited range in deserts south of the Grand Canyon.

Geographic isolation creates opportunities for new species to develop, but it does not necessarily lead to new species because speciation occurs only when the gene pool undergoes enough changes to establish reproductive barriers between the isolated population and its parent population. The likelihood of allopatric speciation increases when a population is small as well as isolated, making it more likely than a large population to have its gene pool changed substantially. For example, in less than two million years, small populations of stray animals and plants from the South American mainland that managed to colonize the Galapagos Islands gave rise to all the species that now inhabit the islands.

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When oceanic islands are far enough apart to permit populations to evolve in isolation, but close enough to allow occasional dispersions to occur, they are effectively outdoor laboratories of evolution. The Galapagos island chain is one of the world’s greatest showcases of evolution. Each island was born from underwater volcanoes and was gradually covered by organisms derived from strays that rode the ocean currents and winds from other islands and continents. Organisms can also be carried to islands by other organisms, such as sea birds that travel long distances with seeds clinging to their feathers.

The species on the Galapagos Islands today, most of which occur nowhere else, descended from organisms that floated, flew, or were blown over the sea from the South American mainland. For instance, the Galapagos island chain has a total of thirteen species of closely related birds called Galapagos finches. These birds have many similarities but differ in their feeding habits and their beak type, which is correlated with what they eat. Accumulated evidence indicates that all thirteen finch species evolved from a single small population of ancestral birds that colonized one of the islands. Completely isolated on the island after migrating from the mainland, the founder population may have undergone significant changes in its gene pool and become a new species. ■Later, a few individuals of this new species may have been blown by storms to a neighboring island. ■Isolated on this second island, the second founder population could have evolved into a second new species, which could later recolonize the island from which its founding population emigrated. ■Today each Galapagos island has multiple species of finches, with as many as ten on some islands. ■

1. The word “key” in the passage is closest in meaning to

A. early

B. crucial

C. noticeable

D. frequent

2. The word “initial” in the passage is closest in meaning to

A. best

B. usual

C. first

D. actual

3. According to paragraph 1, allopatric speciation is possible when

A. a population contains all the different genes present in a species at a particular time

B. a population becomes isolated due to the presence of a geographic barrier

C. genetic mixing begins to occur in previously separate populations of a species

D. a species is successful in crossing a geographic barrier

4. How is paragraph 2 related to paragraph 1?

A. Paragraph 2 points out a number of ways in which the phenomenon of geographic isolation mentioned in paragraph 1 can occur

B. Paragraph 2 identifies discoveries that led to the conclusion presented in paragraph 1 that geographic isolation has played a role in the origin of many species

C. Paragraph 2 provides evidence supporting the statement in paragraph 1 that a population can follow its own evolutionary course once its gene pool becomes isolated

D. Paragraph 2 explains why the term “allopatric” was adopted to describe the method of speciation described in paragraph 1

5. In paragraph 3, the author contrasts a variety of organisms to illustrate which of the following points?

A. Geographic barriers are less likely to keep apart populations of plants than populations of animals

B. Geographic barriers are more likely to keep apart populations of large organisms than populations of small organisms

C. Some members of a species are able to cross geographic barriers, while other members of the same species are not

D. The effectiveness of geographic barriers in keeping organisms apart depends on an organism’s ability to move across barriers

6. Paragraph 3 supports the idea that white-tailed antelope squirrels and Hams' antelope squirrels have which of the following in common?

A. They are the two smallest rodents now found in the southwestern United States.

B. They have white coloring underneath their tails

C. They cannot cross the Grand Canyon

D. They cannot survive in desert conditions

7. The word “undergoes" in the passage is closest in meaning to

A. experiences

B. allows

C. prevents

D. causes

8. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information

A. Geographic isolation is sometimes but not always the reason for the creation of reproductive barriers between a parent population and the populations descended from it

B. Genetic changes in a geographical isolated population do not necessarily make the population look different enough from its parent population to be considered a new species

C. Geographical isolation allows the separated populations to evolve independently of each other and so can lead to the formation of new species

D. Geographic isolation can lead to new species only if the gene pool of the isolated population changes enough to prevent it from reproducing with the parent population

9. According to paragraph 4, why does the size of a population affect the likelihood of allopatric speciation?

A. Because smaller populations are more likely than larger ones to become geographically isolated

B. Because the gene pool of a small isolated population is more likely to undergo substantial change than is the gene pool of a larger population

C. Because an isolated population can become a new species with substantially less change to its gene pool than would be required by a larger population

D. Because smaller populations are more likely to be made up of stray animals or plants than larger populations are

10. The word “managed” in the passage is closest in meaning to

A. were able

B. were forced

C. arrived

D. expanded

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11. Paragraph 5 supports the idea that the Galapagos island chain was able to become “one of the world's greatest showcases of evolution” primarily because of

A. the richness of the volcanic soil of each of the islands in the chain

B. the distance of the individual islands from each other and from the mainland

C. the relativity long time it took for the islands to become covered by organisms

D. the outdoor laboratories that scientists have built on the islands to study evolution

12. According to paragraph 6, what is true about the thirteen species of Galapagos finches?

A. All thirteen species are now found on most of the Galapagos Islands

B. All thirteen species are descended from the same population of ancestral birds

C. All thirteen species evolved on the island that was originally colonized by finches from the mainland.

D. All thirteen species occur only in small, completely isolated populations.

13. Look at the four squares [█] that indicate where the following sentence could be added to the passage

**This process of speciation and colonization could have been repeated over and over again, gradually involving all the islands in the chain.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **The question is worth 2 points.**

The geographic isolation of a population can result in the rise of a new species.

●

●

●

**Answer Choices**

○ Isolation can result when a geographic barrier forms and splits a population or when a few organisms somehow get carried across an existing geographic barrier and form a new population

○ Speciation is more likely when an isolated population is small because significant genetic changes are more likely to occur in a small population than in a large one

○ Because of the geographic isolation of the Galapagos Islands, the species that now inhabit them have gene pools that have not changed very much since the islands were first populated.

○ Fish populations are more easily isolated by geographic barriers than are populations of most other organisms because fish cannot move across areas where there is no water.

○ The Galapagos Islands are well situated for speciation because they provide opportunities for population isolation while also making occasional dispersions between islands possible.

○ Evidence indicates that the first organisms to reach the Galapagos Islands were probably a small population of finches that, in less than two million years of isolation, evolved into thirteen species.

答案：1-5: B C B A D 6-10:C A D B A 11-14: B B C A B E

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## **参考译文：物种的地理隔离**

生物学家厄恩斯特·迈尔将物种定义为“一个可以互相交配或可能互相交配的群体，但这个群体不能与其它生物交配，即便有交配的机会”。许多物种起源时的一个关键事件是有着自己的基因库的种群（任何时候这个种群的所有基因）与该物种其他种群分离。由于基因库被隔离，各自的种群可以按照自身的进程来进化。在许多物种的形成过程中，最初的种群隔离似乎来自一种地理上的屏障，这种进化新物种的模式被称为异域物种形成。

许多因素可以在地域上隔离一个种群。某些山脉的出现会逐渐分离出一个只能在低洼的湖泊中生活的物种，某些鱼类可能就这样被隔离出来了。类似地，冰川的上升可能会慢慢地将同一个种群分开，或者像巴拿马地峡这样的大陆桥会将海洋生物隔离在大陆桥的两边水域。

多么强大的地理屏障才能将种群分开呢？它取决于生物跨越障碍的能力。鸟类和狼可以轻易越过山川河流。那些通过风来传播花粉的树木也不会受到这些壁垒的阻碍，并且很多植物的种子会被动物搬来搬去。相对来说，一个很深的峡谷或一条宽阔的河流可能是小型啮齿类动物的有效屏障。例如，美国西南部的大峡谷将白尾羚羊松鼠的生活范围以及与其密切相关的哈里斯羚羊松鼠的生活范围隔开。白尾羚羊松鼠体型较小，尾巴很短且下面是白色的，栖息于大峡谷以北、科罗拉多河以西的南加利福尼沙漠地区。哈里斯羚羊松鼠的生活范围比较有限，位于大峡谷以南的沙漠地区。

地理隔离为新物种的进化创造了机会，但这并不一定会形成新物种。因为物种形成只有在基因库发生足够大的变化，被隔离的种群与亲本种群之间出现繁殖障碍（即不能交配繁殖）时才发生。种群的数量比较小且被隔离开来时，比数量大的种群更容易发生基因库的实质变化，也就增加了异域物种形成的可能性。例如，从南美大陆流浪而来，成功移居到加拉帕戈斯群岛的动物和植物小种群，在不到二百万年的时间就进化出了现在岛上存在的所有物种。

当海洋岛屿互相之间的距离比较远，使得种群得以独立进化，但又不至于太远从而使得物种可以在偶然的条件下传播过去时，它们就是有效的户外进化实验室。加拉帕戈斯群岛是世界上最伟大的进化展示窗之一。它的每个岛屿都来自海底火山喷发，岛上逐渐住满了洋流和风从其他岛屿和陆地带来的生物。这些生物也可能是被其他生物带到岛屿上来的，如长途飞来的海鸟羽毛上可能沾有其他植物的种子。

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今天生活在加拉帕戈斯群岛的物种，是那些由从南美大陆飘过来、飞过来、或者被风吹过来的物种演变而来的，其中大多数物种是岛上独有的，在其他地方见不到。例如，加拉帕戈斯群岛有十三种联系紧密的鸟都叫加拉帕戈斯雀类。这些鸟类有许多相似之处，但他们的饮食习惯和嘴型（与它们所吃的东西有关）存在不同。已经收集到的证据表明，这十三种雀鸟都是从一个小种群的鸟类祖先进化而来的，这个鸟类的祖先在其中的一个岛栖息繁殖。从大陆迁移来后，它们在岛上完全被隔离开来，最初的种群基因库发生了很大的变化，成为一个新的物种。后来，新物种的小部分可能被风暴吹到了邻近的一个岛。它们在这个岛上再次被隔离开来，这第二个初始种群可能又进化出另一个新物种，而这个新物种之后又可能重新回到它的初始种群来自的那个岛。今天每个加拉帕戈斯岛都有多种雀鸟，有些岛上多达十种。

## Explaining Dinosaur Extinction

Dinosaurs rapidly became extinct about 65 million years ago as part of a mass extinction known as the K-T event, because it is associated with a geological signature known as the K-T boundary, usually a thin band of sedimentation found in various parts of the world (K is the traditional abbreviation for the Cretaceous, derived from the German name Kreidezeit). █Many explanations have been proposed for why dinosaurs became extinct. █For example, some have blamed dinosaur extinction on the development of flowering plants, which were supposedly more difficult to digest and could have caused constipation or indigestion—except that flowering plants first evolved in the Early Cretaceous, about 60 million years before the dinosaurs died out. █In fact, several scientists have suggested that the duckbill dinosaurs and horned dinosaurs, with their complex battery of grinding teeth, evolved to exploit this new resource of rapidly growing flowering plants █Others have blamed extinction on competition from the mammals, which allegedly ate all the dinosaur eggs—except that mammals and dinosaurs appeared at the same time in the Late Triassic, about 190 million years ago, and there is no reason to believe that mammals suddenly acquired a taste for dinosaur eggs after 120 million years of coexistence. Some explanations (such as the one stating that dinosaurs all died of diseases) fail because there is no way to scientifically test them, and they cannot move beyond the realm of speculation and guesswork.

This focus on explaining dinosaur extinction misses an important point: the extinction at the end of the Cretaceous was a global event that killed off organisms up and down the food chain. It wiped out many kinds of plankton in the ocean and many marine organisms that lived on the plankton at the base of the food chain. These included a variety of clams and snails, and especiallythe ammonites, a group of shelled squidlike creatures that dominated the Mesozoic seas and had survived many previous mass extinctions. The K-T event marked the end of the marine reptiles, such as the mosasaurs and the plesiosaurs, which were the largest creatures that had ever lived in the seas and which ruled the seas long before whales evolved. On land, there was also a crisis among the land plants, in addition to the disappearance of dinosaurs. So any event that can explain the destruction of the base of the food chain (plankton in the ocean, plants on land) can better explain what happened to organisms at the top of the food chain, such as the dinosaurs. By contrast, any explanation that focuses strictly on the dinosaurs completely misses the point. The Cretaceous extinctions were a global phenomenon, and dinosaurs were just a part of a bigger picture.

According to one theory, the Age of Dinosaurs ended suddenly 65 million years ago when a giant rock from space plummeted to Earth. Estimated to be ten to fifteen kilometers in diameter, this bolide (either a comet or an asteroid) was traveling at cosmic speeds of 20-70 kilometers per second, or 45,000-156,000 miles per hour. Such a huge mass traveling at such tremendous speeds carries an enormous amount of energy. When the bolide struck this energy was released and generated a huge shock wave that leveled everything for thousands of kilometers around the impact and caused most of the landscape to burst into flames. The bolide struck an area of the Yucatan Peninsula of Mexico known as Chicxulub, excavating a crater 15-20 kilometers deep and at least 170 kilometers in diameter. The impact displaced huge volumes of seawater, causing much flood damage in the Caribbean. Meanwhile, the bolide itself excavated 100 cubic kilometers of rock and debris from the site, which rose to an altitude of 100 kilometers. Most of it fell back immediately, but some of it remained as dust in the atmosphere for months. This material, along with the smoke from the fires, shrouded Earth, creating a form of nuclear winter. According to computerized climate models, global temperatures fell to near the freezing point, photosynthesis halted, and most plants on land and in the sea died. With the bottom of the food chain destroyed, dinosaurs could not survive.

1. In paragraph 1, why does the author include a discussion of when flowering plants evolved?

A. To help explain why some scientists believe that the development of flowering plants led to dinosaur extinction

B. To cast doubt on the theory that the development of flowering plants caused dinosaurs to become extinct

C. To suggest that dinosaurs were able to survive for as long as they did because of the availability of flowering plants

D. To emphasize that duckbill dinosaurs and horned dinosaurs were the first dinosaurs to become extinct

2. The word “allegedly” in the passage is closest in meaning to

A. inevitably

B. gradually

C. supposedly

D. increasingly

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3. According to paragraph 1 the extinction of the dinosaurs is unlikely to have been the result of competition from mammals because

A. mammals would not have been capable of eating dinosaur eggs

B. mammals did not appear in any significant numbers until after the Late Triassic

C. mammals and dinosaurs did not, in fact, compete for any of the same resources

D. mammals and dinosaurs lived together for roughly 120 million years before the extinction

4. According to paragraph 2, what is problematic about some scientists' focus on dinosaur extinction?

A. Dinosaurs became extinct so long ago that no theory about their disappearance can be proven scientifically.

B. Dinosaurs were not the only organisms that went extinct at the end of the Cretaceous period.

C. More marine organisms went extinct during the Cretaceous than did dinosaur species.

D. It is more important to understand how plankton and other marine organisms came to thrive during the Cretaceous period.

5. According to paragraph 2, each of the following became extinct during the K-T event EXCEPT

A. early species of whales

B. marine reptiles

C. various species of clams

D. many species of land plants

6. What makes the extinction of “the ammonites” especially significant?

A. They were among the largest creatures that ever lived.

B. They existed at the lowest level of the food chain.

C. They had been able to survive in the Mesozoic seas.

D. They had survived many previous mass extinctions.

7. The word “halted” in the passage is closest in meaning to

A. slowed

B. stopped

C. contracted

D. declined

8. The word “strictly" in the passage is closest in meaning to

A. exclusively

B. mainly

C. initially

D. wrongly

9. The word “crisis” in the passage is closest in meaning to

A. collapse

B. disturbance

C. critical situation

D. loss

10. How does paragraph 3 relate to paragraph 2?

A. Paragraph 3 provides an alternative explanation to the one provided in paragraph 2.

B. Paragraph 3 provides an explanation that satisfies the conditions set forth in paragraph 2.

C. Paragraph 3 provides the facts to support the theory presented in paragraph 2.

D. Paragraph 3 presents a theory that calls into question the position described in paragraph 2.

11. Paragraph 3 answers all of the following questions EXCEPT:

A. Why did the bolide fall to Earth?

B. How fast was the bolide traveling?

C. How was the bolide capable of generating a shock wave?

D. How did the bolide cause flood damage to the Caribbean?

12. Paragraph 3 strongly suggests that if the bolide impact theory is correct, the majority of the extinctions associated with the K-T event resulted from

A. sunlight being blocked for months by dust and smoke in Earth's atmosphere

B. widespread flooding that followed the displacement of huge volumes of seawater

C. the leveling of the landscape by the shock wave that was generated when the bolide struck Earth

D. the rise in global temperatures caused by the fires that burned much of the landscape

13. Look at the four squares [█] that indicate where the following sentence could be added to the passage

**Some explanations seem plausible until the facts are considered.**

Where would the sentence best fit? Click on a square to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **The question is worth 2 points.**

Over the years, scientists have proposed a number of theories as to why dinosaurs suddenly became extinct about 65 million years ago.

●

●

●

Answer Choices

○ Many explanations for dinosaur extinction have been proposed, but most of them are either called into question by known facts or are merely unsupported hypotheses.

○ Focusing on dinosaurs misses the point that the extinction, at about the same time, of the shelled squidlike creatures that dominated the Mesozoic seas was far more scientifically significant.

○ Computerized climate models of global temperature fluctuations support the theory that a huge rock from space hit the Yucatan Peninsula in Mexico about 65 million years ago.

○ Although mammals and dinosaurs appeared at about the same time in the Late Triassic, the K-T event, which marked the end of the dinosaurs, apparently had relatively little impact on mammals.

○ Any satisfactory explanation of the mass extinction of dinosaurs must take into account the fact that the disappearance of the dinosaurs was part of a global mass extinction.

○ A huge bolide striking Earth would have created conditions in which most plants would have died, thus explaining the mass extinction of organisms—including dinosaurs—further up the food chain.

答案：1-5: B C D B A; 6-10: D B A C B 11-14: A A B AEF

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## **参考译文：解释恐龙灭绝现象**

大约在6500万年前，恐龙迅速地灭绝，成为K-T大规模灭绝事件的一部分。之所以称作K-T是因为它与地质学上的标签K-T边界有关。K-T边界通常是一个薄薄的沉积带，在世界各处都有存在（K在惯例上是白垩纪Cretaceous的缩写，源自德国名字kreidezeit）。关于恐龙为何绝种有很多解释。例如，有些将恐龙的灭绝归咎于开花植物的发展，这种植物据称更难消化，可引起便秘和消化不良——但是开花植物最初是在早白垩世纪进化的，也就是在恐龙灭绝前约60万年就出现了。实际上，一些科学家提出，鸭嘴恐龙和有角恐龙已经进化出一口复杂的磨牙，能够消化吸收这些迅速增长的开花植物。也有科学家将恐龙的灭绝归咎于其他哺乳动物的竞争，据说是它们吃掉了所有的恐龙蛋——但是，哺乳动物和恐龙都生活在在约190万年前的晚三叠世，没理由说哺乳动物在和恐龙共同生活了120万年之后，忽然爱吃恐龙蛋了。还有些解释（比如有一种解释认为恐龙死于疾病）也说不通，因为有没有办法进行科学验证，而且这些解释也无非都是臆想和猜测。

对恐龙灭绝的解释都错过了一个重要信息：白垩纪末的灭绝是一个全球性的事件，这次事件杀死的生物来自整个食物链。有许多海洋中的浮游生物都灭绝了，而在食物链的底端以这些浮游生物为食的许多海洋生物也都灭绝了。这些生物包括各种蛤蜊和蜗牛，尤其是菊石，一种类似鱿鱼的带壳生物，它曾经在中生代海洋中大规模存在，并且在以前的很多大规模灭绝中幸存了下来。K-T事件标志着海洋爬行动物（如沧龙类与蛇颈龙，曾经生活在海洋，并且早在鲸鱼出现之前统治海洋很久的最大生物）的结束。在陆地上，除了恐龙灭绝以外，陆地植物也面临着生存危机。因此，任何能解释食物链底端生物（海洋中的浮游生物、陆地上的植物）毁灭的原因，都能更好地解释发生在食物链顶端的生物，如恐龙的灭绝。相比之下，那些只关注恐龙本身的解释就没有解释到点子上，白垩纪灭绝是一个全球性的现象，恐龙的灭绝只是其中的一部分。

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根据某一个理论，恐龙时代在6500万年前突然结束，是因为当时一个巨大的星体从太空撞到了地球上。这颗火流星（彗星或小行星）的直径估计在10000~15000米左右，以20~70千米每秒或45000~156000英里每小时的速度旋转。这个体积庞大、速度飞快的星体带着大量的能量。当星体撞击地球时，这些能量被释放，产生了巨大的冲击波，受到影响的数千公里的土地瞬间夷为平地，大部分景观突然起火。星体击中了墨西哥尤卡坦半岛的希克苏鲁伯地区，凿出一个直径15~20千米、深度至少有170千米的大坑。撞击造成大量海水移位，在加勒比海地区引起了很多洪灾。与此同时，火球自身也在撞击地凿出了100立方公里的岩石和碎片，使得当地的高度增加了100千米。大部分的碎片立刻就掉下来了，但有一些变成了灰尘仍然在大气中漂浮了数月之久。这些灰尘与火灾产生的烟雾一起笼罩着地球，创造出一种“核冬天”的感觉。根据计算机模拟的气候模型，全球气温下降到接近冰点，光合作用停止，陆地和海洋中的大部分植物都死掉了。随着食物链的底端被破坏，恐龙也就无法生存了。

## Callisto and Ganymede

From 1996 to 1999, the Galileo spacecraft passed through the Jovian system, providing much information about Jupiter's satellites. Callisto, the outermost of Jupiter's four largest satellites, orbits the planet in seventeen days at a distance from Jupiter of two million kilometers. Like our own Moon, Callisto rotates in the same period as it revolves, so it always keeps the same face toward Jupiter. Its noontime surface temperature is only about -140°C, so water ice is stable on its surface year-round. Callisto has a diameter of 4.820 kilometers, almost the same as that of Mercury. Its mass is only one-third as great, which means its density must be only one-third as great as well. This tells us that Callisto has far less of the rocky metallic materials found in the inner planets and must instead be an icy body through much of its interior.

Callisto has not fully differentiated, meaning separated into layers of different density materials. Astronomers can tell that it lacks a dense core from the details of its gravitational pull on the Galileo spacecraft during several very close flybys. This fact surprised scientists, who expected that all the big icy moons would be differentiated. It is much easier for an icy body to differentiate than for a rocky one, since the melting temperature of ice is so low. Only a little heating will soften the ice and get the process started, allowing the rock and metal to sink to the center and the slushy ice to float to the surface. Yet Callisto seems to have frozen solid before the process of differentiation was complete.

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Like our Moon's highlands, the surface of Callisto is covered with impact craters. The survival of these craters tells us that an icy object can form and retain impact craters in its surface. In thinking of ice so far from the Sun, it is important not to judge its behavior from that of the much warmer ice we know on Earth; at the temperatures of the outer solar system, ice on the surface is nearly as hard as rock, and behaves similarly. Ice on Callisto does not deformor flow like ice in glaciers on Earth. Callisto is unique among the planet-sized objects of the solar system in its absence of interior forces to drive geological evolution. The satellite was born dead and has remained geologically dead for more than four billion years.

Ganymede, another of Jupiter's satellites and the largest in our solar system, is also cratered, but less so than Callisto. █About one-quarter of its surface seems to be as old and heavily cratered; the rest formed more recently, as we can tell by the sparse covering of impact craters as well as the relative freshness of the craters. █Ganymede is a differentiated world, like the terrestrial planets. █Measurements of its gravity field tell us that the rock and metal sank to form a core about the size of our Moon, with a mantle and crust of ice floating above it. █In addition, the Galileo spacecraft discovered that Ganymede has a magnetic field, the signature of a partially molten interior. Ganymede is not a dead world, but rather a place of continuing geological activity powered by an internal heat source. Much of its surface may be as young as half a billion years.

The younger terrain is the result of tectonic and volcanic forces. Some features formed when the crust cracked, flooding many of the craters with water from the interior. Extensive mountain ranges were formed from compression of the crust, forming long ridges with parallel valleys spaced one to two kilometers apart. In some places older impact craters were split and pulled apart. There are even indications of large-scale crustal movements that are similar to the plate tectonics of Earth.

Why is Ganymede different from Callisto? Possibly the small difference in size and internal heating between the two led to this divergence in their evolution. But more likely the gravity of Jupiter is to blame for Ganymede's continuing geological activity. Ganymede is close enough to Jupiter that tidal forces from the giant planet may have episodically heated its interior and triggered major convulsions on its crust.

1. According to paragraph 1, which of the following statements about Callisto is true?

A. It is the satellite closest to Jupiter's surface

B. Its surface temperature is constant at all times of the day.

C. It has the same mass and diameter as the planet Mercury

D. It completes one rotation every seventeen days.

2. According to paragraph 1, how do scientists know that Callisto is made up largely of ice?

A. A sample of its interior was taken by the Galileo spacecraft in the late 1990s

B. It has too low a density to contain much rocky metallic material

C. With a noontime surface temperature of only about .140° C. the ice on it never melts

D. All of the bodies in the Jovian system are icy, because they are so far from the Sun.

3. Why does the author provide the information that “It is much easier for an icy body to differentiate than for a rocky one”?

A. To support the claim that all of the big icy moons are differentiated

B. To suggest that Callisto may be a rocky body rather than an icy one

C. To explain why scientists expected Callisto to be differentiated

D. To refute the claim that Callisto could not differentiate because it was frozen solid

4. All of the following questions are answered in paragraph 2 EXCEPT:

A. Why was Callisto frozen solid before differentiation was complete?

B. What allows the process of differentiation to get started?

C. Why is it easier for an icy body to differentiate than a rocky one?

D. How do astronomers know that Callisto lacks a dense core?

5. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. It should not be assumed that surface ice has the same characteristics wherever it is found

B. Surface ice and rock are much more similar in temperature in the outer solar system than they are on Earth.

C. The further away surface ice is from the Sun, the more its temperature differs from that of the warmer ice on Earth

D. In the cold of the outer solar system, surface ice is so hard it behaves more like rock than like the warmer ice on Earth

6. According to paragraph 3, how is Callisto different from all other planet-sized objects in the solar system?

A. It can form and retain impact craters on its icy surface

B. It has ice glaciers that do not flow or deform.

C. It has never had the interior forces required for geological evolution.

D. It is more than four billion years old.

7. The word “signature” in the passage is closest in meaning to

A. primary cause

B. end result

C. identifying mark

D. by-product

8. According to paragraph 4, each of the following provides evidence about Ganymede's interior EXCEPT

A. Ganymede's large size

B. measurements of Ganymede's gravity field

C. the fact that Ganymede has a magnetic field

D. the fact that Ganymede continues to be geologically active

9. The word “Extensive” in the passage is closet in meaning to

A. Unusual

B. Large

C. New

D. Steep

10. Paragraph 5 supports each of the following statements about Ganymede EXCEPT:

A. All water on it has always been frozen solid.

B. There is evidence that part of its crust once broke open

C. Its crust has been subject to forces that have created mountains and valleys.

D. Some of its older craters have been split apart by more recent geological activity

11. According to paragraph 6, the differences in how Callisto and Ganymede evoked are most probably due to differences in their

A. size and internal heating

B. distance from Jupiter

C. chemical and physical composition

D. age

12. Look at the four squares [█] that indicate where the following sentence could be added to the passage

**The difference between Ganymede and Callisto, however, extend much further below the surface of the satellites.**

Where would the sentence best fit? Click on a square to add the sentence to the passage. **(2)**

13. 【**Directions**】Select from the seven sentences below, the two sentences that correctly characterize endogenous rivers and the three sentences that correctly characterize exogenous rivers. Drag each sentence you select into the appropriate column of the table. Two of the sentences will NOT be used. **This question is worth 3 points.**

|  |  |
| --- | --- |
| **Callisto** | **Ganymede** |
| * + - * 5 | * + - * 3 |
| * + - * 7 | * + - * 1 |
|  | * + - * 4 |

**Answer Choice**

1. It has a core that consists mainly of rock and metal.

2. It may have formed as recently as half a billion years ago

3. Its interior is not fully solid

4. Its evolution has probably been strongly influenced by Jupiter's gravity

5. It always keeps the same face toward Jupiter as it orbits the planet

6. Its crust is covered by slow-moving glaciers

7. Its entire surface is heavily cratered

答案： 1-5：D B C A D 6-10: C C A B A 11-13: B B Callisto:5,7; Ganymede: 3,1,4

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## **参考译文：木卫四和木卫三**

从1996年到1999年，伽利略号宇宙飞船围绕木星飞行，提供了很多关于木星的卫星的信息。木卫四，木星的四个最大的卫星中最外层的一个，围绕木星转一圈需要17天，轨道半径200万公里。像地球的卫星月球一样，木卫四在同一周期公转和自转，所以它总是与木星保持固定的相对位置。它中午的表面温度大约只有零下140°C，所以表面常年都是冰。木卫四的直径为4820千米，几乎与水星（的直径）相同，但它的质量仅为水星的三分之一，这也意味着它的密度应该也只有水星的三分之一。这就告诉我们，木卫四内核的岩石金属材料比较少，内核的大部分应该是冰。

木卫四还没有完全分化，也就意味着还没分离成几层不同密度的材料。在几次近地的飞行中，通过伽利略号宇宙飞船的重力探测，天文学家可以知道木卫四缺乏一个高密度的内核。这使科学家们感到吃惊，因为他们认为所有大的冰卫星都会有分层现象。一个冰质天体要比一个岩石天体更容易分层，因为冰的融化温度很低。只要有一点热量，冰就开始软化，分化便开始了。这使得岩石和金属向中心下沉，融化的冰会浮到表面。然而木卫四似乎在分化过程完成之前就已经冻成固体了。

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就像地球的卫星月球的高地一样，木卫四表面到处都是撞击坑。这些撞击坑的存在告诉我们，一个冰体可以形成并保留其表面的撞击坑。在考虑距离太阳如此之远的冰体时，不要根据我们在地球上所了解的温度更高的冰体来判断其行为是很重要的；在外太阳系的温度下，表面的冰几乎就像岩石一样坚硬，且性质也相似。木卫四上的冰不像地球上的冰川那样会变形或流动。作为太阳系一个行星大小的天体，木卫四是唯一一个无法依靠内部力量推动地质演变的星体。卫星一形成就是死的，它保持地质不变的时间超过了4亿年。

木卫三是木星的另一个卫星，也是太阳系中最大的卫星，其表面也是坑坑洼洼的，但不如木卫四那么多坑。木卫三有大约四分之一的表面似乎是很老了，布满了坑洞；其余的四分之三形成的时间更近一些，这一点我们可以从稀疏分布的撞击坑和相对较新的坑判断出来。像类地行星一样，木卫三已经分化了。通过测量它的引力场，我们可以知道下沉的岩石和金属形成了一个月球大小般的核，而冰形成地幔和地壳浮在其上面。此外，伽利略号宇宙飞船发现木卫三有一个磁场，意味着它的内部已经部分熔融了。木卫三并非一个死的星体，其内部的热能会持续地引发地质活动。它的表面大部分的年龄可能是五亿年左右。

较年轻的地形是地质和火山活动形成的。当地壳破裂时，一些地理特征便形成了，内部涌出的洪水淹没了大部分的地壳。巨大的山脉是由地壳挤压形成的，形成了长长的山脊和间隔一到两千米的平行山谷。在一些地方，更早的撞击坑被拉扯开来。甚至有迹象表明木卫三存在类似于板块构造的大型地壳运动。

为什么木卫三和木卫四有这么多不同？可能体积上和内部热量上的小差异导致了他们在进化中的差距。但更可能的原因是，木星的引力造成了木卫三持续的地质活动。木卫三离木星较近，这个巨行星的潮汐力偶尔会使得木卫三的内部温度升高，引发重大的地壳运动。

# TPO-43

## The Empire of Alexander the Great

In 334 B.C. Alexander the Great took his Greek armies to the east and in only a few years completed his creation of an empire out of much of southwest Asia In the new empire, barriers to trade and the movement of peoples were removed; markets were put in touch with one another. In the next generation thousands of Greek traders and artisans would enter this wider world to seek their fortunes. Alexander’s actions had several important consequences for the region occupied by the empire.

The first of these was the expansion of Greek civilization throughout the Middle East. Greek became the great international language. Towns and cities were established not only as garrisons (military posts) but as centers for the diffusion of Greek language, literature, and thought, particularly through libraries, as at Antioch (in modern Turkey) and the most famous of all, at Alexandria in Egypt, which would be the finest in the world for the next thousand years.

Second, this internationalism spelled the end of the classical Greek city-state——the unit of government in ancient Greece——and everything it stood for. Most city-states had been quite small in terms of citizenry, and this was considered to be a good thing. The focus of life was the agora, the open marketplace where assemblies could be held and where issues of the day, as well as more fundamental topics such as the purpose of government or the relationship between law and freedom, could be discussed and decisions made by individuals in person.The philosopher Plato (428-348 B.C.) felt that the ideal city-state should have about 5,000 citizens, because to the Greeks it was important that everyone in the community should know each other. In decision making, the whole body of citizens together would have the necessary knowledge in order generally to reach the right decision, even though the individual might not be particularly qualified to decide. The philosopher Aristotle (384-322 B.C.), who lived at a time when the city-state system was declining, believed that a political entity of 100,000 simply would not be able to govern itself.

This implied that the city-state was based on the idea that citizens were not specialists but had multiple interests and talents——each a so-called jack-of-all-trades who could engage in many areas of life and politics. It implied a respect for the wholeness of life and a consequent dislike of specialization. ■ It implied economic and military self-sufficiency. ■But with the development of trade and commerce in Alexander’s empire came the growth of cities; it was no longer possible to be a jack-of-all-trades. ■One now had to specialize, and with specialization came professionalism. ■There were getting to be too many persons to know, an easily observable community of interests was being replaced by a multiplicity of interests. The city-state was simply too "small-time."

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Third, Greek philosophy was opened up to the philosophy and religion of the East At thepeak of the Greek city-state, religion played an important part. Its gods—such as Zeus, father of the gods, and his wife Hera—were thought of very much as being like human beings but with superhuman abilities. Their worship was linked to the rituals connected with one’s progress through life—birth, marriage, and death— and with invoking protection against danger, making prophecies, and promoting healing, rather than to any code of behavior. Nor was there much of a theory of afterlife.

Even before Alexander’s time, a life spent in the service of their city-state no longer seemed ideal to Greeks The Athenian philosopher Socrates (470-399 B.C.) was the first person in Greece to propose a morality based on individual conscience rather than the demands of the state, and for this he was accused of not believing in the city’s gods and so corrupting the youth, and he was condemned to death. Greek philosophy—or even a focus on conscience—might complement religion but was no substitute for it, and this made Greeks receptive to the religious systems of the Middle East, even if they never adopted them completely. The combination of the religious instinct of Asia with the philosophic spirit of Greece spread across the world in the era after Alexander’s death, blending the culture of the Middle East with the culture of Greece.

1. According to paragraph 1, Alexander the Great did which of the following?

ORegulated the movement and resettlement in southwest Asia of thousands of Greek people

OOpened up opportunities in new markets for traders and artisans

OCreated new restrictions on trade

OEncouraged Greek citizens to choose military careers over careers in trade

2. The word "diffusion" in the passage is closest in meaning to

O adoption

O spread

O teaching

O learning

3. In paragraph 2,the author mentions the libraries at Antioch and Alexandria in order to

O provide evidence that the library was a cultural institution in the East before it spread to the West

O explain why it was important for Greek to become the great international language

O identify two of the sources of Greek cultural influence within Alexander’s empire

O support the claim that the Greeks transformed Middle Eastern garrisons and military posts into cultural centers

4. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O Assemblies were held in the agora to discuss some issues of the day, but more fundamental questions were decided by key individuals.

O In a culture where philosophical discussions were frequent, some individuals questioned the value of a life focused on the marketplace.

O Life centered around the agora, an open marketplace and site for public debate, where individuals could participate in decision making.

O The focus of individuals was on fundamental topics such as the purpose of government and the connection between law and freedom.

5. According to paragraph 3，Plato believed that the ideal city-state should be

O governed by a ruling body of about 5,000 city leaders with a total population of no more than 100,000

O led by the most qualified individual

O governed by the group of citizens with the most knowledge about the issues of the day

O small enough so that everyone would know each other

6. Why does the author mention "The philosopher Aristotle"?

O To provide additional evidence that the ancient Greeks believed that political units must be small

O To demonstrate the accuracy of philosophers’ predictions about the end of the classical Greek city-state

O To show how changes in the city-state system from the fifth to the third century B C. were reflected in the ideas of its philosophers

O To support the claim that small city-states were ideally suited to produce philosophical inquiry

7. The word "declining" in the passage is closest in meaning to

O at its best

O rapidly expanding

O first being formed

O weakening

8. According to paragraph 4, Alexander's empire was characterized by all of the following EXCEPT

O decreased need for military control

O growing professionalism

O growth of cities

O specialization in trades

9. The word “peak” in the passage is closest in meaning to

O end

O command

O high point

O beginning

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10. According to paragraph 5, religion in the Greek city-state involved

O a set of rules governing behavior

O a detailed conception of life after death

O rituals related to significant life events

O worship of gods who were not like humans

11. According to paragraph 6，what was the basis for the accusation against Socrates?

O He encouraged people to be guided by their own consciences instead of by the state.

O He stated that people had a duty to fight against the corruption of their leaders.

O He reasoned that the needs of the youth were more important than the needs of the state.

O He argued that people’s behavior should be guided by the religious systems of the Middle East.

12.The word "propose" in the passage is closest in meaning to

O suggest

O deny

O consider

O question

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Likewise, the collective decision-making process of the open marketplace was no longer practical.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points**.

**Alexander the Great’s creation of a vast empire had important consequences for Greece and the conquered areas of southwest Asia.**

●

●

●

**Answer choices**

O Scholars from Antioch, Alexandria, and other Middle Eastern cultural centers came to Greece to study the Greek language and culture.

O Increasing urbanization and the elimination of trade barriers meant the end of the Greek city-state and the creation of a much larger political and economic body.

O The professionalism and specialization so prized by the ancient Greeks were replaced by a more generalized philosophy of education in the empire.

O The expansion of Alexander’s empire led to the diffusion of Greek language, literature, and thought throughout the Middle East.

O The empire saw the birth of a new culture, merging Greek philosophical ideas with the religious spirit of Asia.

O Religion played an important part in the expansion of the empire, as Alexander introduced Zeus and the other Greek gods to Asia.

参考答案：1-5 BBCCD 6-10 ADACC 11-13 AAC 14 BDE

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**参考译文：亚历山大帝国**

公元前334年，亚力山大大帝带领希腊军队来到东方，在短短几年里，他就建立了一个包括亚洲西南大部分的帝国。在新帝国中，贸易壁垒和民族运动都不复存在，市场也互通有无。在下一代，成千上万的希腊商人和工匠将进入这个更广阔的世界去寻求财富。亚力山大建立的帝国对所在的地区有几个重要的影响。

首先是希腊文明在整个中东地区的扩张。希腊语成为了国际语言。城镇和城市建立起来，不仅成为驻军之地（军事哨所），也是传播希腊语言、文学、思想的中心。这种传播尤其是在图书馆进行，比如在安提阿（今土耳其）的图书馆。而最为著名的是埃及亚历山大的图书馆，该图书馆在接下来的一千年里都是世界一流的。

其次，这种国际主义使古典希腊城邦（古希腊的政府单位）以及它所代表的一切走向了结束。大多数城邦在市民数量上来说都很小，这在当时被认为是一件好事。市民们生活的中心是市集。市集是一个开放的市场，市民们可以在那集会，讨论当下的各种问题，以及如政府的目的或法律与自由的关系这类的基本问题，并且每个人都做出自己的决定。哲学家柏拉图（公元前428-348）认为一个理想的城邦应该有大约5000名公民，因为对希腊人来说，社区的每个人要互相认识是很重要的。在做决策的过程中，全体公民都得掌握必要的知识以做出正确的决定，即使这个人并非特别有资格做决定。生活在城邦制度衰落时期的哲学家亚里士多德（公元前384-322）认为一个政治实体若是有100000人，那根本就无法自治。

这意味着城邦是基于公民虽然不是专家但有着广泛的兴趣和才能这一理念的，每个人都是可以参与到生活和政治的许多领域的多面手。这意味着对人生的完整性的尊重和随之而来的对专业化的厌恶。这也隐含经济和军事上的自给自足。但随着亚力山大帝国的贸易和商业的发展，城市也发展起来；人们不再可能是多面手。每个人都要专门化，随着专门化而来的是专业度。由于有太多的人要了解，原来很显而易见的群体利益被各种各样的利益取代。城邦实在是太“小”了。

第三，希腊哲学建立在东方的哲学和宗教之上。在希腊城邦的繁盛时期，宗教发挥了重要的作用。其神如众神之父宙斯和他的妻子赫拉通常认为很像人类，但具有超能力。他们的信仰会结合与生命历程（出生、结婚、死亡）、祈求远离危险、做出预言、提高治愈能力的仪式，而不是与行为规范有关。他们的信仰中也不存在一个来世的理论。

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即使在亚力山大之前的时代，希腊的城邦生活也不是理想的。雅典哲学家苏格拉底（公元前470-399）是希腊第一个提出道德要基于个人良心而不是国家要求的人，为此他被指控亵渎神明和腐蚀青年，所以被判了死刑。希腊哲学——或甚至仅是对良心的关注——可能会成为宗教的补充，但不能替代宗教，这让中东的宗教系统接受了希腊人，即使希腊人从未采纳他们的宗教系统。亚洲的宗教本能与希腊的哲学精神这种结合在在亚历山大死后传遍了世界，将亚洲文化和希腊的文化融合在一起。

## The Origin of Petroleum

Petroleum is defined as a gaseous, liquid, and semisolid naturally occurring substance that consists chiefly of hydrocarbons (chemical compounds of carbon and hydrogen). Petroleum is therefore a term that includes both oil and natural gas. Petroleum is nearly always found in marine sedimentary rocks. In the ocean, microscopic phytoplankton (tiny floating plants) and bacteria (simple, single-celled organisms) are the principal sources of organic matter that is trapped and buried in sediment. Most of the organic matter is buried in clay that is slowly converted to a fine-grained sedimentary rock known as shale.During this conversion, organic compounds are transformed to oil and natural gas.

■Sampling on the continental shelves and along the base of the continental slopes has shown that fine muds beneath the seafloor contain up to 8 percent organic matter. ■Two additional kinds of evidence support the hypothesis that petroleum is a product of the decomposition of organic matter: oil possesses optical properties known only in hydrocarbons derived from organic matter, and oil contains nitrogen and certain compounds believed to originate only in living matter. ■A complex sequence of chemical reactions is involved in converting the original solid organic matter to oil and gas, and additional chemical changes may occur in the oil and gas even after they have formed. ■

It is now well established that petroleum migrates through aquifers and can become trapped in reservoirs. Petroleum migration is analogous to groundwater migration. When oil and gas are squeezed out of the shale in which they originated and enter a body of sandstone or limestone somewhere above, they migrate readily because sandstones (consisting of quartz grains) and limestones (consisting of carbonate minerals) are much more permeable than any shale.The force of molecular attraction between oil and quartz or carbonate minerals is weaker than that between water and quartz or carbonate minerals. Hence, because oil and water do not mix, water remains fastened to the quartz or carbonate grains, while oil occupies the central parts of the larger openings in the porous sandstone or limestone. Because oil is lighter than water, it tends to glide upward past the carbonate- and quartz-held water. In this way, oil becomes segregated from the water; when it encounters a trap, it can form a pool.

Most of the petroleum that forms in sediments does not find a suitable trap and eventually makes its way, along with groundwater, to the surface of the sea. It is estimated that no more than 0.1 percent of all the organic matter originally buried in a sediment is eventually trapped in an oil pool. It is not surprising, therefore, that the highest ratio of oil and gas pools to volume of sediment is found in rock no older than 2.5 million years—young enough so that little of the petroleum has leaked away—and that nearly 60 percent of all oil and gas discovered so far has been found in strata that formed in the last 65 million years. This does not mean that older rocks produced less petroleum; it simply means that oil in older rocks has had a longer time in which to leak away.

How much oil is there in the world? Thisis an extremely controversial question. Many billions of barrels of oil have already been pumped out of the ground. A lot of additional oil has been located by drilling but is still waiting to be pumped out. Possibly a great deal more oil remains to be found by drilling. Unlike coal, the volume of which can be accurately estimated, the volume of undiscovered oil can only be guessed at. Guesses involve the use of accumulated experience from a century of drilling. Knowing how much oil has been found in an intensively drilled area, such as eastern Texas, experts make estimates of probable volumes in other regions where rock types and structures are similar to those in eastern Texas. Using this approach and considering all the sedimentary basins of the world, experts estimate that somewhere between 1,500 and 3,000 billion barrels of oil will eventually be discovered.

1. According to paragraph 1, petroleum is formed in which of the following ways?

O Bacteria and tiny plants undergo a change while they are buried in clay.

O Carbon and hydrogen combine to form shale.

O Ocean rocks are converted into organic compounds.

O Oil and gas rise to the surface of sediment and are trapped in rocks.

2. The word "trapped" in the passage is closest in meaning to

O hidden

O destroyed

O caught

O found

3. All of the following are cited in paragraph 2 as evidence that petroleum is a product of the decomposition of organic matter EXCEPT

O the amount of organic matter found in layers of mud below the seafloor

O the chemical changes that occur in oil and natural gas after they have formed

O the optical properties of oil

O the fact that oil contains nitrogen and other compounds believed to be of organic origin

4. According to paragraph 2, which of the following is true of the change of solid organic material into oil and gas?

O It is more likely to occur along the base of continental slopes than on the continental shelves.

O It only takes place in areas where the seafloor contains at least 8 percent organic matter.

O It is a process that can be reversed through chemical changes that occur after the oil and gas have formed.

O It involves a complicated series of chemical reactions.

5.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O When oil and gas are squeezed out of the rock in which they originated, it is probably because the layer of rock above them is much more permeable than shale.

O Sandstones, which are made of quartz grains, and limestones, which are made of carbonate minerals, can hold much more oil and gas than any shale can.

O When they are squeezed from the shale in which they were formed, oil and gas move easily into the much more permeable layers of sandstone or limestone above.

O Oil and gas are squeezed out of sandstones, consisting of quartz grains, and migrate readily into limestones, which consist of carbonate minerals and are much more permeable.

6. Why does the author include the information that "The force of molecular attraction between oil and quartz or carbonate minerals is weaker than that between water and quartz or carbonate minerals."?

O To help explain why petroleum behaves differently from water in bodies of sandstone and limestone

O To illustrate why petroleum migrates more rapidly through sandstone than it does through limestone

O To help explain how water and petroleum can mix in certain aquifers

O To account for the different molecular structures of oil and water

7. The word "encounters" in the passage is closest in meaning to

Omeets

Oforms

Oescapes

Oavoids

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8. The word "suitable" in the passage is closest in meaning to

O noticeable

O permanent

O protected

O appropriate

9. According to paragraph 4, what happens to most of the petroleum that forms in sediments?

OIt remains in underground pools.

OIt is buried under organic matter.

OIt rises to the surface of the ocean.

OIt combines with the minerals found in groundwater.

10.Paragraph 4 supports which of the following statements about future petroleum discoveries?

O Less petroleum will be found than in the past because the ratio of petroleum pools to volume of sediment will decrease.

O Most of the petroleum will come from rocks that are less than 65 million years old.

O Petroleum that has leaked away from older rocks will be the source of most new discoveries.

O More petroleum will become available because the amount of trapped organic matter will increase.

11. The phrase "is an extremely controversial question" in the passage is closest in meaning to

O is a question of great importance

O is a question causing strong disagreement

O is a question that has existed for a long time

O is a question composed of many related parts

12. According to paragraph 5, eastern Texas is an example of a geologic region where

O oil is located but has not yet been pumped out

O experts accurately predicted the rock types and structures found there

O the volume of oil can only be guessed at

O intensive oil exploration has occurred over a long time

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Because such muds are a major source of petroleum, scientists believe that petroleum originated as living organisms.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage **This question is worth 2 points**.

**Petroleum, which includes both oil and natural gas, can be a gaseous, liquid, or semisolid substance.**

●

●

●

**Answer Choices**

O Petroleum comes from organic matter that has undergone a complex series of chemical changes under the seafloor.

O Although most of the petroleum formed leaks away into the ocean, some migrates from shale to sandstone or limestone, and is caught in pools.

O Porous rocks made of quartz or carbonate minerals are particularly likely to house oil pools because of their strong molecular attraction with oil.

O Petroleum forms best when organic matter is evenly distributed over a large area and does not exceed 8 percent of the material in the clay.

O More than 60 percent of the petroleum discovered so far has been found in rocks that are less than two-and-a-half million years old.

O It is difficult to estimate the total amount of petroleum in the world, but experts believe that 1,500-3,000 billion barrels will eventually be discovered.

**参考答案：**1-5.A C A D C 6-10:A A D C C 11-13.B B B 14.ABF

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## **参考译文：石油的起源**

石油被定义为一种天然存在的气体、液体、和半固体物质，其主要成分是烃（碳氢化合物）。因此石油是一个包括石油和天然气的术语。石油几乎总是在海洋沉积岩中发现。在海洋中，微小的浮游植物（微小的漂浮植物）和细菌（简单的单细胞生物）是被留在或是埋在沉积物中的有机物的主要来源。大多数有机物都被埋在泥土里，泥土慢慢转化成一种细粒沉积岩，叫做页岩。在这个转化过程中，有机化合物转化为石油和天然气。

对大陆架和沿大陆斜坡底部进行采样可以发现，海底下面的细泥浆含有高达百分之八的有机物。另外还有两类证据证实了石油是一种有机物的分解产物的假说：一是石油具有一些光学特性，这些特性只有来源于有机物的碳氢化合物才有，二是石油还含有氮和某些化合物，这些化合物被认为只能来源于有生命的物质。将有机固体转化成石油和天然气涉及一系列复杂的化学反应，并且在石油和天然气形成之后可能还会发生其他的化学反应。

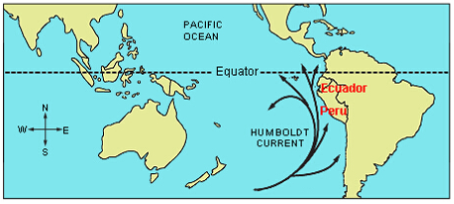
目前公认的说法是，石油向上迁移，穿过含水层，可能被困在蓄水层。石油的迁移与地下水的流动相似。当石油和天然气被从形成它们的页岩中挤出，进入砂岩或石灰岩时，它们就很容易流动，因为砂岩（由石英颗粒组成）和石灰岩（由碳酸盐矿物组成）比页岩的渗透性要强。石油和石英或碳酸盐矿物之间的分子引力弱于水和石英或碳酸盐矿物分子之间的引力。因此，由于石油和水不混合，水会依附在石英或碳酸盐颗粒上，而石油则占据了多孔的砂岩或石灰岩有着更大空隙的中央区域。由于石油比水轻，所以它会向上流动，越过吸附于碳酸盐和石英上的水。这样，石油就与水分离开来；当遇到圈闭时就形成一个油藏。

大多数形成于沉积物的石油都没有找到合适的圈闭，并最终通过某种方式随着地下水来到了海洋的表面。据估计，这些最初埋在沉积物中的有机物只有不到0.1%被留住最终形成了油藏。因此也就不奇怪，油藏和气藏的数目与沉积物的总量相比，最高的比例出现在年龄不超过250万年的沉积岩中——岩石还较新，所以只有很少的石油泄露——而迄今发现的近60%的石油和天然气都出现在过去650万年形成的地层中。这并不意味着年龄较大的岩石产生的石油较少，这只是意味着石油在更古老的岩石里的时间较长，而在这段时间里石油泄漏了。

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世界上有多少石油？这是一个非常有争议的问题。数十亿桶石油已经被从地下抽出。还有很多石油已被钻井所发现，等待被抽出。也许还有更多的石油等待着被钻井发现。石油和煤不一样，煤的储量可以被准确估计，未探明的石油储量只能估计。这种估计依靠的是一个世纪以来的钻探经验。在一个集中钻探的区域，如东部德克萨斯州，在知道此处已经发现的石油量之后，专家们以此估计其他岩石类型和结构与其类似的区域的潜在石油储量。使用这种方法，并考虑到世界上沉积盆地的总量，专家估计未来还会有1.5万亿到3万亿桶石油被发现。

## El Niño



The cold Humboldt Current of the Pacific Ocean flows toward the equator along the coasts of Ecuador and Peru in South America. When the current approaches the equator, the westward-flowing trade winds cause nutrient-rich cold water along the coast to rise from deeper depths to more shallow ones. This upwelling of water has economic repercussions. Fishing, especially for anchovies, is a major local industry.

Every year during the months of December and January, a weak, warm countercurrent replaces the normally cold coastal waters. Without the upwelling of nutrients from below to feed the fish, fishing comes to a standstill. Fishers in this region have known the phenomenon for hundreds of years. In fact, this is the time of year they traditionally set aside to tend to their equipment and await the return of cold water. The residents of the region have given this phenomenon the name of El Niño,which is Spanish for "the child," because it occurs at about the time of the celebration of birth of the Christ child.

While the warm-water countercurrent usually lasts for two months or less, there are occasions when the disruption to the normal flow lasts for many months. In these situations, water temperatures are raised not just along the coast, but for thousands of kilometers offshore. Over the last few decades, the term El Niño has come to be used to describe these exceptionally strong episodes and not the annual event. During the past 60 years, at least ten El Niños have been observed. Not only do El Niño affect the temperature of the equatorial Pacific, but the strongest of them impact global weather.

The processes that interact to produce an El Niño involve conditions all across the Pacific, not just in the waters off South America. Over 60 years ago, Sir Gilbert Walker, a British scientist, discovered a connection between surface pressure readings at weather stations on the eastern and western sides of the Pacific. He noted that a rise in atmospheric pressure in the eastern Pacificis usually accompanied by a fall in pressure in the western Pacific and vice versa. He called this seesaw pattern the Southern Oscillation. It was later realized that there is a close link between El Niño and the Southern Oscillation. In fact, the link between the two is so great that they are often referred to jointly as ENSO (El Niño -Southern Oscillation).

During a typical year, the eastern Pacific has a higher pressure than the western Pacific does. This east-to-west pressure gradient enhances the trade winds over the equatorial waters. This results in a warm surface current that moves east to west at the equator. The western Pacific develops a thick, warm layer of water while the eastern Pacific has the cold Humboldt Current enhanced by upwelling. However, in other years the Southern Oscillation, for unknown reasons, swings in the opposite direction, dramatically changing the usual conditions described above, with pressure increasing in the western Pacific and decreasing in the eastern Pacific. This change in the pressure gradient causes the trade winds to weaken or, in some cases, to reverse. This then causes the warm water in the western Pacific to flow eastward, increasing sea-surface temperatures in the central and eastern Pacific. The eastward shift signals the beginning of an ElNiño.

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Scientists try to document as many past El Niño events as possible by piecing together bits of historical evidence, such as sea-surface temperature records, daily observations of atmospheric pressure and rainfall, fisheries’ records from South America, and the writings of Spanish colonists dating back to the fifteenth century. From such historical evidence we know that El Niños have occurred as far back as records go. ■ It would seem that they are becoming more frequent. ■Records indicate that during the sixteenth century, an El Niño occurred on average every six years. ■ Evidence gathered over the past few decades indicates that El Niños are now occurring on average a little over every two years. ■Even more alarming is the fact that they appear to be getting stronger. The 1997-1998 ElNiño brought copious and damaging rainfall to the southern United States, from California to Florida. Snowstorms in the northeast portion of the United States were more frequent and intense than in most years.

1. The word "approaches" in the passage is closest in meaning to

O nears

O crosses

O travels along

O leaves

2.According to paragraph 1, what happens when the Humboldt Current interacts with westward flowing trade winds?

O Anchovies from southern waters are carried northward.

O Cold water from lower depths is brought closer to the surface.

O The Humboldt Current stops flowing toward the equator.

O The Humboldt Current begins to flow closer to the coasts of Ecuador and Peru.

3.Which of the following questions about the El Niño phenomenon is NOT answered in paragraph 2 ?

## O Why is the El Niño phenomenon called El Niño?

## O How do fishers spend their time during the El Niñoseason?

## O How do coastal fish obtain enough nutrients during the El Niño season?

## O Is the temperature of coastal waters different during the El Niño

season than it is the rest of the year?

4. The word "exceptionally"，in the passage is closest in meaning to

Oobviously

Ounusually

Orelatively

Ooccasionally

5. Paragraph 3 supports which of the following statements about El Niños, as that term is now used?

## O El Niños can originate in areas other than the Pacific Ocean.

## O El Niños can arise when warm currents last for two months or less.

## O El Niños affect water temperatures long distances from the South American coast.

## O Multiple El Niños can arise within a single calendar year.

6. The phrase "is usually accompanied by” in the passage is closest in meaning to

O usually develops before

O usually occurs together with

O is usually indicated by

O is usually caused by

7. The word "jointly" in the passage is closest in meaning to

Otogether

Otherefore

Orightfully

O simply

8. According to paragraph 4, what did Sir Gilbert Walker discover?

## O There is a close link between El Niño and the Southern Oscillation.

## O Surface pressure readings all across the Pacific first rise and then fall before an El Niñooccurs.

O Surface pressure on one side of the Pacific tends to fall when pressure rises on the opposite side.

## O The formation of an El Niñodepends on conditions all across the Pacific, not just in the waters off of South America.

9. According to paragraph 5, what is the end result of the east-to-west pressure gradient in the eastern Pacific during a typical year?

O The formation of a thick, warm layer of water in the western Pacific

O The reversal of the pressure gradient to west-to-east by the end of the year

O A change in the direction of the Southern Oscillation

O The eastward flow of warm water from the western Pacific

## 10. According to paragraph 5, all of the following changes occur in the Pacific before an El Niño begins EXCEPT:

OPressure increases in the western Pacific and decreases in the eastern Pacific.

OThe trade winds decrease in intensity or reverse in the direction.

OSurface temperatures increase in the central and eastern Pacific.

OOcean currents speed up as they move eastward.

11. What can be inferred about El Niños from the historical evidence mentioned in paragraph 6?

O They have often brought damaging weather to parts of the United States.

O They have been occurring since at least the fifteenth century.

O They occurred less frequently in the sixteenth century than in the fifteenth.

O They have had stronger weather effects on the United States in recent decades than on other locations.

12. Why does the author include the information that in 1997-1998 "Snowstorms in the northeast portion of the United States were more frequent and intense than in most years"?

## O To provide evidence supporting the claim that El Niño are getting stronger

O To explain why the southern United States experienced copious and damaging rainfall in 1997-1998

## O To show that traditional methods are not adequate for documenting the effects of El Niño

## O To identify a consequence of the fact that El Niñoare now occurring a little over once every two years

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**There is clear support for this view in the available documents.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

## **As it is currently used, the term El Niño refers to a strong and lengthy disruption to the normal pattern ofocean currents, water temperatures, and winds in the Pacific.**

●

●

●

**Answer Choices**

O An El Niño typically begins when the Humboldt Current causes upwelling as it travels toward the equator along the coast of Peru and Ecuador.

## O El Niños are preceded by the reversal of the usual east-to- west pressure gradient in the Pacific, the weakening or reversal of the trade winds, and the movement of warm water eastward.

O Comparisons of historical records with recent past events show that El Niños are becoming more frequent and stronger.

O In an El Niño, warm surface currents replace the Humboldt Current for many months, raising ocean temperatures far from the coast.

O Scientists discovered the Southern Oscillation by taking surface-pressure readings at weather stations on both sides of the Pacific.

## O In recent decades, El Niños have begun to occur north of the equator and thereby affect weather conditions in the United States.

参考答案:1-5.A B A B A 6-10.B A C A D 11-13.B A B 14.AEF

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## **参考译文：厄尔尼诺现象**

太平洋沿岸的洪堡德寒流[[2]](#footnote-3)沿着南美洲的厄瓜多尔和秘鲁流向赤道。当接近赤道时，西流的信风会导致沿海营养丰富的冷水从深处上升到较浅的地方。冷水上涌会带来经济上的影响。捕鱼业，尤其是鯷鱼的捕捞因此成为当地的主要产业。

每年十二月和次年一月之间，一股微弱的、温暖的逆流取代了通常寒冷的沿海水域。没有营养物质从海水深处涌上来喂鱼，渔业就停滞了。这片区域的渔民几百年前就已经知道这种现象了。事实上，这段时间向来也是渔民们修补设备、等待冷水回归的时间。该地区的居民已经替这种现象取了个名字叫“厄尔尼诺”，在西班牙语里意思是“圣婴”，因为它发生在庆祝基督诞生的这段时间。

温暖的逆流通常会持续2个月或更短，但正常的洋流中断几个月的情况也时有发生。在这种情况下，不只是海岸附近的海水温度升高，连数千公里之外的海面温度都会升高。在过去的几十年里，厄尔尼诺一词已经被用来描述这些异常强烈的事件，而不是一年一度的普遍现象。在过去的60年中，至少出现了10次厄尔尼诺现象。厄尔尼诺现象不仅影响赤道太平洋的温度，其中最强的还会影响全球的天气。

扔掉字典，拿起《新托福TPO阅读词汇速查速记》，读懂原文。Wechat: geeqi0805

相互作用造成厄尔尼诺现象的过程包括整个太平洋的条件，而不仅仅是美国南部的水域。60年前，英国科学家吉尔伯特·沃克先生发现气象站播报的东西太平洋之间的气压有一定的关系。他注意到，当东太平洋气压上升时，通常会伴随着西太平洋气压的下降，反之亦然。他把这种交互式的现象叫做“南方涛动”。后来人们意识到，厄尔尼诺现象和南方涛动之间有着密切的联系。事实上，两者之间的联系是如此之大，他们往往将两者统称ENSO（厄尔尼诺-南方涛动）。

在一个典型的年份里，东太平洋的气压比西太平洋的气压高。这由东西向的气压梯度增强了赤道水域的信风，形成一股温暖的沿赤道由东向西移动的表层流。这样，西太平洋便形成了一个深厚的、温暖的水层，而东太平洋则有被上涌增强的洪堡德寒流。然而，在其他年份，南方涛动不知道是因为什么原因，朝相反的方向波动，使得西太平洋气压增加，东太平洋气压减小，极大地改变了前面所说的通常情况。这种压力梯度的变化使得信风减弱，在某些情况下还可能逆转。这就导致了西太平洋的暖水向东流动，提高了太平洋中部和东部的海平面温度。这种向东流动标志着厄尔尼诺现象的开始。

科学家们试图尽可能多地记录发生的厄尔尼诺现象。他们收集各种微小的历史证据，如海面温度记录、气压和降水的日常观察，南美洲渔业记录，以及追溯到15世纪的西班牙殖民者的作品。从这样的历史证据，我们知道，厄尔尼诺现象从有文字记载开始就发生过。而且看起来变得越来越频繁。记录表明，十六世纪平均每六年就发生一次厄尔尼诺现象。而最近几十年收集的证据表明，厄尔尼诺现象平均两年多就要发生一次。更令人吃惊的是，厄尔尼诺的威力越来越强。1997-1998年的厄尔尼诺给美国南部从加利福尼亚到佛罗里达带来了大量的、破坏性的降雨。美国东北部的暴风雪也比大多数年份更频繁、更猛烈。

# TPO-44

## From Fish to Terrestrial Vertebrates

One of the most significant evolutionary events that occurred on Earth was the transition of water-dwelling fish to terrestrial tetrapods (four-limbed organisms with backbones). Fish probably originated in the oceans, and our first records of them are in marine rocks. However, by the Devonian Period (408 million to 362 million years ago), they had radiated into almost all available aquatic habitats, including freshwater settings. One of the groups whose fossils are especially common in rocks deposited in fresh water is the lobe-finned fish.

The freshwater Devonian lobe-finned fish rhipidistian crossopterygian is of particular interest to biologists studying tetrapod evolution. These fish lived in river channels and lakes on large deltas. The delta rocks in which these fossils are found are commonly red due to oxidized iron minerals, indicating that the deltas formed in a climate that had alternate wet and dry periods. If there were periods of drought, any adaptations allowing the fish to survive the dry conditions would have been advantageous. In these rhipidistians，several such adaptations existed. It is known that they had lungs as well as gills for breathing. Cross sections cut through some of the fossils reveal that the mud filling the interior of the carcass differed in consistency and texture depending on its location inside the fish. These differences suggest a sadlike cavity below the front end of the gut that can only be interpreted as a lung. Gills were undoubtedly the main source of oxygen for these fish, but the lungs served as an auxiliary breathing device for gulping air when the water became oxygen depleted, such as during extended periods of drought.So, these fish had already evolved one of the prime requisites for living on land: the ability to use air as a source of oxygen.

A second adaptation of these fish was in the structure of the lobe fins. The fins were thick, fleshy, and quite sturdy, with a median axis of bone down the center. They could have been used as feeble locomotor devices on land, perhaps good enough to allow a fish to flop its way from one pool of water that was almost dry to an adjacent pond that had enough water and oxygen for survival. These fins eventually changed into short, stubby legs. The bones of the fins of a Devonian rhipidistian exactly match in number and position the limb bones of the earliest known tetrapods, the amphibians. It should be emphasized that the evolution of lungs and limbs was in no sense an anticipation of future life on land. These adaptations developed because they helped fish to survive in their existing aquatic environment.

What ecological pressures might have caused fishes to gradually abandon their watery habitat and become increasingly land-dwelling creatures? Changes in climate during the Devonian may have had something to do with this if freshwater areas became progressively more restricted. Another impetus may have been new sources of food. The edges of ponds and streams surely had scattered dead fish and other water-dwelling creatures. ■In addition, plants had emerged into terrestrial habitats in areas near streams and ponds, and crabs and other arthropods were also members of this earliest terrestrial community. ■Thus, by the Devonian the land habitat marginal to freshwater was probably a rich source of protein that could be exploited by an animal that could easily climb out of water. ■ Evidence from teeth suggests that these earliest tetrapods did not utilize land plants as food; they were presumably carnivorous and had not developed the ability to feed on plants. ■

How did the first tetrapods make the transition to a terrestrial habitat? Like early land plants such as rhyniophytes, they made only a partial transition; they were still quite tied to water. However, many problems that faced early land plants were not applicable to the first tetrapods. The ancestors of these animals already had a circulation system, and they were mobile, so that they could move to water to drink. Furthermore, they already had lungs, which rhipidistians presumably used for auxiliary breathing. The principal changes for the earliest tetrapods were in the skeletal system—changes in the bones of the fins, the vertebral column, pelvic girdle, and pectoral girdle.

P1：One of the most significant evolutionary events that occurred on Earth was the transition of water-dwelling fish to terrestrial tetrapods (four-limbed organisms with backbones). Fish probably originated in the oceans, and our first records of them are in marine rocks. However, by the Devonian Period (408 million to 362 million years ago), they had radiated into almost all available aquatic habitats, including freshwater settings. One of the groups whose fossils are especially common in rocks deposited in fresh water is the lobe-finned fish.

1. Paragraph 1 supports which of the following statements about fish evolution?

A. Lobe-finned fish were among the earliest types of fish to appear.

B. Fish began living in freshwater habitats only after originating elsewhere.

C. Lobe-finned fish radiated into almost all available aquatic habitats.

D. During the Devonian, lobe-finned fish were more common in marine than in freshwater habitats.

P2：The freshwater Devonian lobe-finned fish rhipidistian crossopterygian is of particular interest to biologists studying tetrapod evolution. These fish lived in river channels and lakes on large deltas. The delta rocks in which these fossils are found are commonly red due to oxidized iron minerals, indicating that the deltas formed in a climate that had alternate wet and dry periods. If there were periods of drought, any adaptations allowing the fish to survive the dry conditions would have been advantageous. In these rhipidistians，several such adaptations existed. It is known that they had lungs as well as gills for breathing. Cross sections cut through some of the fossils reveal that the mud filling the interior of the carcass differed in consistency and texture depending on its location inside the fish. These differences suggest a sadlike cavity below the front end of the gut that can only be interpreted as a lung. Gills were undoubtedly the main source of oxygen for these fish, but the lungs served as an auxiliary breathing device for gulping air when the water became oxygen depleted, such as during extended periods of drought.So, these fish had already evolved one of the prime requisites for living on land: the ability to use air as a source of oxygen.

2. According to paragraph 2, what do the minerals in the delta rocks containing rhipidistian crossopterygian fossils reveal?

A. These deltas formed in dry periods but gradually became wetter.

B.These deltas contain different types of iron minerals than do the surrounding areas.

C.Most rhipidistian crossopterygian fish died when the climate became dry.

D.Rhipidistian crossopterygian fish lived in areas that experienced alternate dry and wet periods.

3. The word "advantageous" in the passage is closest in meaning to

A. beneficial

B. necessary

C. remarkable

D. common

4. In paragraph 2, why does the author include the information that mud inside rhipidistian crossopterygian fossils differed in consistency and texture depending on where the mud was located?

A. To provide evidence that rhipidistian crossopterygian lived in river channels and lakes on large deltas.

B. To identify an effect of the oxidation of iron minerals on the evolution of rhipidistian crossopterygian.

C. To help explain why scientists have concluded that rhipidistian crossopterygian probably had lungs.

D. To explain why scientists decided to cut cross sections through some fossils of rhipidistian crossopterygian.

5.Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Because the lungs of these fish were able to provide only a small amount of oxygen, these fish obtained most of their oxygen through their gills during periods of drought.

B. During periods of extended drought, these fish used their lungs to increase their intake of oxygen beyond the levels absorbed by the gills in normal times.

C. Although these fish primarily used their gills to obtain oxygen, they used their lungs to obtain oxygen from the air when there was not enough in the water.

D. During periods of extended drought, the gills became an auxiliary breathing device and the lungs became the main source of oxygen for these fish.

6. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

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P3：A second adaptation of these fish was in the structure of the lobe fins. The fins were thick, fleshy, and quite sturdy, with a median axis of bone down the center. They could have been used as feeble locomotor devices on land, perhaps good enough to allow a fish to flop its way from one pool of water that was almost dry to an adjacent pond that had enough water and oxygen for survival. These fins eventually changed into short, stubby legs. The bones of the fins of a Devonian rhipidistian exactly match in number and position the limb bones of the earliest known tetrapods, the amphibians. It should be emphasized that the evolution of lungs and limbs was in no sense an anticipation of future life on land. These adaptations developed because they helped fish to survive in their existing aquatic environment.

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7. The word "adjacent" in the passage is closest in meaning to:

A. nearby

B. available

C. temporary

D. fresh

P4：What ecological pressures might have caused fishes to gradually abandon their watery habitat and become increasingly land-dwelling creatures? Changes in climate during the Devonian may have had something to do with this if freshwater areas became progressively more restricted. Another impetus may have been new sources of food. The edges of ponds and streams surely had scattered dead fish and other water-dwelling creatures. ■In addition, plants had emerged into terrestrial habitats in areas near streams and ponds, and crabs and other arthropods were also members of this earliest terrestrial community. ■Thus, by the Devonian the land habitat marginal to freshwater was probably a rich source of protein that could be exploited by an animal that could easily climb out of water. ■ Evidence from teeth suggests that these earliest tetrapods did not utilize land plants as food; they were presumably carnivorous and had not developed the ability to feed on plants. ■

8. The word “progressively” in the passage is closest in meaning to:

A. increasingly

B. noticeably

C. occasionally

D. rapidly

9. In paragraph 4, why does the author point out that crabs and other arthropods were already living on land when the ancestors of the first tetrapods began living there?

A. To account for the presence of dead fish along the edges of ponds and streams during the Devonian.

B. To support the claim that climate change caused freshwater habitats to become more restricted during the Devonian.

C. To identify a consequence of the emergence of plants into terrestrial habitats near ponds and streams.

D. To identify a possible reason for why certain fish gradually became terrestrial organisms.

10. According to paragraph 4，teeth of the earliest tetrapods suggest that these tetrapods

A. competed with other animals for protein

B. were probably carnivores

C. could easily climb out of water

D. were able to eat plants

P5：How did the first tetrapods make the transition to a terrestrial habitat? Like early land plants such as rhyniophytes, they made only a partial transition; they were still quite tied to water. However, many problems that faced early land plants were not applicable to the first tetrapods. The ancestors of these animals already had a circulation system, and they were mobile, so that they could move to water to drink. Furthermore, they already had lungs, which rhipidistians presumably used for auxiliary breathing. The principal changes for the earliest tetrapods were in the skeletal system—changes in the bones of the fins, the vertebral column, pelvic girdle, and pectoral girdle.

11. According to paragraph 5, which of the following was true of the first tetrapods?

A. They became dependent for food on organisms already living on land.

B. They needed to develop new mechanisms for obtaining nutrients.

C. They continued to live in close association with aquatic environments.

D. They were evolutionarily far removed from their rhipidistian ancestors.

12. According to paragraph 5, what was the main way that the earliest tetrapods differed from their immediate fish ancestors?

A. The tetrapods had a different skeletal structure.

B. The tetrapods had more sources of food available

C. The tetrapods had a circulation system.

D. The tetrapods could move to new pools of water.

P4：What ecological pressures might have caused fishes to gradually abandon their watery habitat and become increasingly land-dwelling creatures? Changes in climate during the Devonian may have had something to do with this if freshwater areas became progressively more restricted. Another impetus may have been new sources of food. The edges of ponds and streams surely had scattered dead fish and other water-dwelling creatures. ■In addition, plants had emerged into terrestrial habitats in areas near streams and ponds, and crabs and other arthropods were also members of this earliest terrestrial community. ■Thus, by the Devonian the land habitat marginal to freshwater was probably a rich source of protein that could be exploited by an animal that could easily climb out of water. ■ Evidence from teeth suggests that these earliest tetrapods did not utilize land plants as food; they were presumably carnivorous and had not developed the ability to feed on plants. ■

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**These would have been deposited by the receding waters of droughts, during which many aquatic animals must have died.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth** 2 **points.**

**Freshwater lobe-finned fish may be the direct ancestors of terrestrial tetrapods.**

●

●

●

**Answer Choices**

A. Rhipidistian crossopterygian had features such as primitive lungs and thick fins that could have helped it survive dry periods.

B. During the Devonian, the number of bones increased in the fins of rtiipidistians, improving such animals’ ability to swim and move over land

C. Shortly after the earliest tetrapods developed lungs, plants and other animals began to flourish on land.

D. By the Devonian period, lobe-finned fish preferred freshwater habitats to life in the ocean.

E. A drier climate and new sources of food on land may have encouraged the lobe-finned fish’s move to a terrestrial existence.

F. Early tetrapods remained closely connected to water, but several of their body structures were adapted for life on land.

参考答案：1-5.BDACC 6-10.DAADB 11-13.CAA 14.AEF

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## **参考译文：从鱼类到陆生脊椎动物**

水中栖息的鱼类进化为陆地四足动物（有脊椎的四肢生物）是地球上发生过的重大进化事件之一。鱼类很可能起源于海洋，有关鱼类的最早记录是在海洋岩石中。然而，到了泥盆纪（4.08亿至3.62亿年前），鱼类的栖息地已经扩展到几乎所有可能的水生环境，包括淡水水域。淡水沉积岩石中十分常见的是一种叶状鳍鱼化石。

研究四足动物进化的生物学家对泥盆纪时期生活在淡水水域的总鳍鱼纲、扇鳍鱼目叶状鳍鱼尤其感兴趣。这种鱼生活在大型三角洲的河道和湖泊里。它们的化石常见于三角洲岩石中，这类岩石因为含有氧化铁矿物，故而呈红色，这也表明三角洲形成时已经有干湿季节的交替。如果有干旱期存在，任何有助于鱼类度过干旱的进化都会是有利的。这些扇鳍鱼身上也出现了几处这样的进化。我们知道扇鳍鱼的呼吸器官除了鳃还有肺。一些化石的横截面显示，扇鳍鱼尸体内的泥的稠度和质地根据其在体内位置的不同而不同。这些差异表明在鱼肠前端下面像腔一样的东西只可能是肺。鳃无疑是这些鱼的主要氧气来源，但当水中含氧量大幅减少时，比如在长期干旱的情况下，肺就会作为辅助呼吸系统来吸气。可见，这些鱼已经进化出陆地生存的必备条件之一：将空气作为氧气来源的能力。

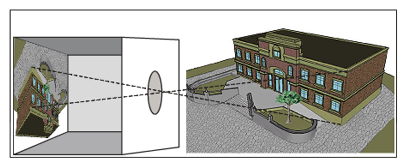
这些鱼的另一个适应是在叶状的鳍。这些鳍很厚、很有肉质感、而且十分结实，内有一条轴心骨。在陆地上鱼鳍从一定程度上可以作为运动的装置，或许能使鱼为了生存从几近干涸的池塘挪动到相邻的有足够水和氧气的池塘。这些鳍最终进化成了短而健壮的腿。泥盆纪扇鳍鱼的鳍骨在数量和位置上与已知的最早的四足动物的肢骨完全匹配。应该强调的是，肺和四肢的进化并不是因为它们预料到未来要在陆地上生活。这些适应是为了帮助它们在当时的水生环境中存活下来。

是什么样的生态压力导致鱼类逐渐放弃在水中的栖息地，逐渐成为陆生生物呢？如果淡水区域逐步缩减，泥盆纪的气候变化可能与此相关。另一个动力可能是新的食物来源。池塘和溪流的边缘无疑会散落有死掉的鱼和其他水栖生物。此外，溪流与池塘附近的陆地开始有植物出现，蟹和其他节肢动物也加入了这一最早的陆地群落。因此，在泥盆纪时期，对于能够轻易爬出水面的生物，淡水边缘的陆地很可能是丰富的蛋白质食物来源。对四足动物的牙齿的研究表明，最早的四足动物并不食用陆生植物；它们可能是食肉动物，而且也尚未形成食用植物的能力。

第一批四足动物是怎样向陆地环境过渡的呢？就像早期的陆生植物莱尼蕨类一样，这些四足动物只是产生了部分变化，这个阶段，它们仍然很依赖于水。不过，早期陆生植物面临的许多问题并不会困扰到它们。这些动物从祖先起就已经有了一个流通系统，它们可以移动，所以可以挪到水边饮水。另外，它们已经有肺了，当时扇鳍鱼可能都已经将其用于辅助呼吸了。最早期的四足动物主要进化的是骨骼系统，即鳍骨、脊柱、骨盆、肩胛骨发生变化。

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## The Use of the Camera Obscura



The precursor of the modern camera, the camera obscura is a darkened enclosure into which light is admitted through a lens in a small hole. The image of the illuminated area outside the enclosure is thrown upside down as if by magic onto a surface in the darkened enclosure. This technique was known as long ago as the fifth century B.C. in China. Aristotle also experimented with it in the fourth century B.C., and Leonardo da Vinci described it in his notebooks in 1490. In 1558 Giovanni Battista Della Porta wrote in his twenty-volume work ***Magia naturalis*** (meaning "natural magic") instructions for adding a convex lens to improve the quality of the image thrown against a canvas or panel in the darkened area where its outlines could be traced. ■Later, portable camera obscuras were developed, with interior mirrors and drawing tables on which the artist could trace the image. ■ For the artist, this technique allows forms and linear perspective to be drawn precisely as they would be seen from a single viewpoint. ■Mirrors were also used to reverse the projectedimages to their original positions. ■

Did some of the great masters of painting, then, trace their images using a camera obscura? Some art historians are now looking for clues of artists' use of such devices. One of the artists whose paintings are being analyzed from this point of view is the great Dutch master, Jan Vermeer, who lived from 1632 to 1675 during the flowering of art and science in the Netherlands, including the science of optics. Vermeer produced only about 30 known paintings, including his famous ***The Art of Painting.*** The room shown in it closely resembles the room in other Vermeer paintings, with lighting coming from a window on the left, the same roof beams, and similar floor tiles, suggesting that the room was fitted with a camera obscura on the side in the foreground. The map hung on the opposite wall was a real map in Vermeers possession, reproduced in suchfaithfuldetail that some kind of tracery is suspected. When one of Vermeer’s paintings was X-rayed, it did not have any preliminary sketches on the canvas beneath the paint, but rather the complete image drawn in black and white without any trial sketches.Vermeer did not have any students, did not keep any records, and did not encourage anyone to visit his studio, facts that can be interpreted as protecting his secret use of a camera obscura.

In recent times the British artist David Hockney has published his investigations into the secret use of the camera obscura, claiming that for up to 400 years, many of Western art’s great masters probably used the device to produce almost photographically realistic details in their paintings. He includes in this group Caravaggio, Hans Holbein, Leonardo da Vinci, Diego Velazquez, Jean-Auguste-Dominique Ingres, Agnolo Bronzino, and Jan van Eyck. From an artist’s point of view, Hockney observed that a camera obscura compresses the complicated forms of a three-dimensional scene into two-dimensional shapes that can easily be traced and also increases the contrast between light and dark, leading to the chiaroscuro effect seen in many of these paintings. In Jan van Eyck’s *The Marriage of Giovanni Arnolfini and Giovanna Cenami,* the complicated foreshortening in the chandelier and theintricate detail in the bride’s garments are among the clues that Hockney thinks point to the use of the camera obscura.

So what are we to conclude? If these artists did use a camera obscura, does that diminish their stature? Hockney argues that the camera obscura does not replace artistic skill in drawing and painting. In experimenting with it, he found that it is actually quite difficult to use for drawing, and he speculates that the artists probably combined their observations from life with tracing of shapes.

:P1：The precursor of the modern camera, the camera obscura is a darkened enclosure into which light is admitted through a lens in a small hole. The image of the illuminated area outside the enclosure is thrown upside down as if by magic onto a surface in the darkened enclosure. This technique was known as long ago as the fifth century B.C. in China. Aristotle also experimented with it in the fourth century B.C., and Leonardo da Vinci described it in his notebooks in 1490. In 1558 Giovanni Battista Della Porta wrote in his twenty-volume work ***Magia naturalis*** (meaning "natural magic") instructions for adding a convex lens to improve the quality of the image thrown against a canvas or panel in the darkened area where its outlines could be traced. ■Later, portable camera obscuras were developed, with interior mirrors and drawing tables on which the artist could trace the image. ■ For the artist, this technique allows forms and linear perspective to be drawn precisely as they would be seen from a single viewpoint. ■Mirrors were also used to reverse the projectedimages to their original positions. ■

1. What can be inferred from paragraph 1 about Giovanni Battista Della Porta's contribution to the camera obscura?

A. He translated a Chinese description of the use of the camera obscura and made the technique available to artists.

B. His convex lens made the projected image easier to trace.

C. His version of the camera obscura allowed for the later addition of a mirror.

D. His improvements relied heavily on design changes proposed earlier by Leonardo da Vinci.

2. The word “portable” in the passage is closest in meaning to

A. valuable

B. practical

C. moveable

D. popular

3. The word "projected" in the passage is closest in meaning to

A. whole

B. corrected

C. enlarged

D. shown

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:P2：Did some of the great masters of painting, then, trace their images using a camera obscura? Some art historians are now looking for clues of artists' use of such devices. One of the artists whose paintings are being analyzed from this point of view is the great Dutch master, Jan Vermeer, who lived from 1632 to 1675 during the flowering of art and science in the Netherlands, including the science of optics. Vermeer produced only about 30 known paintings, including his famous ***The Art of Painting.*** The room shown in it closely resembles the room in other Vermeer paintings, with lighting coming from a window on the left, the same roof beams, and similar floor tiles, suggesting that the room was fitted with a camera obscura on the side in the foreground. The map hung on the opposite wall was a real map in Vermeers possession, reproduced in suchfaithfuldetail that some kind of tracery is suspected. When one of Vermeer’s paintings was X-rayed, it did not have any preliminary sketches on the canvas beneath the paint, but rather the complete image drawn in black and white without any trial sketches. Vermeer did not have any students, did not keep any records, and did not encourage anyone to visit his studio, facts that can be interpreted as protecting his secret use of a camera obscura.

4. Paragraph 2 answers which of the following questions about paintings by Vermeer?

A. What characteristics of Vermeer’s paintings suggest that he may have used a camera obscura?

B. Why did Vermeer produce only about 30 paintings?

C. Do Vermeer's paintings in general suggest that he was unable to paint accurately without using a camera obscura?

D. Why did Vermeer need to draw an image on the canvas of the painting that was X-rayed if he was using a camera obscura?

5. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. One artist with a particularly interesting point of view about the use of the camera obscura in painting was Jan Vermeer, who lived in the Netherlands from 1632 to 1675.

B. Historical analyses suggest that Dutch masters were interested in the science of optics, so they may have used the camera obscura to trace images.

C. The use of the camera obscura is being analyzed in the paintings of Jan Vermeer, who lived in the Netherlands when art and science were flourishing there.

D. One view held by historians is that most Dutch masters were as interested in art as they were in science, and that provides clues about the techniques used in their paintings.

6. What does paragraph 2 indicate about Vermeer’s *The Art of Painting*?

A. It is the first in a series of about 30 paintings that he created.

B. It may have been painted by one of his students.

C. it was in his possession until his death in 1675.

D. It has the same setting as several other works of his.

7. The word "faithful" in the passage is closest in meaning to

A. unusual

B. extensive

C. exact

D. historical

8. Why does the author provide the information that 'When one of Vermeer's paintings was X-rayed, it did not have any preliminary sketches on the canvas beneath the paint, but rather the complete image drawn in black and white without any trial sketches"?

A. To provide an example of a way to learn about the practices of artists who did not keep good records

B. To emphasize Vermeer’s confidence and skill as an artist

C. To provide evidence that Vermeer may have traced the image using a camera obscura

D. To argue that Vermeer did his preliminary sketching on paper, rather than on canvas

:P3：In recent times the British artist David Hockney has published his investigations into the secret use of the camera obscura, claiming that for up to 400 years, many of Western art’s great masters probably used the device to produce almost photographically realistic details in their paintings. He includes in this group Caravaggio, Hans Holbein, Leonardo da Vinci, Diego Velazquez, Jean-Auguste-Dominique Ingres, Agnolo Bronzino, and Jan van Eyck. From an artist’s point of view, Hockney observed that a camera obscura compresses the complicated forms of a three-dimensional scene into two-dimensional shapes that can easily be traced and also increases the contrast between light and dark, leading to the chiaroscuro effect seen in many of these paintings. In Jan van Eyck’s *The Marriage of Giovanni Arnolfini and Giovanna Cenami,* the complicated foreshortening in the chandelier and theintricate detail in the bride’s garments are among the clues that Hockney thinks point to the use of the camera obscura.

9. According to paragraph 3, Hockney believes that all of the following indicate use of a camera obscura EXCEPT

A. very detailed, realistic work

B. increased contrast between light and dark

C. oversimplification of forms when the image is traced

D. complicated foreshortening of objects

10. The word "intricate” in the passage is closest in meaning to

A. surprising

B. complex

C. beautiful

D. clear

P4：So what are we to conclude? If these artists did use a camera obscura, does that diminish their stature? Hockney argues that the camera obscura does not replace artistic skill in drawing and painting. In experimenting with it, he found that it is actually quite difficult to use for drawing, and he speculates that the artists probably combined their observations from life with tracing of shapes.

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11. The word “diminish" in the passage is closest in meaning to

A. reduce

B. affect

C. reflect

D. determine

12. According to paragraph 4，what does Hockney argue about the use of the camera obscura in producing art?

A. Works produced using a camera obscura do not deserve as much respect as those produced without it.

B. The camera obscura was probably used primarily as a training device, rather than used in producing finished works.

C. Use of the camera obscura by Western art’s great masters was probably relatively rare.

D. While the use of the camera obscura may have helped artists, they still needed to have significant artistic ability.

:P1：The precursor of the modern camera, the camera obscura is a darkened enclosure into which light is admitted through a lens in a small hole. The image of the illuminated area outside the enclosure is thrown upside down as if by magic onto a surface in the darkened enclosure. This technique was known as long ago as the fifth century B.C. in China. Aristotle also experimented with it in the fourth century B.C., and Leonardo da Vinci described it in his notebooks in 1490. In 1558 Giovanni Battista Della Porta wrote in his twenty-volume work ***Magia naturalis*** (meaning "natural magic") instructions for adding a convex lens to improve the quality of the image thrown against a canvas or panel in the darkened area where its outlines could be traced. ■Later, portable camera obscuras were developed, with interior mirrors and drawing tables on which the artist could trace the image. ■ For the artist, this technique allows forms and linear perspective to be drawn precisely as they would be seen from a single viewpoint. ■Mirrors were also used to reverse the projectedimages to their original positions. ■

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**All these developments helped artists to create accurate images of objects, people, and scenes.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth** 2 **points.**

**The camera obscura is a darkened enclosure into which light is admitted through a lens in a small hole**

●

●

●

**Answer Choices**

A. Evidence that the use of the camera obscura has long been known is provided by its description in many sources, including works dating back to Chinese writers from the fifth century B.C.

B. Some historians who have studied paintings by Western masters have found clues indicating that the masters may have secretly used the camera obscura in their works.

C. It is now widely believed that the use of the camera obscura led to the development of a style of photographic realism in Western art.

D. The camera obscura was most widely used by artists in Seventeenth-century Netherlands, a period when art and science thrived

E. The unique features of Vermeer’s The Art of Painting make it unlikely that it was made with a camera obscura, as opposed to his other works.

F. The artist David Hockney has speculated that artists probably combined the use of the camera A with their own original observations from life.

参考答案：1-5.B C D A C 6-10.D C C C B 11-13.A D D 14.A B F

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## **参考译文：暗箱的使用**

现代相机的前身——暗箱是一个密不透光的箱子，箱子上有一个带着透镜的小孔，光线由此射入。来自箱外接受光照的图像如同被施了魔法一般，在这个密不透光的箱子内壁上构成倒影。暗箱技术最早可追溯至公元前五世纪的中国。公元前四世纪，亚里士多德曾进行相关实验；1490年，列奥纳多·达芬奇也曾在他的笔记本中描述了这一现象。1558年，乔瓦尼·巴蒂斯塔·德拉波尔塔在他长达二十卷的作品*Magia naturalis*（意为“自然魔术”）中介绍，增加一个凸透镜可以改善倒映在暗箱的帆布或画板上的图像质量，就可以看到图像的轮廓。之后，便携式暗箱诞生，内置镜子和制图板让艺术家可以捕捉到图像。对于艺术家来说，这项技术使得景物的外表和线性透视能够被精准地描绘出来，因为艺术家可以从单一的视角来观察它们。镜子的使用也使得倒立的投影变为正常。

那么在当时，是否有绘画大师曾使用暗箱来描绘图像呢？一些艺术史学家正在寻找相关线索，证明确有此事。用这种角度对其画作进行分析的艺术家之一是杰出的荷兰画家杨·维梅尔（1632-1675）。在他生活的这段时期，荷兰的艺术和科学（包括光学）正值繁荣兴盛。维梅尔知名的画品只有30幅左右，这其中包括他的著名作品《绘画艺术》。画中描绘的房间与维梅尔的其他画作中的房间极为相似：光线都是从左边窗户照入，一样的横梁，相似的地板砖，这些都表明房内前侧方位置可能装有一个暗箱。挂在对面墙上的地图是维梅尔现实中拥有的物品，地图的细节还原得如此真实，不得不让人质疑是否出于描摹。当用X射线检测这幅画时，颜料下的帆布上并没有任何草图的痕迹，有的只是一副干净完整的黑白画。维梅尔没有学生，没有留下任何记录，也没有邀请任何人去参观他的画室，人们解释说这是因为他在秘密地使用暗箱。

近些年来，英国艺术家大卫·霍克尼发表了他对画家秘密使用暗箱的调查结果，声称在长达400年当中，许多西方艺术大师有可能借助了这一设备来描摹他们画作当中格外逼真的部分。这些大师包括卡拉瓦乔、汉斯·荷尔拜因、列奥纳多·达·芬奇、迪亚哥·委拉斯开兹、让·奥古斯特·多米尼克·安格尔、阿尼奥洛·布伦齐诺、以及扬·凡·艾克。从艺术家的角度来看，霍克尼观察到暗箱可以将复杂的三维场景变成易于捕捉的二维图像，并增加光与影之间的反差，从而产生了在很多这类画中常见的明暗效果。在扬·凡·艾克的画作《阿尔诺芬尼夫妇像》中，枝形吊灯按透视法缩短了，加上画中呈现的新娘服装的复杂细节，这些线索使得霍克尼认为作者使用了暗箱。

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综上，我们要得出什么结论呢？如果这些艺术家的确用了暗箱，这会不会降低他们的声望？霍克尼认为，暗箱不能取代绘画中的艺术技巧。通过亲身实验，他发现暗箱其实很难用于绘画。于是他推测，艺术家在借助暗箱捕捉图像作画时，很可能也结合了他们生活中对原物的观察结果。

## Seagrasses



Many areas of the shallow sea bottom are covered with a lush growth of aquatic flowering plants adapted to live submerged in seawater. ■These plants are collectively called seagrasses. ■Seagrass beds are strongly influenced by several physical factors. ■The most significant is water motion: currents and waves. ■Since seagrass systems exist in both sheltered and relatively open areas, they are subject to differing amounts of water motion. For any given seagrass system, however, the water motion is relatively constant. Seagrass meadows in relatively turbulent waters tend to form a mosaic of individual mounds, whereas meadows in relatively calm waters tend to form flat, extensive carpets. The seagrass beds, in turn, dampen wave action, particularly if the blades reach the water surface. This damping effect can be significant to the point where just one meter into a seagrass bed the wave motion can be reduced to zero. Currents are also slowed as they move into the bed.

The slowing of wave action and currents means that seagrass beds tend to accumulate sediment. However, this is not universal and depends on the currents under which the bed exists.Seagrass beds under the influence of strong currents tend to have many of the lighter particles, including seagrass debris, moved out, whereas beds in weak current areas accumulate lighter detrital material.It is interesting that temperate seagrass beds accumulate sediments from sources outside the beds, whereas tropical seagrass beds derive most of their sediments from within.

Since most seagrass systems are depositional environments, they eventually accumulate organic material that leads to the creation of fine-grained sediments with a much higher organic content than that of the surrounding unvegetated areas. This accumulation, in turn, reduces the water movement and the oxygen supply. The high rate of metabolism (the processing of energy for survival) of the microorganisms in the sediments causes sediments to be anaerobic (without oxygen) below the first few millimeters. According to ecologist J. W. Kenworthy, anaerobic processes of the microorganisms in the sediment are an important mechanism for regenerating and recycling nutrients and carbon, ensuring the high rates of productivity—that is, the amount of organic material produced-that are measured in those beds. In contrast to other productivity in the ocean, which is confined to various species of algae and bacteria dependent on nutrient concentrations in the water column, seagrasses are rooted plants that absorb nutrients from the sediment or substrate. They are, therefore, capable of recycling nutrients into the ecosystem that would otherwise be trapped in the bottom and rendered unavailable.

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Other physical factors that have an effect on seagrass beds include light, temperature, and desiccation (drying out). For example, water depth and turbidity (density of particles in the water) together or separately control the amount of light available to the plants and the depth to which the seagrasses may extend. Although marine botanist W. A. Setchell suggested early on that temperature was critical to the growth and reproduction of seagrass, it has since been shown that this particularly widespread seagrass grows and reproduces at temperatures between 2 and 4 degrees Celsius in the Arctic and at temperatures up to 28 degrees Celsius on the northeastern coast of the United States. Still, extreme temperatures, in combination with other factors, may have dramatic detrimental effects. For example, in areas of the cold North Atlantic, ice may form in winter. Researchers Robertson and Mann note that when the ice begins to break up, the wind and tides may move the ice around, scouring the bottom and uprooting the eelgrass. In contrast, at the southern end of the eelgrass range, on the southeastern coast of the United States, temperatures over 30 degrees Celsius in summer cause excessive mortality. Seagrass beds also decline if they are subjected to too much exposure to the air. The effect of desiccation is often difficult to separate from the effect of temperature. Most seagrass beds seemtolerant of considerable changes in salinity (salt levels) and can be found in brackish (somewhat salty) waters as well as in full- strength seawater.

P1：Many areas of the shallow sea bottom are covered with a lush growth of aquatic flowering plants adapted to live submerged in seawater. ■These plants are collectively called seagrasses. ■Seagrass beds are strongly influenced by several physical factors. ■The most significant is water motion: currents and waves. ■Since seagrass systems exist in both sheltered and relatively open areas, they are subject to differing amounts of water motion. For any given seagrass system, however, the water motion is relatively constant. Seagrass meadows in relatively turbulent waters tend to form a mosaic of individual mounds, whereas meadows in relatively calm waters tend to form flat, extensive carpets. The seagrass beds, in turn, dampen wave action, particularly if the blades reach the water surface. This damping effect can be significant to the point where just one meter into a seagrass bed the wave motion can be reduced to zero. Currents are also slowed as they move into the bed.

1. According to paragraph 1, which of the following is true about seagrasses in calm ocean waters? A. They will not survive for very long without the nutrients brought In by fast-moving waters.

B. They tend to form beds covering large areas along the ocean floor.

C. They usually are arranged in separate mounds.

D. They grow more slowly than do seagrasses in fast-moving waters.

2. According to paragraph 1, which of the following is MOST likely to describe a bed in which seagrasses reach the surface of the water?

A. The water is almost completely still.

B. The bed often has major damage from strong waves or currents.

C. The bed is generally no more than one square meter in size.

D. Grasses form a mosaic of individual mounds.

:P2：The slowing of wave action and currents means that seagrass beds tend to accumulate sediment. However, this is not universal and depends on the currents under which the bed exists.Seagrass beds under the influence of strong currents tend to have many of the lighter particles, including seagrass debris, moved out, whereas beds in weak current areas accumulate lighter detrital material.It is interesting that temperate seagrass beds accumulate sediments from sources outside the beds, whereas tropical seagrass beds derive most of their sediments from within.

3. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Light particles and debris collect in some seagrass beds, but are washed out of those affected by strong currents.

B. Seagrass beds under the influence of strong currents tend to accumulate many of the lighter particles from other beds

C. The strength of the currents determines how quickly accumulated seagrass debris is moved out of the beds.

D. Seagrass debris and other light particles are often moved from areas of strong currents to areas of weak currents.

4. The word"derive" in the passage is closest in meaning to

A. maintain

B. expel

C. obtain

D. enrich

5. According to paragraph 3, which of the following does NOT accurately describe the sediments that collect in seagrass beds?

A. Fine-grained

B. Only a few millimeters deep

C. Low in oxygen

D. Rich in organic matter

:P3：Since most seagrass systems are depositional environments, they eventually accumulate organic material that leads to the creation of fine-grained sediments with a much higher organic content than that of the surrounding unvegetated areas. This accumulation, in turn, reduces the water movement and the oxygen supply. The high rate of metabolism (the processing of energy for survival) of the microorganisms in the sediments causes sediments to be anaerobic (without oxygen) below the first few millimeters. According to ecologist J. W. Kenworthy, anaerobic processes of the microorganisms in the sediment are an important mechanism for regenerating and recycling nutrients and carbon, ensuring the high rates of productivity—that is, the amount of organic material produced-that are measured in those beds. In contrast to other productivity in the ocean, which is confined to various species of algae and bacteria dependent on nutrient concentrations in the water column, seagrasses are rooted plants that absorb nutrients from the sediment or substrate. They are, therefore, capable of recycling nutrients into the ecosystem that would otherwise be trapped in the bottom and rendered unavailable.

6. The word "confined" in the passage is closest in meaning to

A. related

B. limited

C. relevant

D. helpful

7. According to paragraph 3, how do seagrasses affect the nutrient supply in the ecosystem?

A. Because of their high rate of metabolism, they consume a large percentage of the available nutrients.

B. They attract various species of algae and bacteria that produce high nutrient concentrations in the water column.

C. They take up carbon and other nutrients trapped on the sea bottom and bring them back into use.

D. Through anaerobic processes at their roots, they produce a very nutrient-rich sediment.

:P4：Other physical factors that have an effect on seagrass beds include light, temperature, and desiccation (drying out). For example, water depth and turbidity (density of particles in the water) together or separately control the amount of light available to the plants and the depth to which the seagrasses may extend. Although marine botanist W. A. Setchell suggested early on that temperature was critical to the growth and reproduction of seagrass, it has since been shown that this particularly widespread seagrass grows and reproduces at temperatures between 2 and 4 degrees Celsius in the Arctic and at temperatures up to 28 degrees Celsius on the northeastern coast of the United States. Still, extreme temperatures, in combination with other factors, may have dramatic detrimental effects. For example, in areas of the cold North Atlantic, ice may form in winter. Researchers Robertson and Mann note that when the ice begins to break up, the wind and tides may move the ice around, scouring the bottom and uprooting the eelgrass. In contrast, at the southern end of the eelgrass range, on the southeastern coast of the United States, temperatures over 30 degrees Celsius in summer cause excessive mortality. Seagrass beds also decline if they are subjected to too much exposure to the air. The effect of desiccation is often difficult to separate from the effect of temperature. Most seagrass beds seemtolerant of considerable changes in salinity (salt levels) and can be found in brackish (somewhat salty) waters as well as in full- strength seawater.

8. It can be inferred from paragraph 4 that the reason seagrasses do not grow in very deep water is that

A. they cannot handle intense water pressure

B. deep water is too cold

C. they would not get enough light

D. deep water is too salty

9. The word “detrimental'’ in the passage is closest in meaning to

A. harmful

B. significant

C. unexpected

D. distinct

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10. Paragraph 4 suggests that which of the following would be the LEAST likely to cause major damage to eelgrass and other common seagrasses?

A. Factors related to extreme temperatures

B. Exposure to air

C. Major changes in salinity

D. The movement of ice on the seafloor

11. Paragraph 4 suggests that which of the following would be the LEAST likely to cause major damage to eelgrass and other common seagrasses?

A. Factors related to extreme temperatures

B. Exposure to air

C. Major changes in salinity

D. The movement of ice on the seafloor

12. The phrase “tolerant of’ in the passage is closest in meaning to

A. unused to

B. strongly affected by

C. protected from

D. able to withstand

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Seagrasses grow together in dense patches, or beds, with as many as 4,000 blades per square meter.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth** 2 **points.**

**Seagrasses are aquatic flowering plants that grow in either sheltered or open areas of the sea**

●

●

●

**Answer Choices**

A. Seagrass beds are influenced by several physical factors, the most significant being the stability of the sea bottom, which must anchor them against the currents.

B. Because they slow currents and waves, seagrass beds collect deposits of rich organic sediments, which are home to many anaerobic microorganisms.

C. Unlike sea organisms that depend on the water column for their productivity, seagrasses ensure high rates of productivity by taking nutrients from ocean floor sediment.

D. Sediments in seagrass beds vary by region, with temperate beds accumulating sediments from within, and tropical beds collecting sediments from without.

E. Seagrasses under weak currents tend to have higher rates of metabolism than those under strong currents, perhaps because of differences in oxygen levels.

F. Although seagrasses survive in temperatures ranging from 2 to 28 degrees Celsius, more extreme temperatures can damage them, as can desiccation and lack of light.

参考答案：1-5.BAACB 6-10.BCCDC 11-13.CDB 14.BCF

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## **参考译文：海草**

浅海底部的许多地方都被茂密的水生开花植物所覆盖，这些植物已经完全适应了浸没于海水的生活。这些植物统称为海草。海草床深受几个物理因素的影响。其中，最重要的因素是海水运动：海流和海浪。因为海草不仅生存在隐蔽的水域，也生存在相对开放的水域，因此海草需要去适应各种不同程度的水流运动。然而，对于特定的海草系统而言，海水运动是相对恒定的。在相对动荡的水域，海草一般会形成一个个小丘；而在相对平静的水域则倾向于形成平坦广阔的草地。反过来，海草床也会减少波浪的作用，特别是当叶片长至水面以上时。海草床的阻碍作用很强，一般的波浪只要遇到一米高的海草床，波动就会完全停滞。而海流遇到海草床时，速度也会变慢。

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海浪和海流的速度减缓，意味着海草床经常会有沉积。然而，情况也非绝对如此，是否有沉积主要取决于海草床下水流的强度。遇到较湍急的海流，海草床中一些较轻的颗粒物，比如海草残骸，就会被海水流带走，而遇到较缓的水流，这些较轻的碎屑物质就会沉积下来。有趣的是，温带海草床通常会沉淀外来物，而热带海草床的沉积物通常来自海草床内部。

由于绝大多数海草系统都处于沉积环境，它们最终会积累下有机物质，进而得到有机质含量远高于比周围无植被区的细颗粒状沉淀物。这样的积累反过来也减少了海水的运动和氧气供应。沉积物中微生物的高新陈代谢（为生存而进行的能量转化）率，导致数毫米以下的沉积物缺氧（没有氧气）。根据生态学家J·W·肯沃西所说，沉积物中微生物的无氧代谢是一项重要的使得营养物质和碳再生和循环的机制，保证了有机物的高产出率——即测量到的海草床中产生的有机物的量。海洋中其他物种的产出率受到各种藻类和细菌的限制，而藻类和细菌又依赖于水体营养物质的浓度，但海草与其不同，海草是根系植物，可以从沉积物或海洋基底当中吸收养分，因此它们能够将海洋底部的营养物质回收进入生态系统，否则，这些营养将会永远困在海底，不可利用。

其他影响海草床的物理因素包括光、温度、干化（干燥）。例如，水的深度和浊度（水中颗粒的密度）共同或单独控制海草可获取的光照量和海草可生长的深度。尽管海洋植物学家W·A·萨契尔早期曾提出温度是海草生长和繁殖的关键，但研究已经证明，从2到4摄氏度的北极，到28摄氏度的美国东北海岸，这些广泛分布的海草都可以生长和繁殖。当然，极端温度及其他因素一起可能会对海草的生存产生巨大的不良影响。例如，在寒冷的北大西洋地区，冬天海水可能会结冰。研究人员罗伯森和曼指出，如果冰层破裂，风和潮汐可以将冰块四处移动，刮擦海洋底部，将大叶藻连根拔起。相反，在大叶藻可以生存的南端——美国的东南部海岸，夏季温度超过30摄氏度会造成大叶藻大量死亡。如果过多的暴露在空气中，海草床也会枯萎。因为干化效应往往难以和高温效应分离开来。大多数的海草床都能适应各种盐度（盐含量）的变化，在半咸水（微咸）海域和纯咸水海域都能生存。

# TPO-45

## Microscopes: The Beringia Landscape



During the peak of the last ice age, northeast Asia (Siberia) and Alaska were connected by a broad land mass called the Bering Land Bridge. This land bridge existed because so much of Earth’s water was frozen in the great ice sheets that sea levels were over 100 meters lower than they are today. Between 25,000 and 10,000 years ago, Siberia, the Bering Land Bndge, and Alaska shared many environmental characteristics. These included a common mammalian fauna of large mammals, a common flora composed of broad grasslands as well as wind-swept dunes and tundra, and a common climate with cold, dry winters and somewhat warmer summers. The recognition that many aspects of the modem flora and fauna were present on both sides of the Bering Sea asremnants of the ice-age landscape led to this region being named Beringia.

It is through Beringia that small groups of large mammal hunters, slowly expanding their hunting territories, eventually colonized North and South America. On this archaeologists generally agree, but that is where the agreement stops. One broad area of disagreement in explaining the peopling of the Americas is the domainof paleoecologists, but it is critical to understanding human history: what was Beringia like?

The Beringian landscape was very different from what it is today. ■ Broad, windswept valleys; glaciated mountains; sparse vegetation; and less moisture created a rather forbidding land mass. ■ This land mass supported herds of now-extinct species of mammoth, bison, and horse and somewhat modern versions of caribou, musk ox, elk, and saiga antelope. ■ These grazers supported in turn a number of impressive carnivores, including the giant short-faced bear, the saber-tooth cat, and a large species of lion. ■

The presence of mammal species that require grassland vegetation has led Arctic biologist Dale Guthrie to argue that while cold and dry, there must have been broad areas of dense vegetation to support herds of mammoth, horse, and bison.Further, nearly all of the ice-age fauna had teeth that indicate an adaptation to grasses and sedges; they could not have been supported by a modern flora of mosses and lichens. Guthrie has also demonstrated that the landscape must have been subject to intense and continuous winds, especially in winter. He makes this argument based on the anatomy of horse and bison, which do not have the ability to search for food through deep snow cover. They need landscapes with strong winds that remove the winter snows, exposing the dry grasses beneath. Guthrie applied the term “ mammoth steppe" to characterize this landscape.

In contrast, Paul Colinvaux has offered a counterargument based on the analysis of pollen in lake sediments dating to the last ice age. He found that the amount of pollen recovered in these sediments is so low that the Beringian landscape during the peak of the last glaciation was more likely to have been what he termed a "polar desert," with little or only sparse vegetation, in no way was it possible that this region could have supported large herds of mammals and thus, human hunters. Guthrie has argued against this view by pointing out that radiocarbon analysis of mammoth, horse, and bison bones from Beringian deposits revealed that the bones date to the period of most intense glaciation.

The argument seemed to be at a standstill until a number of recent studies resulted in a spectacular suite of new finds. The first was the discovery of a 1,000-square-kilometer preserved patch of Beringian vegetation dating to just over 17,000 years ago—the peak of the last ice age The plants were preserved under a thick ash fall from a volcanic eruption. Investigations of the plants found grasses, sedges, mosses, and many other varieties in a nearly continuous cover, as was predicted by Guthrie. But this vegetation had a thin root mat with no soil formation, demonstrating that there was little long-term stability in plant cover, a finding supporting some of the arguments of Colinvaux. A mixture of continuous but thin vegetation supporting herds of large mammals is one that seems plausible and realistic with the available data.

1. The word "remnants" in the passage is closest in meaning

O remains

O evidence

O results

O reminders

2. The word "domain"in the passage is closest in meaning to

O field of expertise

O challenge

O interest

O responsibility

3. According to paragraph 3, all of the following are true of the Beringian landscape EXCEPT.

O There was little vegetation.

O The mammal species there all survived into modern versions.

O The climate was drier than it is today.

O There were mountains with glaciers.

4. The purpose of paragraph 3 is to

O contrast today’s Beringian landscape with other landscapes in the American continent

O describe the Beringian landscape during the last ice age

O explain why so many Beringian species became extinct during the last ice age

O summarize the information about Beringia that historians agree on

5. The word "continuous” in the passage is closest in meaning to

O unpredictable

O very cold

O dangerous

O uninterrupted

6. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O According to biologist Dale Guthrie, mammal species require broad areas of vegetation to survive.

O Dale Guthrie is an Arctic biologist who argued that broad areas of dense vegetation were surely enough to attract mammals such as mammoth, horse, and bison to Beringia.

O Dale Guthrie argued that Beringia, though cold and dry, must have had enough dense vegetation to support the herds of mammoth, horse, and bison that lived there.

O As long as Beringia was cold and dry, argued Dale Guthrie, dense vegetation grew in order to support the herds of mammoth, horse, and bison—the mammal species present there.

7. According to paragraph 4，Guthrie believes that the teeth of ice-age fauna support which of the following conclusions?

O Large mammals would not have been able to survive in the Beringian landscape.

O Grasslands were part of the Beringian landscape.

O Strong winds exposed dry grasses under the snow.

O Horses and bison did not have the ability to search for food through deep snow cover..

8. According to paragraph 4，which of the following statements is true of the relationship between ice- age Benngian animals and their environment?

O When present in sufficient quantities, lichens and mosses provide enough nutrients to satisfy the needs of herds of large mammals.

O The anatomy of certain animals present in that environment provides information about the intensity of winds there at that time.

O The structure of the teeth of most ice-age fauna indicates that they preyed on animals such as the mammoth, horse, and bison.

O Horses and bison are large enough that their feet can easily penetrate deep snow and uncover areas where they can feed on plant material.

9. In paragraph 5, the amount of pollen in Beringian lake sediments from the last ice age is used to explain

Ohow long the ice age lasted

Ohow important pollen is as a source of food

Ohow many different kinds of plants produce pollen

Ohow little vegetation must have been present at that time

10. According to paragraph 5, how did Dale Guthrie use the information about radiocarbon analysis of bones from Benngian deposits?

O To suggest that Colinvaux should have used different methods to measure the amount of pollen in ice-age lake sediments

O To argue that the large Beringian mammals must have eaten plants that produce little, if any, pollen

O To show that the conclusions that Colinvaux drew from the analysis of pollen in ice-age lake sediments cannot be correct

O To explain why so-called polar deserts are incapable of supporting such large animals as mammoth, horse, and bison

11. The word "plausible" in the passage is closest in meaning to

O preferable

O practical

O reasonable

O advantageous

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12. Which of the following best describes the organization of paragraph 6?

O Two contrasting views are presented, and a study that could decide between them is proposed

O An argument is offered, and reasons both for and against the argument are presented

O A claim is made, and a study supporting the claim is described

O New information is presented, and the information is used to show that two competing explanations can each be seen as correct in some way.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Nevertheless, large animals managed to survive in Beringia.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**During the last ice age, human hunters pursued large mammals across Beringia, a land whose climatic characteristics have been in dispute.**

●

●

●

**Answer Choices**

O Strong evidence indicates that large mammals like mammoth and bison survived in the harsh ice-age Beringian landscape.

O Carnivores such as the saber-tooth cat were primarily responsible for the disappearance of the largest of the grazing animals, but the harsh winters caused some grazers to die of starvation.

O The discovery that grasses, sedges, and mosses survived under the thick ash from a large volcanic eruption proved that the ice-age Benngian plant cover was extremely resistant to climatic extremes.

O Benngian mammals crossed easily from northeastern Asia to Alaska across the Bering Land Bridge, though there are indications that they usually went back to Asia for the brief, but warm, summers.

O Analyses of ice-age sediments uncovered very small amounts of pollen, suggesting that Benngia lacked the quantity of vegetation needed to support large herds of mammals.

O Recent discoveries suggest that shallow-rooted plants created a fairly continuous cover over ice-age Beringia, though the cover most likely was variable and uncertain in any one location.

参考答案：1-5.A A B B D 6-10.C B B D C 11-13.C D B 14.AEF

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## **参考译文：白令陆桥景观**

上一次冰期高峰，东北亚（西伯利亚）和阿拉斯加被一名为白令陆桥的广阔大陆块连接起来。这座大陆桥的出现是因为，那时候地球上大量的水被冻结成巨大的冰盖，所以海平面比现在低100米（即大陆桥就露出来了）。在10000年到25000年之前，西伯利亚、白令大陆桥和阿拉斯加有许多共同的环境特征。其中包括，这三个地方都有常见的由大型哺乳动物组成的哺乳动物群和由广袤的草地、寒风凌厉的沙丘和冻原组成的植物群，以及冬季寒冷干燥、夏季校暖和的气候。人们认为现在白令海两岸的植物群和动物群在许多方面都可以被认为是冰河时代的残存者，所以这个地区被命名为白令陆桥。

正是通过白令陆桥，一些捕捉大型哺乳动物的猎人小团体慢慢地扩大了他们的狩猎领地，最终占领了美洲的北部和南部。在这一点上考古学家普遍表示认同，但是在其他方面大家就产生了分歧。在解释美洲印第安人的居住情况时产生的一个比较大的分歧在于古生物学的范畴，但这关键是要理解人类历史：那时候的白令陆桥是什么样的？

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彼时白令陆桥的景观与如今大不相同。那时山谷宽广，海风吹拂，山脉被冰覆盖，植被稀疏；降水稀少，令人望而生畏。这个陆块中生存着成群的现今已灭绝的猛犸象、野牛、马，以及现代版的驯鹿、麝牛、麋鹿和赛加羚羊。以这些食草动物为食的是大型食肉动物，包括巨型短面熊、剑齿猫、和大型狮子。

哺乳动物的存在需要草地植被，这使得北极生物学家戴尔·古思莱认为虽然白令陆桥地区寒冷干燥，但是应该有大面积的茂密植被来养活庞大的猛犸群、马群和野牛群。此外，几乎所有冰河时代动物的牙齿都表明它们适应了禾草和莎草；他们不可能只吃现代植物苔藓和地衣。古思莱还表明，陆桥地区应该时常持续刮强风，特别是在冬季。对野马和野牛的解剖可以发现它们没有穿过深雪寻找食物的能力，这就证明了他的论点。野马和野牛需要大风吹走积雪，使得下面的干草显露出来。古思莱用了“猛犸草原”一词来描述陆桥地区。

与这个论点相反，保罗.柯林沃斯基于对湖泊沉积物中发现的可追溯至冰河时期的花粉的研究，提出了反对论据。他发现，在这些沉积物中的花粉是如此之少，以至于他认为末次冰河时代高峰期的白令陆桥很可能是“极地荒漠”，由于植被稀疏，所以这个地区不可能养活那么大群的大型哺乳动物，因此也不会有那么多猎人。古思莱表示反对，他指出，对白令陆桥地区猛犸象、马、草原野牛的骨头沉积物进行放射性碳定年分析发现这些骨头可以追溯到冰川作用最强烈的时期。

两种观点一直以来处于僵持状态，直到最近才有了一些重大的新发现。首先是发现了一个保存下来的1000平方公里的白令陆桥植被区，该植被区可以追溯到17000多年前，也就是上一次冰期高峰。植被区被火山喷发出来的厚厚的灰烬覆盖，故而得以保存。对其调查发现，正如古思莱预测的那样，在这几乎不断的灰层覆盖之下，这个地区生长着包括禾草、莎草、苔藓在内的多种植物。不过这个植被区有一层细细的根系，但是并没有土壤形成，说明本地区的植被不具备长期稳定性，这与柯林沃斯的一些观点吻合。以现有的数据来看，目前看似合理和现实的解释是，大型哺乳动物群是以这些连续生长的、薄薄的植被层为食的。

## Wind pollination

Pollen, a powdery substance, which is produced by flowering plants and contains male reproductive cells, is usually carried from plant to plant by insects or birds, but some plants rely on the wind to carry their pollen. Wind pollination is often seen as being primitive and wasteful in costly pollen and yet it is surprisingly common, especially in higher latitudes. Wind is very good at moving pollen a long way; pollen can be blown for hundreds of kilometers, and only birds can get pollen anywhere near as far. Thedrawback is that wind is obviously unspecific as to where it takes the pollen. It is like trying to get a letter to a friend at the other end of the village by climbing onto the roof and throwing an armful of letters into the air and hoping that one will end up in the friend's garden. For the relatively few dominant tree species that make up temperate forests, where there are many individuals of the same species within pollen range, this is quite a safe gamble. If a number of people in the village were throwing letters off roofs, your friend would be bound to get one. By contrast, in the tropics, where each tree species has few, widely scattered individuals, the chance of wind blowing pollen to another individual is sufficiently slim that animals are a safer bet as transporters of pollen. Even tall trees in the tropics are usually not wind pollinated despite being in windy conditions. In a similar way, trees in temperate forests that are insect pollinated tend to grow as solitary, widely spread individuals.

Since wind-pollinated flowers have no need to attract insects or other animals, they have dispensed with bright petals, nectar, and scent. These are at best a waste and at worst an impediment to the transfer of pollen in the air. The result is insignificant-looking flowers and catkins (dense cylindrical clusters of small, petalless flowers).

Wind pollination does, of course, require a lot of pollen. ■ Birch and hazel trees can produce 5.5 and 4 million grains per catkin, respectively. ■There are various adaptations to help as much of the pollen go as far as possible. ■ Most deciduous wind-pollinated trees (which shed their leaves every fall) produce their pollen in the spring while the branches are bare of leaves to reduce the surrounding surfaces that “compete" with the stigmas (the part of the flower that receives the pollen) for pollen.■Evergreen conifers, which do not shed their leaves, have less to gain from spring flowering, and, indeed,some flower in the autumn or winter.

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Pollen produced higher in the top branches is likely to go farther: it is windier (and gustier) and the pollen can be blown farther before hitting the ground. Moreover, dangling catkins like hazel hold the pollen in until the wind is strong enough to bend them, ensuring that pollen is only shed into the air when the wind is blowing hard. Weather is also important. Pollen is shed primarily when the air is dry to prevent too much sticking to wet surfaces or being knocked out of the air by rain. Despite these adaptations, much of the pollen fails to leave the top branches, and only between 0.5 percent and 40 percent gets more than 100 meters away from the parent. But once this far, significant quantities can go a kilometer or more. Indeed, pollen can travel many thousands of kilometers at high altitudes. Since all this pollen is floating around in the air, it is no wonder that wind-pollinated trees are a major source of allergies.

Once the pollen has been snatched by the wind, the fate of the pollen is obviously up to the vagaries of the wind, but not everything is left to chance. Windborne pollen is dry, rounded, smooth, and generally smaller than that of insect-pollinated plants. But size is a two-edged sword. Small grains may be blown farther but they are also more prone to be whisked past the waiting stigma because smaller particles tend to stay trapped in the fast-moving air that flows around the stigma. But stigmas create turbulence, which slows the air speed around them and may help pollen stick to them.

1. The word "drawback" in the passage is closest in meaning to

O other side of the issue

O objection

O concern

O problem

2. Which of the following can be inferred from paragraph 1 about pollen production?

O Pollen production requires a significant investment of energy and resources on the part of the plant.

O The capacity to produce pollen in large quantities is a recent development in the evolutionary history of plants.

O Plants in the tropics generally produce more pollen than those in temperate zones.

O The highest levels of pollen production are found in plants that depend on insects or birds to carry their pollen.

3. According to paragraph 1, wind-pollinated trees are most likely to be found

O in temperate forests

O at lower latitudes

O in the tropics

O surrounded by trees of many different species

4. Paragraph 1 supports which of the following as the reason animals are a safer bet than wind as pollinators when the individual trees of a species are widely separated?

O Animals tend to carry pollen from a given flower further than the wind does.

O Animals serve as pollinators even where there is little wind to disperse the pollen.

O An animal that visits a flower is likely to deliberately visit other flowers of the same species and pollinate them.

O Birds and insects fly in all directions, not just the direction the wind is blowing at a given moment.

5. In paragraph 1, the author compares pollen moved by wind with letters thrown off roofs in order to

O explain why there are relatively few species of trees that depend on wind pollination

O compare natural, biological processes with human social practices

O make a point about the probability of wind-blown pollen reaching a tree of the same species

O argue against the common assumption that the tallest trees are the most likely to employ wind pollination

6. Paragraph 2 suggests that wind-pollinated plants do not have bright petals, nectar, and scent for which TWO of the following reasons? To receive credit, you must select TWO answers.

OThey interfere with pollination by wind.

OThey are easily damaged by wind.

OThey are unnecessary.

OThey reduce the amount of pollen that can be produced.

7. The word "respectively” in the passage is closest in meaning to

O over time

O separately

O in that order

O consistently

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8. According to paragraph 3, why do most deciduous wind-pollinated trees produce their pollen in the spring?

O To avoid competing with evergreen conifers, which flower in the fall or winter

O So that the leaves of the trees receiving the pollen will not prevent the pollen from reaching the trees' stigmas

O Because they do not have enough energy to produce new leaves and pollen at the same time

O In order to take advantage of the windiest time of year

9. According to paragraph 4，which of the following is NOT an adaptation that helps ensure that pollen travels as far as possible?

O Pollen-producing flowers and catkins are located at or near the top of the tree.

O Trees grow at least 100 meters away from each other.

O Dangling catkins release pollen only when the wind is blowing hard.

O Pollen is not released during rain storms or when the air is damp.

10. The word "significant" in the passage is closest in meaning to

O sufficient

O considerable

O increasing

O small

11. The phrase “no wonder" in the passage is closest in meaning to

O unsurprising

O understandable

O well-known

O unfortunate

12. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O Because smaller particles tend to stay trapped in the fast moving air, they are blown much farther than other grains.

O Smaller particles are trapped by the stigma when fast-moving air flows past it.

O Small particles that are whisked past the waiting stigma gain speed and are often trapped in the fast-moving air.

O While smallness helps pollen travel farther, it also makes it more likely to be blown past the stigma.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**This level of volume is important to ensure that at least some of the pollen reaches target tree, but dispersing the pollen is crucial as well.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. Directions: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. This question is worth 2 points.

**Some plants depend on the wind to carry their pollen.**

●

●

●

**Answer Choices**

O Because there are few trees in temperate forests, it is safer to transport pollen by insects or birds.

O Wind pollination is a safe reproductive strategy for trees in temperate forests where there are only a few dominant species and, therefore, many individuals of the same species.

O Wind pollination requires production of a large amount of pollen, which must be released at the right time and under the right conditions to extend its range.

O Most wind-pollinated trees are deciduous because evergreen needles compete with the stigma for pollen, making wind pollination uncertain.

O Wind-pollinated plants usually have small petalless flowers which often grow in catkins that produce a very fine-grained pollen.

O Wind-pollinated trees must grow in regions that are only moderately windy because strong winds will blow the tiny pollen grains past the stigma.

参考答案：1-5: D A A C C 6.A C 7-10.B B B B 11-13.A D B 14.BCE

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：风媒传粉**

花粉，一种由开花植物产生且含有雄性生殖细胞的粉状物质通常是由昆虫或鸟类在植物间传播的，但有些植物也靠风来携带花粉。风媒传粉常被视为是原始和低效率的方式，但这种传粉手段极其常见，特别是在高纬度地区。风可以把花粉带到很远的地方，远至几百公里，这点上，只有鸟类传播才能勉强达到这个距离。但风媒传播有个缺点，那就是传播的不定向性。这就好比爬上屋顶，把一大堆信扔到空中，希望其中一封能落在村子另一端的朋友家的花园里。如果是在只有相对较少的几种树种占主导地位的温带森林，花粉的传播范围内存有众多相同的树种，风媒传播就相对比较安全。这就像是村子里有许多人都把信从屋顶扔下来，你的朋友终归会收到一封一样。相比之下，在热带地区，每种树的数量很少，而且散布在各处，靠风把花粉从一棵吹到另一棵的几率太小，这时靠动物来传播花粉就会更保险。因此，即便是热带的高大树木也不会靠风来传播花粉，即使它们处于大风环境中。类似地，在温带森林中靠昆虫授粉的树木通常会长成孤立的大树。

由于风媒传粉的花不需要吸引昆虫或其它动物，它们无需鲜艳的花瓣，诱人的花蜜与花香。因为这些东西对于风媒传粉的花来说充其量只是多余的，搞不好还会变成花粉在空中传播的阻碍。所以这些花只有不起眼的外观和花序（密集的圆柱状、无花瓣小花团）。

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当然，风媒传粉需要大量的花粉。桦树和榛子树的每个花序可分别能产生550万和400万粒花粉。要使得更多的花粉传得更远，植物们各有各的适应方式。大多数风媒传粉的落叶植物（每年秋天落叶的植物）在春天产出花粉，这时候树枝光秃秃的，花粉就有更大几率落到柱头（接收花粉的部分）上，落到树的表面上的部分就不会太多。常绿针叶树由于不会落叶，春天开花对它们来说并没有什么好处，因此，确实会有部分树在秋天或冬天开花。

越高的树枝上产生的花粉，就越有可能飘得越远，因为高处风更多（也更大），花粉在落地前也就可以吹得更远。此外，悬挂的榛序直到被风吹弯了才会把花粉释放出来，确保花粉只在风力够强时脱落进入空气中。天气也很重要。只有当空气干燥的时候，花粉才会被释放出来，以防止花粉被潮湿的表面粘住或者被雨打落到地面。尽管有这些适应方式，大部分花粉还是无法离开顶端的树枝，只有千分之五到百分之四十的花粉能够飘到离树木100米以外的地方。不过飘过100米后，这些花粉相当一大部分就能飘到一公里或者之外的地方。事实上，花粉可以在高海拔地区飘至数千公里外。有这些花粉在空气中漂浮，难怪风媒传粉的树是过敏的主要来源。

一旦花粉被风带走，花粉的命运就交给喜怒无常的风了，但也并非说一切都取决于运气。风传花粉是干燥的，圆形的，光滑的，比虫媒传粉的植物的花粉小。但是花粉的大小是一把双刃剑。小花粉可能被吹得更远，但它们也更容易拂过花的柱头，因为较小的颗粒会被困在在柱头周围快速流动的空气中。但与此同时柱头处也会有动荡，从而降低风速，有助于花粉附着在柱头上。

## Feeding Strategies in the Ocean

In the open sea, animals can often find food reliably available in particular regions or seasons (e g., in coastal areas in springtime). In these circumstances, animals are neither constrained to get the last calorie out of their diet nor is energy conservation a high priority. In contrast, the food levels in the deeper layers of the ocean are greatly reduced, and the energy constraints on the animals are much more severe. To survive at those levels, animals must maximize their energy input, finding and eating whatever potential food source may be present.

In the near-surface layers, there are many large, fast carnivores as well as an immense variety of planktonic animals, which feed on plankton (small, free-floating plants or animals) by filtering them from currents of water that pass through a specialized anatomical structure. These filter-feeders thrive in the well-illuminated surface waters because oceans have so many very small organisms, from bacteria to large algae to larval crustaceans. Even fishes can become successful filter-feeders in some circumstances. Although the vast majority of marine fishes are carnivores, in near-surface regions of high productivity the concentrations of larger phytoplankton (the plant component of plankton) are sufficient to support huge populations of filter-feeding sardines and anchovies. These small fishes use their gill filaments to strain out the algae that dominate such areas. Sardines and anchovies provide the basis for huge commercial fisheries as well as a food resource for large numbers of local carnivores, particularly seabirds. At a much larger scale, baleen whales and whale sharks are also efficient filter-feeders in productive coastal or polar waters, although their filtered particles comprise small animals such as copepods and krill rather than phytoplankton.

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Filtering seawater for its particulate nutritional content can be an energetically demanding method of feeding, particularly when the current of water to be filtered has to be generated by the organism itself, as is the case for all planktonic animals.Particulate organic matter of at least 2.5 micrograms per cubic liter is required to provide a filter-feeding planktonic organism with a net energy gain. This value is easily exceeded in most coastal waters, but in the deep sea, the levels of organic matter range from next to nothing to around 7 micrograms per cubic liter. Even though mean levels may mask much higher local concentrations, it is still the case that many deep-sea animals are exposed to conditions in which a normal filter-feeder would starve.

There are, therefore, fewer successful filter-feeders in deep water, and some of those that are there have larger filtering systems to cope with the scarcity of particles. Another solution for such animals is to forage in particular layers of water where the particles may be more concentrated. Many of the groups of animals that typify the filter-feeding lifestyle in shallow water have deep-sea representatives that have become predatory. Their filtering systems, which reach such a high degree of development in shallow- water species, are greatly reduced. Alternative methods of active or passive prey capture have been evolved, including trapping and seizing prey, entangling prey, and sticky tentacles.

■ In the deeper waters of the oceans, there is a much greater tendency for animals to await the arrival of food particles or prey rather than to search them out actively (thus minimizing energy expenditure). ■ This has resulted in a more stealthy style of feeding, with the consequent emphasis on lures and/or the evolution of elongated appendages that increase the active volume of water controlled or monitored by the animal. ■ Another consequence of the limited availability of prey is that many animals have developed ways of coping withmuch larger food particles, relative to their own body size, than the equivalent shallower species can process. ■ Among the fishes there is a tendency for the teeth and jaws to become appreciably enlarged. In such creatures, not only are the teeth hugely enlarged and/or the jaws elongated but the size of the mouth opening may be greatly increased by making the jaw articulations soflexiblethat they can be effectively dislocated. Very large or long teeth provide almost no room for cutting the prey into a convenient size for swallowing, the fish must gulp the prey down whole.

1. The word "severe" in the passage is closest in meaning to

O extreme

O complex

O basic

O immediate

2. What can be inferred from paragraph 1 about why energy conservation is not a high priority for ocean animals in coastal waters during the spring?

O Those animals are least active during the spring

O Those animals have a plentiful supply of food

O Those animals have to expend energy to avoid predators.

O Those animals store energy during the colder seasons.

3. What can be inferred from paragraph 2 about fish?

O Most fish feed on plankton.

O Fish tend to avoid well-illuminated areas.

O Most fish species are not filter-feeders.

O Few fish species are successful in the near-surface layers.

4. According to paragraph 2, how do sardines and anchovies obtain food near the surface of the ocean?

OThey rely on the large quantities of food resources also available to local carnivores.

OThey capture the larvae of some crustaceans.

OThey feed on the organisms left over by commercial fisheries.

OThey obtain algae by using their gills as filters.

5. In paragraph 1, the author compares pollen moved by wind with letters thrown off roofs in order to

O explain why there are relatively few species of trees that depend on wind pollination

O compare natural, biological processes with human social practices

O make a point about the probability of wind-blown pollen reaching a tree of the same species

O argue against the common assumption that the tallest trees are the most likely to employ wind pollination

6. Paragraph 2 suggests that wind-pollinated plants do not have bright petals, nectar, and scent for which TWO of the following reasons? To receive credit, you must select TWO answers.

OThey interfere with pollination by wind

OThey are easily damaged by wind.

OThey are unnecessary.

OThey reduce the amount of pollen that can be produced.

7. The word "scarcity" in the passage is closest in meaning to

O speed

O variety

O lack

O size

8. According to paragraph 4,deep-water filter-feeders have adopted all of the following ways to obtain food EXCEPT

Odeveloping larger filtering systems

Ocapturing prey using sticky tentacles

Oswimming up to the surface at feeding time

Osearching in ocean layers that contain a substantial amount of particles

9. Why does the author include the information that animals in the deep ocean place an emphasis on lures" and have evolved "elongated appendages”?

O To argue against the view that animals in the deep ocean use more energy to find food thando animals in shallow waters

O To emphasize the importance of an am mars ability to control a large volume of water

O To identify some feeding strategies that animals have developed to minimize their energy expenditure

O To give examples of body structures that help those animals move quickly in deep ocean waters

10. The phrase "coping with" in the passage is closest in meaning to

O Absorbing

O finding

O approaching

O managing

11. The word "flexible" in the passage is closest in meaning to

O huge

O adaptable

O powerful

O precise

12. According to paragraph 5, why do some fish swallow their prey whole?

O Their teeth are too large to allow for cutting prey.

O They have no jaw muscles to allow chewing.

O Swallowing prey whole results in a higher net energy gain.

O Chewing can cause their jaws to dislocate.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Such a passive approach requires those animals to develop specialized methods of acquiring food.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage **This question is worth 2 points**.

**Ocean animals have developed various strategies for maximizing energy input from food.**

●

●

●

**Answer Choices**

O Large carnivores near the ocean surface feed mainly on organic matter left over after it passes through the filters of the filter-feeders.

O Even in deep ocean layers where prey is relatively hard to find, filter feeding is still the least energetically-demanding method of obtaining food.

O Animals in deeper water have evolved strategies and body structures that allow them to use as little energy as possible in obtaining food.

O Near the surface of the water, many animals obtain food by using specialized body parts to filter plankton from the water.

O Filter-feeding is more common in shallow water, where there is a higher concentration of organic matter than there is in deeper water.

O At deeper ocean levels plankton is relatively rare, requiring animals at those levels to actively search for their food sources.

**参考答案：**1-5. A B C D D 6-10.D C C C D 11-13.B A B 14.CDE

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## **参考译文：海洋中的觅食策略**

在开阔的海洋中，动物通常能在特定的地区或季节找到可靠的食物（如春天的沿海地区）。在这种情况下，动物既不用尽力消化吸收食物，也不用节约能源。相比之下，在更深层次的海洋中的食物数量大大降低，对动物的食物约束更严重。为了在这些地方生存，动物必须最大限度地提高他们的能量输入，去寻找和食用任何食物。

在海平面附近，有很多大型的、敏捷的食肉动物以及大量的浮游动物，浮游动物以浮游生物为食（小的浮游植物或动物）的。这些动物有专门的身体结构过滤海水，吃掉其中的小浮游生物。在有可见光的海平面附近，滤食性动物非常繁盛，因为海洋有这么许多很小的生物，从细菌到大型藻类到甲壳类幼体。甚至有些情况下鱼类也是滤食性动物。虽然绝大多数海洋鱼类是食肉动物，但滤食性沙丁油鱼和凤尾鱼靠吃海洋表面区域丰富大量的浮游植物（浮游生物的植物成分）而大量繁殖。这些小鱼使用它们的鳃丝滤食他们生活区域内的藻类。沙丁油鱼和凤尾鱼成为当地大规模渔业的基础，并且是大型肉食动物，特别是海鸟的食物。规模更大的须鲸和鲸鲨也是沿海或极地水域的高效滤食动物，虽然它们的滤食对象不仅限于浮游植物，还有桡足类、磷虾等小动物。

过滤海水来获取其中的微小营养成分是一种非常费力的摄取食物的方法，尤其是当被过滤的水流需要生物体自己来选定时（正如浮游动物所做的那样）。每立方米的海水中，必须要含有至少2.5微克的颗粒有机物质，才能保证滤食浮游生物的净能量摄入。大多数沿海水域都很容易超过这个值，但是在深海，有机物的浓度从几乎没有到每立方米7微克都有可能。即使平均水平可能忽略了局部可能有机物密度很高这一点，但依然说明很多深海动物面临的条件很恶劣，一般的滤食动物可能会饿死。

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因此，深水中的滤食性动物很少，这部分滤食性动物中有一部分有较大的过滤系统来应对有机物的稀缺。还有一些滤食性动物会在特定的有机物密度高的水层中觅食。许多浅海区的典型滤食性动物都可以在深海区找到代表，但是它们已经演化为捕食性动物。在浅海区形成的特别发达的过滤系统，在深海区都退化了。相对的，它们进化出主动或者被动的捕猎方式，包括诱抓和缠住猎物，长出粘性的触须。

在更深的海域，动物更倾向于被动等待食物颗粒或者猎物的来临，而不是主动去寻找它们（这样一来减少了能量消耗）。于是就产生了一种更隐秘的觅食方式，这种方式强调诱捕和/或身体需要有很长的附属物，以便增加动物控制或者监测的活动水量。猎物数量有限的另外一个后果是，很多动物经过进化都可以处理相对于自身体积来讲更大的食物，比相应的浅海区动物能处理的食物要大得多。这些鱼类有一个共同的趋势，它们的牙齿和颌骨明显增大。这些动物不仅是牙齿变得很大和/或下巴变长，而且它们的下颌关节可以随意的脱臼，所以嘴巴能够张得很大。由于牙齿特别大或特别长，这些鱼没有办法把猎物咀嚼成合适的大小，只能把猎物整个地吞下去。

# TPO-46

## The Origins of Writing

It was in Egypt and Mesopotamia (modern-day Iraq) that civilization arose, and it is there that we find the earliest examples of thatkeyfeature of civilization, writing. These examples, in the form of inscribed clay tablets that date to shortly before 3000 B.C.E., have been discovered among the archaeological remains of the Sumerians, a gifted people settled in southern Mesopotamia.

The Egyptians were not far behind in developing writing, but we cannot follow the history of their writing in detail because they used a perishable writing material. In ancient times the banks of the Nile were lined with papyrus plants, and from the papyrus reeds the Egyptians made a form of paper; it was excellent in quality but, like any paper, fragile. Mesopotamia’s rivers boasted no such useful reeds, but its land did provide good clay, and as a consequence the clay tablet became the standard material. Though clumsy and bulky it has a virtue dear to archaeologists: it is durable. Fire, for example, which is death to papyrus paper or other writing materials such as leather and wood, simply bakes it hard, thereby making it even more durable. So when a conqueror set a Mesopotamian palace ablaze, he helped ensure the survival of any clay tablets in it. Clay, moreover, is cheap, and forming it into tablets is easy, factors that helped the clay tablet become the preferred writing material not only throughout Mesopotamia but far outside it as well, in Syria, Asia Minor, Persia, and even for a while in Crete and Greece.Excavators have unearthed clay tablets in all these lands. In the Near East they remained in use for more than two and a half millennia, and in certain areas they lasted down to the beginning of the common era until finally yielding, once and for all, to more convenient alternatives.

The Sumerians perfected a style of writing suited to clay. This script consists of simple shapes, basically just wedge shapes and lines that could easily be incised in soft clay with a reed or wooden stylus; scholars have dubbed it cuneiform from the wedge-shaped marks *(cunei* in Latin) that are its hallmark Although the ingredients are merely wedges and lines, there are hundreds of combinations of these basic forms that stand for different sounds or words. Learning these complex signs required long training and much practice; inevitably, literacy was largely limited to a small professional class, the scribes.

The Akkadians conquered the Sumerians around the middle of the third millennium B.C.E., and they took over the various cuneiform signs used for writing Sumerian and gave them sound and word values that fit their own language. ■ The Babylonians and Assyrians did the same, and so did peoples in Syria and Asia Minor. ■ The literature of the Sumerians was treasured throughout the Near East, and long after Sumerian ceased to be spoken, the Babylonians and Assyrians and others kept it alive as a literary language, the way Europeans kept Latin alive after the fall of Rome. ■ For the scribes of these non-Sumerian languages, training was doubly demanding since they had to know the values of the various cuneiform signs for Sumerian as well as for their own language. ■

The contents of the earliest clay tablets are simple notations of numbers of commodities—animals, jars, baskets, etc. Writing, it would appear, started as a primitive form of bookkeeping. Its use soon widened to document the multitudinous things and acts that are involved in daily life, from simple inventories of commodities to complicated governmental rules and regulations.

Archaeologists frequently find clay tablets in batches. The batches, some of which contain thousands of tablets, consist for the most part of documents of the types just mentioned: bills, deliveries, receipts, inventories, loans, marriage contracts, divorce settlements, court judgments, and so on. These records of factual matters were kept in storage to be available for reference-they were, in effect, files, or, to use the term preferred by specialists in the ancient Near East, archives. Now and then these files include pieces of writing that are of a distinctly different order, writings that do not merely record some matter of fact but involve creative intellectual activity. They range from simple textbook material to literature-and they make an appearance very early, even from the third millennium B C E.

1. The word “key” in the passage is closest in meaning to

O frequent

O essential

O original

O familiar

2. The word “virtue” in the passage is closest in meaning to

Oprice

Odesign

Odesirable quality

Ophysical characteristic

3. Which of the sentences below best expresses the essential information In the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O In part because of its low cost and ease of use, clay became the preferred writing material throughout Mesopotamia and well beyond it

O Clay was cheap throughout Mesopotamia, so clay tablets from Mesopotamia became the preferred writing material as far as the Mediterranean.

O For a while, the day tablet was the preferred writing material in Crete and Greece.

O Moreover, because day was used as the writing material of choice in Mesopotamia, Syria, Asia Minor, Persia, and the Mediterranean, it was cheap and popular.

4. What can be inferred from paragraph 2 about clay as a writing material?

O It had to be baked before it could be written on

O Its good points outweighed its bad points.

O Its durability was its most important feature for its users.

O It was not available in Egypt.

5. In paragraph 2, why does the author discuss the Egyptian use of papyrus as a writing material^

O To describe the superiofity of papyrus over leattier and wood as a writing material

O To explain why writing in Egypt did not develop as quickly as it did Mesopotamia

O To explain why archaeologists' knowledge of the early history of writing relies mainly on Sumerian cuneiform

O To explain why the Sumerians preferred clay tablets for writing over papyrus

6. According to paragraph 3, all of the following are true of cuneiform writing EXCEPT:

O It was composed of very simple shapes

O It was perfected by the ancient Sumerians.

O It influenced the choice of material on which it was written.

O It was understood by very few Sumerians.

7. According to paragraph 4, how did the Akkadians use the Sumerian language?

O They used Sumerian for speaking but used their own national language for writing.

O They used the complex cuneiform signs developed by the Babylonians and Assyrians rather than the Sumerian signs.

O They developed their own cuneiform shapes on clay tablets to replace those used by the Sumerians.

O They assigned new sound and word values to the signs of Sumerian cuneiform.

8. Paragraph 4 answers all the following questions about Sumerian writing in the period after the Sumerians were conquered EXCEPT:

ODid Sumerian literature continue to be read?

ODid Sumerian continue to be spoken?

ODid scribes compose new texts in Sumerian?

ODid Sumerian have the same fate as Latin had after the fall of Rome?

9. The word "document" in the passage is closest in meaning to

O include

O influence

O organize

O record

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10. According to paragraph 5, writing was first used for

O simple bookkeeping

O descriptions of daily events

O counting the contents of clay tablets

O government reports

11. The phrase “Now and then” in the passage is closest in meaning to

O always

O occasionally

O sooner or later

O first and last

12. According to paragraph 6, large batches of clay writing tablets were stored because the tablets

O were being produced quickly and in large quantities

O did not serve any practical purpose for most Mesopotamians

O contained information that needed to be available for future reference

O could not be used again once they had been written on

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**However, the Sumerian language did not entirely disappear.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage

14.**Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points**.

**The earliest examples of writing have been found in Mesopotamia and date to shortly before 3000 B.C.E.**

●

●

●

**Answer Choices**

O Writing was invented in the same areas in which civilization began by the ancient civilizations of Mesopotamia, Asia Minor and the Mediterranean.

O The development of cuneiform is known because it was written on a long-lasting material and because it was long and widely used throughout the ancient Near East.

O Cuneiform tablets generally dealt with business and factual matters, but other topics, including literature, were also recorded and valued.

O Writing was developed first by the Sumerians using wedge shaped marks (cuneiform) on clay tablets and then by the Egyptians using papyrus paper.

O Scribes using cuneiform in Assyria, Babylon, Syria and Asia Minor had to learn all the languages that used the cuneiform script.

O Batches of clay tablets, sometimes with as many as a thousand tablets each, are often found by archaeologists.

参考答案: 1-5.B C A B C 6-10.C D C D A 11-13.B C B 14.ABC

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## **参考译文：文字的起源**

文明诞生于埃及和美索不达米亚（今伊拉克）地区，那里也出现了代表文明主要特征最早的例证——文字。这些刻在泥板的文字可以追溯到公元前3000年，是在苏美尔人的考古遗迹中发现的。苏美尔人曾居住在美索不达米亚南部，是一个有天赋的名族。

埃及人在形成文字上并不落后，但我们不能详细了解到他们的文字发展历史，因为他们使用的书写材料很容易腐烂。当时尼罗河两岸长满了纸莎草，埃及人就利用这种草造了一种纸；这种纸质量很好，但是像普通的纸一样脆弱。美索不达米亚的河边并没有纸莎草，但当地确实有不错的粘土，所以泥板成为了标准的书写材料。虽然泥板很笨重，但对于考古学家来说它有一个珍贵的优点：保存持久。比如说，火对纸莎草或其它书写材料，如皮革和木材是致命的，但是对于泥板来说，火只会把它烧得更坚硬，从而使其能保存更持久。所以当征服者把美索不达米亚宫殿烧为灰烬时，反而使得其中的泥板保存了下来。此外，粘土比较廉价，而且容易成型，这使得泥板不仅在美索不达米亚成为首选的写作材料，而且在遥远的叙利亚、小亚细亚和波斯也很受青睐，甚至在克里特岛和希腊也流行过一段时间。发掘者都曾在这些地方都出土过泥板。在近东地区泥板一直使用了2500多年，在有些地方一直持续使用到公元后，直到最终产生了更方便、更合适的替代品。

苏美尔人创造出了更完善的适合泥板的书写方式。这些文字由一些简单的形状组成，基本上只含有楔形和线条，可以很容易地用苇杆或木制尖笔刻在那些软粘土上；学者将这些以楔形符号（拉丁文意为楔叶）为特点的文字将其称之为楔形文。虽然楔形文只是由楔形笔画和线条构成，但是这些基本的形式可以组合成几百种不同的声调和单词。学习这些复杂的符号需要长期训练和大量的实践，不可避免地，有读写能力的只有小部分专门人士，即写字匠。

在公元前3000年，阿卡德人攻克了苏美尔，他们沿用了书写苏美尔语的楔形文字写法，并赋予了这些文字适合自己语言的声调和意义。巴比伦人、亚述人、叙利亚人和小亚细亚人也是如此。整个近东地区都很重视苏美尔人的文字，即使是在没有人说苏美尔语之后很久一段时间内，巴比伦人和亚述人依然把它当作一种文学语言，就像欧洲人在罗马沦陷后，依然把拉丁语作为文学语言一样。对于那些不说苏美尔语的写字匠，需要加倍的刻苦训练，因为他们需要知道楔形文字在苏美尔语中以及他们自己的语言中的不同意义。

最早的泥板上简单标着各种商品（动物、陶土罐、篮子等）的数量。文字的出现最开始是作为一种原始的记账手段。很快它就被扩展到用来记录日常生活中的各种事件和行为，从简单的商品清单到复杂的政府规章制度。

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考古学家经常能发现成批的泥板。一批泥板可能有数千块，大多数是关于方才提到的几类事物的记录：账单、交付单据、收据、库存清单、贷款、婚姻证书、离婚协议、法院判决等等。这些事实的记录被储存起来供参考使用，事实上，它们就是文件，或者用古代近东专家的术语叫“档案”。在这些文件中，时而会出现一些顺序完全不同的文件。一些不仅仅记录事实，还记录下了一些富有创造性的智力活动。从简单的教科书材料到文学著作，早在三千年以前就出现了。

## The Commercial Revolution in Medieval Europe

Beginning in the 1160s, the opening of new silver mines in northern Europe led to the minting and circulation of vast quantities of silver coins. The widespread use of cash greatly increased the volume of international trade. Business procedures changed radically. The individual traveling merchant who alone handled virtually all aspects of exchange evolved into an operation invoh/ing three separate types of merchants: the sedentary merchant who ran the "home office," financing and organizing the firm’s entire export-import trade; the carriers who transported goods by land and sea; and the company agents resident in cities abroad who, on the advice of the home office, looked after sales and procurements.

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Commercial correspondence, unnecessary when one businessperson oversaweverything and made direct bargains with buyers and sellers, multiplied. Regular courier service among commercial cities began. Commercial accounting became more complex when firms had to deal with shareholders, manufacturers, customers, branch offices, employees, and competing firms. Tolls on roads became high enough to finance what has been called a road revolution, involving new surfaces and bridges, new passes through the Alps, and new inns and hospices for travelers. The growth of mutual trust among merchants facilitated the growth of sales on credit and led to new developments in finance, such as the bill of exchange, a device that made the long, slow, and very dangerous shipment of coins unnecessary.

The ventures of the German Hanseatic League illustrate these advancements. The Hanseatic League was a mercantile association of European towns dating from 1159. ■The league grew by the end of the fourteenth century to include about 200 cities from Holland to Poland. ■Across regular, well- defined trade routes along the Baltic and North seas, the ships of league cities carried furs, wax, copper, fish, grain, timber, and wine. ■These goods were exchanged for finished products, mainly cloth and salt, from western cities. ■At cities such as Bruges and London, Hanseatic merchants secured special trading concessions, exempting them from all tolls and allowing them to trade at local fairs. Hanseatic merchants established foreign trading centers, the most famous of which was the London Steelyard, a walled community with warehouses, offices, a church, and residential quarters for company representatives. By the late thirteenth century, Hanseatic merchants had developed an important business technique, the business register. Merchants publicly recorded their debts and contracts and received a league guarantee for them. This device proved a decisive factor in the later development of credit and commerce in northern Europe.

These developments added up to what one modern scholar has called "a commercial revolution." In the long run, the commercial revolution of the High Middle Ages (a d 1000-1300) brought about radical change in European society. One remarkable aspect of this change was that the commercial classes constituted a small part of the total population—never more than 10 percent. They exercised an influence far in excess of their numbers. The commercial revolution created a great deal of new wealth, which meant a higher standard of living. The existence of wealth did not escape the attention of kings and other rulers. Wealth could be taxed, and through taxation, kings could create strong and centralized states. In the years to come, allianceswith the middle classes were to enable kings to weaken aristocratic interests and build the states that came to be called modern.

The commercial revolution also provided the opportunity for thousands of agricultural workers to improve their social position. The slow but steady transformation of European society from almost completely rural and isolated to relatively more urban constituted the greatest effect of the commercial revolution that began in the eleventh century. Even so, merchants and business people did not run medieval communities, except in central and northern Italy and in the county of Flanders. Most towns remained small. The nobility and churchmen determined the predominant social attitudes, values, and patterns of thought and behavior. The commercial changes of the eleventh through fourteenth centuries did however, lay the economic foundation for the development of urban life and culture.

1. According to paragraph 1, one effect of the increased use of cash was that

Oan individual merchant no longer performed all aspects of trading operations

Oa company's home office declined in importance

Omerchants no longer had to transport their goods to distant places

Othe volume of trade declined in areas lacking silver mines

2. The word “radically”， in the passage is closest in meaning to

O fundamentally

O quickly

O unexpectedly

O gradually

3. The word“oversaw" in the passage is closest In meaning to

O understood

O included

O delivered

O supervised

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4. According to paragraph 2, which of the following was NOT an effect of the change in business procedures?

O An increase in credit sales

O The use of courier services between cities

O The adoption of simpler accounting procedures

O The improvement of roads

5. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O Credit sales and bills of exchange were devices that merchants developed in order to increase their mutual trust.

O Merchants developed ways to finance their sales without having to rely on slow and dangerous shipments of coins.

O Greater trust among merchants led to an increase in credit sales and to the use of bills of exchange that made the shipping of coins unnecessary.

O Merchants began to trust one another when it became too slow and dangerous for a single merchant to ship coins.

6. According to paragraph 3, Hanseatic merchants benefited by all of the following EXCEPT

O the use of trading centers in distant cities

O a new system of recording commercial transactions

O the opening of overland trade routes across northern Europe

O access to markets in about 200 cities

7. The word "decisive" in the passage is closest in meaning to

O probable

O determining

O helpful

O limiting

8. Why does the author provide the information in paragraph 4 that the commercial classes never exceeded 10 percent of the population?

O To argue that the wealth created by the commercial revolution benefited only a small number of people

O To challenge the view that the commercial classes made up a majority of the population of Europe

O To suggest a reason that the commercial revolution ended around A. D. 1300

O To emphasize the point that the commercial revolution was brought about by a small part of the population

9. According to paragraph 4, which of the following was associated with the rise of modem states?

O Increased wealth for the ruling classes

O The weakening of the aristocracy

O The decline of the middle class

O A reduction in taxes

10. The word "alliances" in the passage is closest in meaning to

O transactions

O communications

O partnerships

O conflicts

11. According to paragraph 5, the most important result of the commercial revolution was to

O simplify the organization of European society

O provide employment to agricultural workers

O encourage merchants to become community leaders

O change Europe from a rural to a more urban society

12. Paragraph 5 supports which of the following inferences about the commercial revolution between ad 1000 and 1300?

OIt had very little impact on social attitudes and values.

OIt brought about major political changes throughout Europe.

OIt lessened the influence of the church.

OIt increased the population of small towns.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**While It originated in the German city of Liibeck, it began to expand in 1241 when Liibeck entered into a mutual protection treaty with the city of Hamburg.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points**.

**During the High Middle Ages (A.D. 1000-1300), Europe underwent a commercial revolution.**

●

●

●

**Answer Choices**

O Merchants adopted new accounting and trading procedures to make long-distance trading more efficient.

O The faster transportation made possible by improved roads expanded the variety of goods that could be brought to European towns from far away.

O The increasing importance of commercial trade led to a decline in the influence of traditional sources of power, such as kings and church leaders.

O The mining of silver improved the security of commercial transactions by allowing coins to replace credit and bills of exchange as the means of exchange.

O The Hanseatic League was an association of European towns that obtained shipping, trading, and financial benefits for its members.

O European society became increasingly urban, with better living conditions and a stronger centralized government.

参考答案：1-5.AADCC 6-10.CBDBC 11-13.DAA 14.AEF

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## **参考译文：中世纪欧洲的商业革命**

从十二世纪六十年代欧洲北部开辟了新的银矿开始，大量银币开始铸造和流通。现金的广泛使用大大增加了国际贸易量，从根本上改变了商业程序。贸易从客商几乎要独自处理交易的方方面面演变成了需要三种不同类型的商人：一个久坐总部，负责企业运营、为企业整个进出口贸易筹集资金和做出规划的商人；一个负责通过海陆运输货物的送货员；一个驻国外城市的企业代理，此人依照总部的建议、主管销售和采购。

当一个商人可以监管贸易的所有事项或者买卖双方直接交易时，商业信函就不需要了，但是有了分工后它们被大量使用。商业城市间开始有了常规的快递服务。当企业不得不开始处理与股东、制造商、客户、分支机构、员工和竞争企业之间的众多关系时，商业会计变得更加复杂了。公路收费高到足以为所谓的“道路改革”融资，改革包括建造新的路面和桥梁、穿过阿尔卑斯山的新隧道，以及为旅客提供的新旅馆和招待所。商家间的相互信任促进了赊销的增长，金融出现了新的发展：比如汇票的产生，避免了那些不必要的时间又长、又缓慢而危险的钱币运输。

德国汉萨同盟的商业冒险正是这些进步的体现。汉萨同盟是欧洲城镇的一个商业协会，始建于1159年。该同盟在十四世纪末迅速扩大到包括了荷兰和波兰的约200个城市。沿着波罗的海和北海的明确、固定的贸易路线，同盟城市的船只运输着毛皮、蜡、铜、鱼、谷物、木材和酒。这些货物主要是与西部城市的布料和盐等成品交换。在布鲁日和伦敦等城市，汉萨商人获得特殊的贸易优惠，免除了所有的过路费，并且允许他们在当地的集市做买卖。汉萨商人建立了国外贸易中心，其中最著名的是“伦敦钢院”，一个有仓库、办公室、教堂、公司代表住处的封闭社区。到十三世纪后期，汉萨商人已发展出一种重要的商业技术——商业登记。商人公开记录了他们的债务和合同，并获得了同盟为他们作担保。这一机制在北欧的信贷和商业发展中起了决定性的作用。

所有的这些发展被现代学者称为“商业革命”。从长远来看，中世纪的商业革命（公元1000-1300年）给欧洲社会带来了根本性的变化。其中一个显著的变化是，虽然商人的数量只占人口的一小部分，还不到百分之十，但是他们带来了的影响远远超过这个比例。商业革命创造了大量的新财富，意味着人们可以有更高的生活水平。国王和其他统治者也注意到了这些财富的存在。财富可以被征税，通过税收，国王可以创造强大的集权国家。在后面几年里，与中产阶级的联盟使国王能够削弱贵族的利益，并建立了“现代”的国家。

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商业革命也使成千上万的农业从业者有机会提高社会地位。欧洲社会开始从几乎完全孤立的农村缓慢而稳定地转变为相对更为城市化，这是从十一世纪开始的商业革命带来的最大影响。尽管如此，除了在意大利中北部和弗兰德斯县之外，商人和生意人没有掌控中世纪社会。大部分城镇仍然很小。贵族阶层和教士决定主要的社会态度、价值观，以及思想和行为模式。但是十一世纪到十四世纪的商业变革确实为城市生活和文化的发展奠定了经济基础。

## Ecosystem Diversity and Stability

Conservation biologists have long been concerned that species extinction could have significantconsequences for the stability of entire ecosystems—groups of interacting organisms and the physical environment that they inhabit. An ecosystem could survive the loss of some species, but if enough species were lost, the ecosystem would be severely degraded. In fact, it is possible that the loss of a single important species could start a cascade of extinctions that might dramatically change an entire ecosystem. A good illustration of this occurred after sea otters were eliminated from some Pacific kelp (seaweed) bed ecosystems: the kelp beds were practically obliterated too because in the absence of sea otter predation, sea urchin populations exploded and consumed most of the kelp and other macroalgae.

It is usually claimed that species-rich ecosystems tend to be more stable than species-poor ecosystems. Three mechanisms by which higher diversity increases ecosystem stability have been proposed. First, if there are more species in an ecosystem, then its food web will be more complex, with greater redundancy among species in terms of their nutritional roles. In other words, in a rich system if a species is lost, there is a good chance that other species will take over its function as prey, predator, producer, decomposer, or whatever role it played. Second, diverse ecosystems may be less likely to be invaded by new species, notably exotics (foreign species living outside their native range), that would disrupt the ecosystem’s structure and function. Third, in a species-rich ecosystem, diseases may spread more slowly because most species will be relatively less abundant, thus increasing the average distance between individuals of the same species and hampering disease transmission among individuals.

Scientific evidence to illuminate these ideas has been slow in coming, and many shadows remain. ■One of the first studies to provide data supporting a relationship between diversity and stability examined how grassland plants responded to a drought. ■Researchers D. Tilman and J A. Downing used the ratio of above-ground biomass in 1988 (after two years of drought) to that in 1986 (predrought) in 207 plots in a grassland field in the Cedar Creek Natural History Area in Minnesota as an index of ecosystem response to disruption by drought. ■In an experiment that began in 1982, they compared these values with the number of plant species in each plot and discovered that the plots with a greater number of plant species experienced a less dramatic reduction in biomass. ■ Plots with more than ten species had about half as much biomass in 1988 as in 1986, whereas those with fewer than five species only produced roughly one-eighth as much biomass after the two-year drought. Apparently, species-rich plots were likely to contain some drought-resistant plant species that grew better in drought years,compensating for the poor growth of less-tolerant species.

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To put this result in more general terms, a species-rich ecosystem may be more stable because it is more likely to have species with a wide array of responses to variable conditions such as droughts. Furthermore, a species-rich ecosystem is more likely to have species with similar ecological functions, so that if a species is lost from an ecosystem, another species, probably a competitor, is likely to flourish and occupy its functional role. Both of these, variability in responses and functional redundancy, could be thought of as insurance against disturbances.

The Minnesota grassland research has been widely accepted as strong evidence for the diversity- stability theory; however, its findings have been questioned, and similar studies on other ecosystems have not always found a positive relationship between diversity and stability. Clearly, this is a complex issue that requires further field research with a broad spectrum of ecosystems and species: grassland plants and computer models will only take us so far. In the end, despite insightful attempts to detect some general patterns, we may find it very difficult to reduce this topic to a simple, universal truth.

1. The word "significant" in the passage is closest in meaning to

Odirect

Oimportant

Olong-term

Osurprising

2. According to paragraph 1, why has the extinction of species been a concern for conservation biologists?

O When ecosystems lose just one species, they undergo permanent change.

O The extinction of a particular predator species could cause an overpopulation of certain prey species.

O The loss of one or more species could cause the decline of a whole ecosystem.

O The extinction of a single species is evidence that plant-food sources are in danger of disappearing.

3. According to paragraph 1, what was the result of the removal of Pacific sea otters?

O The kelp and sea urchins were destroyed by new predators.

O The uncontrolled population of sea urchins ate most of the kelp plants.

O Without sea otters, the kelp beds soon became overgrown.

O Macroalgae remained as the primary population in the ecosystem.

4. The word “redundancy” in the passage is closest in meaning to

O duplication

O variety

O requirements

O flexibility

5. What is the function of paragraph 2 in the passage?

O To present a hypothesis about ecosystem diversity and some reasons why it might be true

O To give examples of types of ecosystems that have the greatest diversity

O To contradict a previous belief about the stability of species-rich ecosystems

O To contrast species-rich and species-poor ecosystems

6. According to paragraph 2, which of the following increases the stability of an ecosystem?

O Species in which producers outnumber predators

O New or exotic species that increase ecosystem diversity

O Heavily populated species that are free of disease

O Species that are diverse but have similar nutritional roles

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

O In any ecosystem, as the number of individuals in the same species increases, the rate of disease transmission slows down.

O Ecosystems that have a small number of different species tend to be disease-free, because the species’ habitats are at a safe distance from each other.

O In ecosystems with many species, diseases spread more slowly because there are fewer individuals in a species and, as a result, the individuals are more widely scattered.

O The average distance between individuals in a species-rich ecosystem increases, so diseases are prevented from being communicated between species.

8. The phrase “compensating for” in the passage Is closest in meaning to

O working against

O leaving out

O making up for

O spreading over

9. What Is the main importance of the study discussed in paragraph 3?

O It examines the response of certain grassland plants to a drought.

O It contains an index of plants that survived well in times of drought.

O It provides scientific evidence that diversity helps to make ecosystems stable.

O It shows that ecosystems contain both resistant species and less tolerant ones.

10. Select the TWO answer choices that, according to paragraph 4, are conclusions that can be drawn from the study by Tilman and Downing. To receive credit you must select TWO answer choices.

O A diverse ecosystem will have species that respond differently to a variety of conditions.

O Species within a species-rich ecosystem are more likely to have competitors.

O An ecosystem is more likely to develop diverse and stable species when it is exposed to extreme conditions.

O Species with similar ecological functions will perform the function of a lost species.

11. The word “detect” in the passage is closest in meaning to

O repeat

O alter

O find

O emphasize

12. According to paragraph 5, which of the following is true about Tilman and Downing’s findings?

O General patterns of diversity and stability have been established as a result of the findings.

O Questions about the findings have been refuted by computer models.

O The findings have been tested in a broad spectrum of ecosystems with similar results.

O The findings are not sufficient to prove a definite link between diversity and stability in ecosystems.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**It seems clear that there is room for a great deal more research, although some work has been done.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points**.

**Biologists have long been worried about the possible effect of the extinction of species on whole ecosystems.**

●

●

●

**Answer Choices**

O Conservation biology studies Indicate that the loss of a single important species may bring temporary change to an ecosystem but it seldom results in lasting damage.

O Ecosystems having species with similar functions but different responses to adverse conditions can survive environmental disturbances.

O The Minnesota grassland study by Tilman and Downing presented evidence that the greater the diversity of species in an ecosystem, the more stable the ecosystem.

O The absence of sea otter predation in a Pacific kelp bed ecosystem dramatically changed the entire ecosystem by stabilizing the total kelp population.

O The findings of the Minnesota grassland study by Tilman and Downing indicated an equal number of drought-resistant and drought-tolerant plant species in species-rich plots.

O More research is needed on the relationship between species diversity and ecosystem stability, though a simple explanation is unlikely.

参考答案：1-5.B C B A A 6-9.D C C C 10.A D 11-13.C D A 14.B C F

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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**参考译文：生态系统中的多样性与稳定性**

一直以来，生物保护学家一直关注的一个问题是，物种灭绝可能会对整个生态系统的稳定性产生严重的影响，影响到与它们有交集的生物以及它们所生活的物理环境。一个生态系统可以承受某些物种的损失，但如果损失的物种足够多，生态系统就会严重退化。事实上，一个重要的物种损失就可能引发一系列的物种灭绝，可能极大地改变整个生态系统。海獭被从太平洋海藻（海草）床生态系统中移除就是一个很好的例子：没有了海獭捕食，海胆数量暴增，吃掉了大量海带和其他大型海藻，海草床也因此不复存在。

一般来说，物种丰富的生态系统往往比物种贫乏的生态系统更稳定。有人提出，物种的多样性透过三种机制增加了生态系统的稳定性。首先，一个生态系统的物种越多，它的食物网就越复杂，物种间的营养作用方面就会有更多的重合。换句话说，在一个物种丰富的系统里，如果失去了一个物种，就给了其它物种一个很好的机会，代替它扮演猎物、捕食者、生产者、分解者、或任何它所扮演的角色。第二，多样的生态系统不太可能遭到新物种的入侵，特别是会破坏生态系统结构和功能的外来物种（生活在本土范围以外的物种）。第三，在一个物种丰富的生态系统中，疾病可能会传播得比较慢，因为每个物种的数量相对较少，从而增加了同一物种内个体间的平均距离，从而阻碍了个体间的疾病传播。

很多现象我们仍无法解释，但是已经慢慢有一些科学证据来证明这些观点。最早提供数据来支撑多样性和稳定性之间的关系的是一项关于草原植物如何对抗干旱的研究。D. 蒂尔曼和J A.唐宁两位研究员在美国明尼苏达州的雪松溪自然历史保护区，用207个地块在1988（经过两年的干旱）和1986（干旱前）的地表生物量的比值来反映生态系统受干旱破坏的程度。在一个1982年开始的实验中，他们比较了这些比值与每个取样点的植物物种数，发现取样点的植物物种越多，其生物数量在干旱中急剧下降得就越少。那些物种数量超过十种的取样点在1988年的生物量大概是1986年的一半，而那些物种数量少于五种的取样点在经过两年干旱之后，大概只剩下八分之一的生物数量。显然，物种丰富的地块很可能包含一些抗旱植物品种，这些品种在干旱年份生长得更好，弥补了那些不那么抗旱的品种的数量。

从更一般的意义上来说，一个物种丰富的生态系统可能更稳定，因为它更可能含有能对某种气候条件（如干旱）的做出各种反应的物种。此外，物种丰富的生态系统更可能包含有着类似生态系统的功能，因此，如果生态系统中的一个物种损失，另一个物种，可能是竞争对手，就有希望蓬勃发展，并取代它的作用。对恶劣条件的不同的反应，以及系统内的功能重合性，这两个特征都是对抗恶劣气候的保障。

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明尼苏达草原的研究作为多样性-稳定性理论的有力证据已被广泛接受，但是，它的研究结果已经被质疑。另外，其他生态系统的类似的研究并没有找到多样性和稳定性之间积极的相关性。显然，这是一个复杂的问题，需要进一步的关于更多各种生态系统和物种的实地研究，对草地的研究和建立计算机模型只能证明部分问题。最后，尽管这些富有洞察力的尝试得出了一些概括性结论，我们可能会发现很难将这个话题缩小成一个简单的、普遍认可的事实。

# TPO-47

## Roman Cultural Influence on Britain

After the Roman Empire’s conquest of Britain in the first century A.D., the presence of administrators, merchants, and troops on British soil, along with the natural flow of ideas and goods from the rest of the empire, had an enormous influence on life in the British Isles. Cultural influences were of three types: the bringing of objects, the transfer of craft workers, and the introduction of massive civil architecture. Many objects were not art in even the broadest sense and comprised utilitarian items of clothing, utensils, and equipment. We should not underestimate the social status associated with such mundanepossessions which had not previously been available. The flooding of Britain with red-gloss pottery form Gaul (modern-day France), decorated with scenes from Classical mythology, probably brought many into contact with the styles and artistic concepts of the Greco-Roman world for the first time, whether or not the symbolism was understood. Mass-produced goods were accompanied by fewer more aesthetically impressive objects such as statuettes. Such pieces perhaps first came with officials for their own religious worship; others were then acquired by native leaders as diplomatic gifts or by purchase. Once seen by the natives, such objects created a fashion which rapidly spread through the province.

In the most extreme instances, natives literally bought the whole package of Roman culture. The Fishbourne villa, built in the third quarter of the first century A.D., probably for the native client king Cogidubnus, amply illustrates his Roman pretensions. It was constructed in the latest Italian style with imported marbles and stylish mosaics. It was lavishly furnished with imported sculptures and other Classical objects. A visitor from Rome would have recognized its owner as a participant in the contemporary culture of the empire, not at all provincial in taste. Even if those from the traditional families looked down on him, they would have been unable to dismiss him as uncultured. Although exceptional, this demonstrates how new cultural symbols bound provincials to the identity of the Roman world.

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Such examples established a standard to be copied. One result was an influx of craft worker, particularly those skilled in artistic media like stone-carving which had not existed before the conquest. Civilian workers came mostly from Gaul and Germany. The magnificent temple built beside the sacred spring at Bath was constructed only about twenty years after the conquest. Its detail shows that it was carved by artists from northeast Gaul. In the absence of a tradition of Classical stone-carving and building, the desire to develop Roman amenities would have been difficult to fulfill. Administrators thus used their personal contacts to put the Britons in touch with architects and masons. As many of the officials in Britain had strong links with Gaul, it is not surprising that early Roman Britain owes much to craft workers from that area. Local workshops did develop and stylistically similar groups of sculpture show how skills in this new medium became widerspread. Likewise skills in the use of mosaic, wall painting, ceramic decoration, and metal-working developed throughout the province with the eventual emergence of characteristically Romano-British styles.

This art had a major impact on the native peoples, and one of the most importance factors was a change in the scale of buildings. Pre-Roman Britain was highly localized, with people rarely traveling beyond their own region. On occasion large groups amassed for war or religious festivals, but society remained centered on small communities. Architecture of this era reflected this with even the largest of the fortified towns and hill forts containing no more than clusters of medium-sized structures. The spaces inside even the largest roundhouses were modest, and the use of rounded shapes and organic building materials gave buildings a human scale. ■But the effect of Roman civil architecture was significant. The sheer size of space enclosed within buildings like the basilica of London must have been astonishing. ■This was an architecture of dominance in which subject peoples were literally made to feel small by buildings that epitomized imperial power. ■Supremacy was accentuated by the unyielding straight lines of both individual buildings and planned settlements since these too provided a marked contrast with the natural curvilinear shapes dominant in the native realm. ■

1. The word “mundane” in the passage is closest in meaning to

A. material

B. ordinary

C. valued

D. useful

2. Paragraph 1 suggests that one benefit for British natives in buying such items as red-gloss pottery made in Gaul was

A. improved quality of utilitarian items

B. Understanding the symbolism of Classical mythology

C. higher social standing

D. Learning to mass-produce pottery for a profit

3. Paragraph 1 supports which of the following ideas about contacts that existed between Britain and the Roman Empire before the Roman conquest of Britain?

A. They were sufficient for native Britons to become familiar with everyday Roman objects.

B. They were not sufficient for even very basic aspects of the culture of the Roman Empire to find

their way into British life.

C. They were not sufficient for British to have heard of the power of the Roman Empire.

D. They were sufficient for individual Britons to become very interested in trying to participate in the culture of the Roman Empire.

4. The word “lavishly” in the passage is closest in meaning to

A. exclusively

B. additionally

C. appropriately

D. richly

5. According to paragraph 2, the style and furnishings of the Fishbourne villa suggest that the

person for whom it was built was

A. cultured according to the contemporary standards of the empire

B. caught between native and Roman traditions

C. originally a visitor from Rome

D. a member of a socially inferior family

6. The word “sacred” in the passage is closet in meaning to

A. holy

B. ancient

C. natural

D. Secret

7. According to paragraph 3, one factor contributing to success of the earliest Roman-style construction projects in Britain was

A. the fact that long before the conquest many civilian workers from Gaul and Germany had settled in Britain

B. the rapid development of characteristically Romano-British styles

C. the availability, in northeast Gaul, of structures that could serve as standards to be copied

D. the use, by administrators, of personal connections to bring craft workers form Gaul into contact with Britons

8. In paragraph 4, why does the author mention that “Pre-Roman Britain was highly localized, with people rarely traveling beyond their own region”?

A. To suggest that the Roman conquest of Britain increased the standard of living for natives

B. To indicate that pre-Roman Britain was more interested in festivals and community life than conquering other regions

C. To explain why architecture during this period was not built to be particularly large

D. To illustrate how the traditional roundhouse evolved under the influence of Roman civil architecture

9. The word “modest” in the passage in closet in meaning to

A. comfortable

B. limited in number

C. poorly lit

D. not large

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10. According to paragraph 4, people in pre-Roman Britain lived, for the most part, in

A. architecture that seemed imperial in size

B. small communities

C. large roundhouses

D. fortified towns

11. According to paragraph 4, why did straight lines in buildings and settlements emphasize the dominance of those who introduced them?

A. Because straight lines were in contrast to the shapes found in pre-Roman architecture

B. Because unlike curved lines, which are shaped in all sorts of different ways, straight lines do no differ

C. Because the dominant lines in entire settlements were the same as those in individual buildings

D. Because building and settlements were easier to construct when the dominant lines were straight lines

12. According to paragraph 4, buildings from the pre-Roman period differed sharply from buildings reflection Roman civil architecture in each of the following respects EXCEPT

A. their outside and inside dimensions

B. the impact they had on people

C. the geometric shapes in which they were built

D. the positioning of buildings in clusters

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Practical and unimpressive, most were barely taller than the average adult.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below.Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **Thisquestion is worth 3 points.**

**The conquest of Britain by the Roman Empire resulted in significant cultural change.**

**Answer Choices**

A. New objects entering Britain ranged from mass-produced articles for everyday use to works of art, and they were widely-and enthusiastically-accepted by native Britons.

B. Constructing and furnishing buildings in the Roman style required skills that native workers did not at first have, so workers were brought in from other parts of the empire.

C. Native Britons traveled to Gaul to learn Classical stone-carving and building techniques.

D. The conquest was followed by a building boom, and enough villas and temples in the Italian style were built that a visitor from Rome would have felt quite at home in post-conquest Britain.

E. An important symbol of Roman supremacy was Roman architecture, whose enormous size, emphasized by the use of straight lines, made the natives feel insignificant.

F. Characteristically Romano-British concepts took hold in architecture; roundhouses were built much larger than before, and straight lines began to be used in interior spaces.

参考答案：1-5.B C B D A 6-10. A D C D B 11-13.A D A 14.A B E

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## **参考译文：罗马文化对英国的影响**

公元1世纪罗马帝国征服英国之后，罗马的行政官吏、商人、军队入驻英国，也带来了帝国其他区域的思想和商品，这对英国人民的生活产生了巨大的影响。文化方面的影响可分三类：各种物品的流入、手工艺人的迁移以及民用建筑的大规模引进。大部分物品即使是从最广泛的意义上来说也算不上艺术品，这些物品包括实用性的衣物、餐具和设备。但我们不应该低估这些新进的普通物品所象征的社会地位。来自高卢（现今法国）的饰有古典神话中场景的亮红色陶器，可能让很多人首次接触到了古希腊-罗马世界的风尚与艺术观，不管人们是否理解了这些艺术的象征意义。伴随大规模生产的商品到来的是数量更少但更具有美学价值的物品，比如雕像。这类物品可能起初是官员带来进行宗教礼拜的，之后是当地领导人通过外交馈赠或自己购买所得。这类物品每每进入公众视野，都会掀起一股潮流，迅速传遍当地。

最极端的时候，当地人曾买下一整套罗马文化。菲什本别墅，建于公元50-75年，可能是为当地人科吉杜努斯王公所建的，充分展示了科吉杜努斯罗马式的虚荣。别墅使用进口的大理石和时髦的马赛克，建筑风格是当时最新的意大利风，装饰豪华，里面陈列着许多进口雕塑和其他古典风格的物品。罗马人若到此，会认为别墅的主人相当融入帝国的现代文化，品位毫无当地的俗气。那些来自传统家庭的人，即使看不起别墅主人，也不得不承认其文化修养。虽然这是个个案，但也证明了新的文化符号是如何将当地人与对罗马世界认同联系在一起的。

这类例子树立了一个可以复制的标杆。于是，大量手工艺人涌入英国，特别是那些在艺术媒介技艺娴熟的艺人，比如石头雕刻，在被占领前，无人在英国从事这项工艺。这些民间匠人大多来自高卢和德国。巴斯圣泉旁的宏伟神殿就是在罗马占领后20年建成的。从神殿的细节可见，石雕部分出自东北的高卢艺术家之手。在没有传统石材雕刻与建筑的情况下，很难建造出罗马当地的那种舒适感。因此，罗马行政官吏亲自牵线，让英国人接触到罗马的建筑师和石匠。许多当地的罗马官员与高卢人联系紧密，这也就不难理解为什么早期罗马统治下的英国人很感激高卢地区的工匠了。当地的作坊也制造出了与高卢风格很相近的雕塑，这表明这种新的艺术媒介在当时的英国是多么的流行。同样，马赛克、壁画、陶瓷装饰、金属加工技术也在当地得到了发展，最终形成了一种罗马-英国风格。

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这种艺术对英国当地人影响重大，其中在建筑规模方面的变化是一大要因。在被罗马占领前的英国，很少有人到去到自己的生活区域之外的地方，活动范围十分局限。偶尔，因为参加战争或者举行宗教仪式，人们可能会相聚到一地，但社会仍然是以小社区为中心。这反应在当时的建筑物中是，连最大的设防城镇和山间堡垒中，最多也就是一些中型建筑群。即便是最大的圆屋剧场，内部空间也不是很大，而圆形及整体的建筑材料的使用，让建有筑显得有一种人性化的尺度。罗马的建筑则雄伟庄严，单是内部空间，就堪比伦敦大教堂，令人惊异。这是一种建筑上的占领姿态，用浓缩了皇权的建筑让被占领的民族感到自身的渺小。另外，不管是个体建筑还是规划建筑群都使用了刚毅的直线，与英国本地的自然的曲线建筑形状形成鲜明对比，从而突出了罗马人至高无上的权力。

## Termite Ingenuity

Termites, social insects which live in colonies that, in some species, contain 2 million individuals or more, are often incorrectly referred to aswhite ants. But they are certainly not ants. Termites, unlike ants, have gradual metarnorphosis with only three life stage: egg, nymph, and adult. Ants and the other social members of their order, certain bees and wasps, have complete metarnorphosis in four life stages; egg, larva, pupa, and adult. The worker and soldier castes of social ants, bees, and wasps consist of only females, all daughters of a single queen that mated soon after she matured and thereafter never mated again. The worker and soldier castes of termites consist of both males and females, and the queen lives permanently with a male consort.

Since termites are small and soft-bodied, they easily become desiccated and must live in moist places with a high relative humidity. They do best when the relative humidity in their nest is above 96 percent and the temperature is fairly high, an optimum of about 79°F for temperate zone species and about 86°F for tropical species. Subterranean termites, the destructive species that occurs commonly throughout the eastern United States, attain these conditions by nesting in moist soil that is in contact with wood, their only food. The surrounding soil keeps the nest moist and tends to keep the temperature at a more or less favorable level. When it is cold in winter, subterranean termites move to burrows below the frost line.

Some tropical termites are moreingenious engineers, constructing huge above-ground nests with built-in “air conditioning” that keeps the nest moist, at a constant temperature, and well supplied with oxygen. Among the most architecturally advanced of these termites is an African species, *Macroternes natalensis*. Renowned Swiss entomologist Martin Luscher described the mounds of this fungus-growing species as being as much as 16 feet tall, 16 feet in diameter at their base, and with a cement-like wall of soil mixed with termite saliva that is from 16 to 23 inches thick. The thick and dense wall of the mound insulates the interior microclimate from the variations in humidity and temperature of the outside atmosphere. Several narrow and relatively thin-walled ridges on the outside of the mound extend from near its base almost to its top.

According to luscher, a medium-sized nest of *Macrotermes* has a population of about 2 million individuals. The metabolism of so many termites and of the fungus that they grow in their gardens as food helps keep the interior of the nest warm and supplies some moisture to the air in the nest. The termites saturate the atmosphere of the nest, bringing it to about 100 percent relative humidity, by carrying water up from the soil.

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But how is this well-insulated nest ventilated? Its many occupants require over 250 quarts of oxygen (more than 1,200 quarts of air) per day. How can so much oxygen diffuse through the thick walls of the mound? ■ Even the pores in the wall are filled with water, which almost stops the diffusion of gases. ■ The answer lies in the construction of the nest. ■ The interior consists of a large central core in which the fungus is grown, below it is “cellar” of empty space, above it is an “attic” of empty space, and within the ridges on the outer wall of the nest, there are many small tunnels that connect the cellar and the attic. ■ The warm air in the fungus gardens rises through the nest up to the attic. From the attic, the air passes into the tunnels in the ridges and flows back down to the cellar. Gases, mainly oxygen coming in and carbon dioxide going out, easily diffuse into or out of the ridges, since their walls are thin and their surface area is large because they protrude far out from the wall of the mound. Thus air that flows down into the cellar through the ridges is relatively rich in oxygen, and has lost much of its carbon dioxide. It supplies the nest’s inhabitants with fresh oxygen as it rises through the fungus-growing area back up to the attic.

1. The author mentions “white ants” in the beginning of the passage in order to

A. correct a common misunderstanding about termites’

B. introduce the idea that termites only take the form of ants during certain life stages

C. argue that not all white ants are social insects

D. Illustrate the large variety of insect species that live in colonies

2. According to paragraph 1, which of the following is true about termites?

A. They are a kind of ant, but they are unlike most ants in many ways.

B. They form colonies that grow at first and then gradually decline.

C. Their workers are all males, and their soldiers are all females.

D. They go through a life state called the nymph stage.

3. According to paragraph 2, termites need to live in nests with high humidity in order to

A. keep their food moist

B. withstand cold temperatures in winter

C. protect their bodies from drying out

D. keep nest temperatures high

4. The word “attain” in the passage is closet in meaning to

A. achieve

B. observe

C. overcome

D. reflect

5. The word “ingenious” in the passage is closest in meaning to

A. determined

B. clever

C. ambitious

D. successful

6. The word “Renowned” in the passage is closest in meaning to

A. Skilled

B. Famous

C. Early

D. Revolutionary

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7. According to paragraph 3, the nests of some tropical termite species have the ability to

A. insulate the microclimate in one part of the nest from the microclimate in another part

B. Allow moist outside air to get inside regardless of whether it is warm or cool

C. rapidly decrease the humidity inside when it gets hot outside

D. Provide the oxygen needed in the nest

8. According to paragraphs 3 and 4, all of the following are true of the nests of *Macroternesnatalensis* EXCEPT:

A. The walls are built out of soil mixed with termite saliva.

B. The nests can be as tall as they are wide at the base.

C. The interior of the nest is kept as humid as possible.

D. The termites use hollow, thin-walled ridges to travel from one part of the nest to another.

9. According to paragraph 4, how does the fungus grown by *Macrotermes natalensis* affect the environment of the nest?

A. It carries water up from the soil into the interior.

B. It dries the air by using up moisture as it grows.

C. It heats and adds humidity to the inside of the nest.

D. It lessens the effects of the metabolism of so many termites.

10. According to paragraph 5, what does the thinness of the ridge walls make possible?

A. The concentration of cool air in the cellar

B. The construction of exceptionally long tunnels

C. The even distribution of oxygen from attic to cellar

D. The diffusion of gases into and out of the ridges

11. According to paragraph 5, what happens to the air in the ridge tunnels of *Macrotermesnatalensis* nests?

A. It becomes more humid as water vapor diffuses into the tunnels.

B. It loses carbon dioxide and gains oxygen.

C. It reaches the interior of the nest through pores in the walls.

D. It moves in the same direction as the air in the center of the nest.

12. Paragraph 5 supports which of the following about the air that flows through the interior of a *Macrotermes natalensis* mound?

A. It has a higher concentration of oxygen in the cellar than in the attic.

B. It is the same temperature as the air on the outside of the mound.

C. It contains over 250 quarts of oxygen which circulate continuously.

D. It is most humid in the cellar and gradually loses moisture as it rises to the attic.

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**If not through the walls or its pores, how does oxygen enter the nest at all, since the nest hasa closed surface?**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below.Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **Thisquestion is worth 3 points.**

**Termites are social insects that live in large, often elaborately constructed nests.**

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**Answer Choices**

A. Although termites resemble ants in terms of size, metarmorphosis, and social organization, they actually belong to a different order of insects.

B. Some termites build their nests underground, while other construct above-ground structures with thick, insulating wall.

C. Some termite species grow a fungus in their nests so that it will purify the air by taking in carbon dioxide and giving off oxygen.

D. Termites are sensitive to dryness and to changes in temperature, so their nests are designed to minimize these factors.

E. Whether they lie above ground or below ground, termite nests must include special pores that allow air to enter the nests.

F. The nests of *Macrotermes natalensis* consist of a series of chambers and tunnels that allow for the circulation of air and the exchange of oxygen and carbon dioxide.

参考答案1-5.A D C A B 6-10.B D D C D 11-13.B A B 14.B D F

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

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## **参考译文：白蚁的独创性**

白蚁是生活在蚁穴中的群居昆虫，有些白蚁的蚁穴可以容纳两百万或者更多的白蚁。白蚁通常被错误地称为白色蚂蚁，但它们肯定不是蚂蚁。跟蚂蚁不同的是白蚁的渐变形态只有三个阶段：卵，若虫，和成虫。而蚂蚁和同目的其他动物，如某些蜜蜂和黄蜂，属于全变态昆虫，形变过程需要四个阶段；卵，幼虫，若虫和成虫。蜜蜂和黄蜂的工蜂以及蚂蚁的工蚁只有雌性，这些雌性都是一个蜂后或蚁后所生，蜂后或蚁后成熟后不久就交配，一生就只交配一次。但是白蚁中的工蚁有雌性也有雄性，且蚁后会长期与一个固定的雄性配偶一起生活。

由于白蚁是小而软体的动物，很容易干燥脱水，所以必须生活在相对较潮湿的地方。对白蚁来说最适合生存的蚁穴相对湿度在96%以上，温度也要比较高，温带最适合白蚁的温度是79°F，热带约为86°F。地下白蚁作为破坏性的物种，通常出现在美国东部，它们在有木头（唯一的食物）的潮湿土壤中筑巢，那里可以达到这些温湿条件。周围的土壤可以保持巢的潮湿，并使得温度保持在一个差不多的有利水平。在冬天寒冷的时候，地下白蚁会搬到霜冻线以下的洞穴里。

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一些热带白蚁是更聪明的工程师，它们可以建造有巨大的内置“空调”的地上巢穴，保持巢穴潮湿，温度恒定，氧气充足。这类白蚁中在建筑上最先进的是一种非洲白蚁叫Macroternes natalensis。著名的瑞士昆虫学家马丁·吕舍尔将这些以真菌为食的白蚁建造的土丘描述为：高16英尺，底部直径16英尺，白蚁用自己的唾液和泥土混合成一种类似水泥的材料，建起16到23英寸厚的土壁。厚密的墙壁把内部小气候与外界的温度和湿度变化隔绝开来。巢穴外部几个狭窄且相对薄的隆起从底部附近几乎延伸到它的顶部。

据吕舍尔说，这种非洲白蚁的一个中型巢穴约住着200万只白蚁。这么多的白蚁和生长在花园中的食物真菌的新陈代谢有助于维持巢内的温度和巢内空气湿度。白蚁们使巢穴内的空气湿度饱和，通过土壤中的水达到约百分之百的相对湿度。

但是，这种隔绝的巢是怎么通风的呢？巢内生存的白蚁每天需要超过250夸脱的氧（超过1200夸脱空气）。这么多的氧气怎么扩散到厚厚的墙壁里去呢？就连墙壁上的小孔里都充满了水，这使得空气几乎无法扩散。问题的答案在于巢穴的建造结构。其内部有一个很大的核心区域，那里生长着大量真菌，其底下是空的“地下室”，上面是一个空的“阁楼”，在巢的外墙上的隆起处有许多小隧道，连接“地下室”和“阁楼”。在真菌花园的暖空气会上升到阁楼。从阁楼上，空气穿过隆起处的小隧道，然后流向地下室。气体，主要是进来的氧气和出去的二氧化碳，就很容易扩散到或离开隆起处，因为这些隆起从巢穴墙壁往外延伸很多，所以它们的壁薄、表面积大。因此，通过隆起进入地下室的空气氧气含量相对高一些，而且二氧化碳已经减少了。气流从真菌生长区上升到阁楼上，白蚁们就呼吸到了新鲜的空气。

## Coral Reefs

An important environment that is more or less totally restricted to the intertropical zone is the coral reef. Coral reefs are found where the ocean water temperature is not less than 21 °C, where there is a firm substratum, and where the seawater is not rendered too dark by excessive amounts of river-borne sediment. They will not grow in very deep water, so a platform within 30 to 40 meters of the surface is a necessary prerequisite for their development. Their physical structure is dominated by the skeletons of corals, which are carnivorous animals living off zooplankton. However, in addition to corals there are enormous quantities of algae, some calcareous, which help to build the reefs. The size of reefs is variable. Some atolls are very large—Kwajelein in the Marshall Islands of the South Pacific is 120 kilometers long and as much as 24 kilometers across-but most are very much smaller, and rise only a few meters above the water. The 2,000 kilometercomplex of reefs known as the Great Barrier Reef, which forms a gigantic natural breakwater off the northeast coast of Australia, is by far the greatest coral structure on Earth.

Coral reefs have fascinated scientists for almost 200 years, and some of the most pertinentobservations of them were made in the 1830s by Charles Darwin on the voyage of the Beagle. He recognized that there were three major kinds: fringing reefs, barrier reefs, and atolls; and he saw that they were related to each other in a logical and gradational sequence. A fringing reef is one that lies close to the shore of some continent or island. Its surface forms an uneven and rather rough platform around the coast, about the level of low water, and its outer edge slopes downwards into the sea. Between the fringing reef and the land there is sometimes a small channel or lagoon. When the lagoon is wide and deep and the reef lies at some distance from the shore and rises from deep water it is called a barrier reef. An atoll is a reef in the form of a ring or horseshoe with a lagoon in the center.

Darwin’s theory was that the succession from one coral reef type to another could be achieved by the upward growth of coral from a sinking platform, and that there would be a progression from a fringing reef, through the barrier reef stage until, with the disappearance through subsidence (sinking) of the central island, only a reef-enclosed lagoon or atoll would survive. A long time after Darwin put forward this theory, some deep boreholes were drilled in the Pacific atolls in the 1950s. The drill holes passed through more than a thousand meters of coral before reaching the rock substratum of the ocean floor, and indicated that the coral had been growing upward for tens of millions of years as Earth's crust subsided at a rate of between 15 and 51 meters per million years. Darwin s theory was therefore proved basically correct. There are some submarine islands called guyots and seamounts, in which subsidence associated with sea-floor spreading has been too speedy for coral growth to keep up.

Like mangrove swamps, coral reefs are extremely important habitats. Their diversity of coral genera is greatest in the warm waters of the Indian Ocean and the western Pacific. ■ Indeed, they have been called the marine version of the tropical rain forest, rivaling their terrestrial counterparts in both richness of species and biological productivity. ■They also have significance because they provide coastal protection, opportunities for recreation, and are potential sources of substances like medicinal drugs. ■At present they are coming under a variety of threats, of which two of the most important are dredging and the effects of increased siltation brought about by accelerated erosion from neighboring land areas. ■

1. According to paragraph 1, all of the following are needed for the growth of coral reefs?

A. a solid base to grow on

B. exposure to light

C. the presence of river-borne sediment

D. ocean temperatures of 21 °C or higher

2. the word “prerequisite” in the passage is closest in meaning to

A. precaution

B. preparation

C. requirement

D. achievement

3. According to paragraph 1, algae are important because

A. they help build coral reefs

B. they are the dominant type of sea life living on the reefs

C. they compete with coral for zooplankton

D. they are an important source of food available to corals

4. The word “complex” in the passage is closest in meaning to?

A. extension

B. system

C. region

D. variety

5. According to paragraph 2, how did Charles Darwin contribute to the understanding of coral reefs?

A. He identified the main types of coral reef and explained how they were related.

B. He discovered the existence of coral reefs on a scientific voyage.

C. He proved that reefs are mostly located very close to the shore.

D. He saw the importance of reefs for the support of other marine life.

6. The word “pertinent” in the passage is closest in meaning to

A. extraordinary

B. relevant

C. intelligent

D. famous

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7. According to paragraph 2, which of the following is NOT characteristics of a barrier reef?

A. It is located away from the shore of the neighboring land.

B. It is separated from neighboring land by a wide channel.

C. It is located in deep ocean water.

D. It surrounds a small, central lagoon.

8. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Darwin claimed that, of the three types of coral reefs, only an atoll would be able to survive on a sinking platform.

B. Darwin recognized that coral reefs achieved success by growing upward from a sinking land platform and becoming an atoll.

C. Darwin argued that as a coral reef grew up from a sinking island, it would become a fringing reef, then a barrier reef, and finally, with the disappearance of the island, an atoll.

D. Darwin’s theory helped explain the disappearance of a number of islands by showing how coral reef growth caused them to sink below the ocean surface.

9. Which of the following can be inferred from paragraph 3 about the Pacific atolls?

A. They were once fringing reefs around the coasts of islands.

B. They were first observed by Darwin during his voyage on the Beagle.

C. They will eventually become fringing reefs.

D. They are located where the ocean floor does not sink.

10. Why does the passage provide the information that the drill holes in the Pacific atolls passed through more than a thousand meters of coral before reaching the rock substratum of the ocean floor?

A. To emphasize that according to Darwin’s view coral can grow at great depths

B. To indicate how scientists knew the rate at which Earth’s crust had subsided

C. To support the claim that coral reefs take millions of years to form

D. To present the evidence that confirmed Darwin’s account of coral reef evolution

11. According to paragraph 4, why have coral reefs been compared to tropical rain forests?

A. Both are located near the Indian and western Pacific Oceans.

B. Both are home to a wide variety of species.

C. Both play an important role in protecting coastal islands.

D. Both are threatened by the erosion of nearby land.

12. The word “potential” in the passage is closest in meaning to

A. powerful

B. possible

C. valuable

D. reliable

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Yet because many coral reef organisms can tolerate only a narrow range of environmental conditions, reefsare sensitive to damage from environmental changes.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2 points.**

**Coral reefs constitute an important tropical environment that provides habitat for a rich variety of oceanlife.**

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**Answer Choices**

A. Coral reefs are structures made by living creatures and can grow only in specific ocean conditions.

B. Although atolls can sometimes grow to large proportions, barrier reefs are by far the largest coral structures.

C. Mangrove swamps are as important as coral reefs as the habitat for numerous plant and animal species.

D. Coral reefs are classified as fringing, barrier, or atoll, all of which are linked in a chain of progressive development.

E. Although coral reefs are important to humans in several ways, they are currently threatened by dredging and mud from erosion.

F. Fringing reefs lie close to the shore of continents and islands, forming a transition zone between the land mass and the sea.

参考答案：1-5.C C A B A 6-10. B D C A D 11-13.B B C 14.A D E

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## **参考译文：珊瑚礁**

珊瑚礁生长的重要环境差不多仅限于热带区域。它们一般见于海洋中的水温不低于21°C、基石坚定，并在海水没有因为过量的河流沉积物而显得太暗的环境中。它们不会生长在深水之中，所以在海平面之下30米到40米之间要有一个平台，这是珊瑚礁生长的一个必要的前提条件。珊瑚礁的物理结构主要是珊瑚的骨骼，也就是以浮游动物为食的肉食动物的尸骨。然而，除了珊瑚以外，还有大量的藻类、一些钙质都对珊瑚礁的形成有帮助。珊瑚礁的大小是不定的。一些环礁体积非常之大——南太平洋马绍尔群岛的夸贾林环礁有120千米长，24千米宽，但大多数珊瑚礁都是非常小的，只能生长到水面以上几米。被称为“大堡礁”的珊瑚礁群，长达2000千米，在澳大利亚东北海岸形成了一个巨大的天然防波堤，是地球上迄今为止最大的珊瑚结构。

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科学家研究珊瑚礁已经有近200年的时间，其中1830年查尔斯·达尔文在乘坐贝格尔航行时对珊瑚礁的观察最为深入中肯。他识别出了三种主要的珊瑚礁：岸礁、堡礁和环礁；并且观察到珊瑚之间的排列是渐次有序、相互关联的。岸礁生长于靠近大陆或岛屿的岸边，它的表面粗糙不平，沿着海岸在浅水区生长，外缘向海里倾斜。岸礁和陆地之间有时会有一个小通道或泻湖。如果泻湖宽而且深，且礁生长在离岸边一段距离的深水中，这种珊瑚礁就叫堡礁。环礁是一个环形或马蹄形礁，泻湖在礁的中间。

达尔文的理论是：一种珊瑚礁类型可以演替为另一种类型，首先珊瑚会从一个正在下沉的平面上向上生长，岸礁就演变到堡礁阶段，堡礁阶段由于中央岛全部沉入海里，只剩下珊瑚环绕的泻湖或环礁留存下来。在二十世纪50年代，达尔文提出这一理论很久之后，人们在太平洋的环礁上钻了一些深孔。钻孔深达一千米，穿过珊瑚直到海底的岩石层，说明这些珊瑚已经生长了有数千万年了，因为地壳是以每一百万年15到51米的速度在下沉。因此这说明达尔文的理论基本上是正确的。有一些海底岛屿称为平顶山或海底山，在这些地方海底扩张带来的下沉速度太快，以至于珊瑚礁的生长速度跟不上。

像红树林沼泽一样，珊瑚礁是非常重要的栖息地。在印度洋和西太平洋的温暖水域中，珊瑚属的生物多样性是最大的。事实上，它们被称为海洋版的热带雨林，在物种丰富度和生物生产力方面可以与真正的热带雨林媲美。它们的重要性还体现在海岸防护、旅游娱乐和潜在的药用成分方面。目前，珊瑚礁遭受着很多的威胁，其中最重要的两种威胁是疏浚和邻近土地面积的加速侵蚀所造成的淤积增加。

# TPO-48

## Chinese Population Growth

Increases in population have usually been accompanied (indeed facilitated) by an increase in trade. In the Western experience, commerce provided the conditions that allowed industrialization to get started, which in turn led to growth in science, technology, industry, transport, communications, social change, and the like that we group under the broad term of “development.” However, the massive increase in population that in Europe was at first attributed to industrialization starting in the eighteenth century occurred also and at the same period in China, even though there was no comparable industrialization.

It is estimated that the Chinese population by 1600 was close to 150 million. The transition between the Ming and Qing dynasties (the seventeenth century) may have seen a decline, but from 1741 to 1851 the annual figures rose steadily and spectacularly, perhaps beginning with 143 million and ending with 432 million. If we accept these totals, we are confronted with a situation in which the Chinese population doubled in the 50 years from 1790 to 1840. If, with greater caution, we assume lower totals in the early eighteenth century and only 400 million in 1850, we still face a startling fact: something like a doubling of the vast Chinese population in the century before Western contact, foreign trade, and industrialization could have had much effect.

To explain this sudden increase we cannot point to factors constant in Chinese society but must find conditions or a combination of factors that were newly effective in this period. Among these is the almost complete internal peace maintained under Manchu rule during the eighteenth century. There was also an increase in foreign trade through Guangzhou (southern China) and some improvement of transportation within the empire. Control of disease, like the checking of smallpox by variolation may have been important. But of most critical importance was the food supply.

Confronted with a multitude of unreliable figures, economists have compared the population records with the aggregate data for cultivated land area and grain production in the six centuries since 1368. Assuming that China’s population in 1400 was about 80 million, the economist Dwight Perkins concludes that its growth to 700 million or more in the 1960s was made possible by a steady increase in the grain supply, which evidently grew five or six times between 1400 and 1800 and rose another 50 percent between 1800 and 1965. This increase of food supply was due perhaps half to the increase of cultivated area, particularly by migration and settlement in the central and western provinces, and half to greater productivity—the farmers’ success in raising more crops per unit of land.

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This technological advance took many forms: one was the continual introduction from the south of earlier-ripening varieties of rice, which made possible double-cropping (the production of two harvests per year from one field). ■ New crops such as corn (maize) and sweet potatoes as well as peanuts and tobacco were introduced from the Americas. ■Corn, for instance, can be grown on the dry soil and marginal hill land of North China, where it is used for food, fuel, and fodder and provides something like one-seventh of the food energy available in the area. ■The sweet potato, growing in sandy soil and providing more food energy per unit of land than other crops, became the main food of the poor in much of the South China rice area. ■

Productivity in agriculture was also improved by capital investments, first of all in irrigation. From 1400 to 1900 the total of irrigated land seems to have increased almost three times. There was also a gain in farm tools, draft animals, and fertilizer, to say nothing of the population growth itself, which increased half again as fast as cultivated land area and so increased the ratio of human hands available per unit of land. Thus the rising population was fed by a more intensive agriculture, applying more labor and fertilizer to the land.

1. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Commerce, industrialization, and development are common features of the Western experience.

B. Trade, industrialization, and development accelerated social change in Western societies.

C. Trade and industrialization brought about development in Western societies.

D. In Western societies, social change provided the conditions for development in a number of areas.

2. The word “attributed” in the passage is closest in meaning to

A. accustomed

B. credited

C. exposed

D. transformed

3. According to paragraphs 1 and 2, which of the following is true of Chinese population growth between 1741and 1851?

A. It coincided with the beginning of industrialization in China.

B. It prompted speculation about the actual number of people living in China in previous centuries.

C. It continued the steady growth in population of previous centuries.

D. It occurred in the absence of certain conditions generally associated with population growth.

4. According to paragraph2, the estimated population of China in the mid 1700s was?

A. 143 million

B. 150 million

C. 400 million

D. 432 million

5. The word “constant ” in the passage is closest in meaning to

A. unique

B. dominant

C. altered

D. unchanging

6. Paragraph 3 supports all of the following statements about eighteenth-century Chinese society EXCEPT:

A. It was troubled by frequent conflicts with foreign nations.

B. It improved its transportation system.

C. It experienced growth in international commerce.

D. It managed to prevent the spread of certain diseases.

7. Paragraph 4 answers which of the following questions about China’s population growth between 1400 and 1965?

A. Which figures relating to China’s population growth were unreliable?

B. Why did Dwight Perkins assume that China’s population in 1400 was about 80 million?

C. Where in China did most of the population increase take place?

D. What factors made China’s population growth between 1400 and 1965 possible?

8. The word “aggregate” in the passage is closest in meaning to

A. available

B. reliable

C. combined

D. recorded

9. What can be inferred from paragraph 5 about the introduction of corn and sweet potatoes in China?

A. These crops required much more care than other crops.

B. These crops were consumed in limited quantities.

C. These crops permitted an expansion of the area used for farming.

D. These crops became available all over China within a short period of time.

10. The word “ratio” in the passage is closest in meaning to

A. proportion

B. availability

C. importance

D. cost

11. Which of the following is NOT mentioned in paragraphs 5 and 6 as one of the strategies the Chinese applied in agriculture?

A. The growing of two crops on the same field during the same year

B. The improvement of systems to supply crops with water

C. The application of increasing amounts of fertilizer to the land

D. The reduction in the amount of human labor per unit of land

12. What purpose does paragraph 5 serve in the larger discussion about China’s population growth?

A. It provides evidence of China’s emerging foreign trade relations.

B. It illustrates how the Chinese increased their food supply.

C. It provides evidence of why population growth was most noticeable in the south.

D. It shows how foreign crops gradually gained greater acceptance in China.

13.Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**Other developments addressed the problems of dry and sandy areas unsuitable forgrowing China’s native crops.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2points.**

**Over the centuries, China has experienced an extraordinary increase in its population.**

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**Answer Choices**

A. Understanding the exceptional increase in population in China requires giving up commonly held assumptions relative to the phenomenon of population growth.

B. The economist Dwight Perkins applied a particular statistical method to determine the increase in China’s population.

C. The sudden population growth in China started in its northern and southern provinces, and it spread rapidly to the central and western areas of the country.

D. Improved transportation management and enhanced disease control contributed to China’s population explosion.

E. The increase in China’s food supply, which affected population growth, was the result of technological developments in agriculture and capital investment.

F. A steady increase in foreign trade since the 1400s provided the conditions necessary for large-scale agricultural development.

参考答案：1-5.C B D A D 6-10.A D C C A 11-13.D B A 14.ADE

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## **参考译文：中国的人口增长**

人口增长通常伴随着（事实上促进了）贸易的增加。按照西方的经验，商业为工业化的开始提供了条件，而工业化反过来又导致了科学、技术、工业、交通运输、通信进步和社会变化等等，我们把这些统称为“发展”。但是，十八世纪开始的工业化带来了欧洲的人口大幅增长；同时间中国的人口也暴涨，尽管中国没有经历类似的工业化。

据估计，到1600年中国的人口已经接近1亿5000万。明清之交（十七世纪）人口数量可能有所减少，但从1741年到1851年，人口数量每年都稳步上升，从1亿4300万涨到了4亿3200万，相当惊人。如果我们认为这些合计数字没问题，我们将面临这样一个情形：从1790年到1840年，中国人口在这50年间翻了一番。如果谨慎一些，我们假设在18世纪初总人数要少一些，到1850年也只有4亿的话，事实依然让人吃惊：在与西方接触、对外贸易和工业化之前，中国庞大的人口数量翻倍本应产生很大的影响。

要解释这种突然的人口增加，我们不能指向中国社会的一些一直不变的因素，而是必须找到当时新出现的一系列条件或诸多组成因素。其中包括十八世纪的中国处于满族统治下，国内几乎完全和平。广州（华南）的对外贸易也有所增加，国家内部的交通也有所改善。还有一个重要因素是疾病的控制，如通过人痘接种来克制天花。但这当中最重要的还是食品供应。

面对大量的不可靠的数据，经济学家将1368年以来的6个世纪的人口统计记录与耕地面积和粮食生产总量的综合数据进行了比较。经济学家德怀特·帕金斯得出结论，假设在1400年中国的人口是8000万左右，由于粮食产量稳步增长，到20世纪60年代人口是有可能增长到7亿人的，明显地从1400年到1800年增长了5到6倍，从1800年到1965年又增长了50%。粮食供应的增加可能一半是由于耕地面积的增加，特别移民并定居到中西部省份带来的耕地面积增加；另一半是由于生产力的提高——农民成功提高了每单位土地面积的粮食产量。

技术进步有许多形式：一个是不断从南方引进早熟的水稻品种，这种水稻可以一年两熟（一块地每年收获两季）。新作物如玉米、红薯、花生和烟草从美洲传进来。拿玉米来说，可以在干燥的土壤和华北边缘的山地种植，可用作食品、燃料、饲料，提供了当地七分之一的食物能量。红薯可以在沙质土壤中种植，由于每单位土地面积提供的食物能量比其他作物都多，所以成为了华南水稻种植地区穷人们的主要食品。

资本的投入也提高了农业生产力。首先是灌溉方面，从1400年到1900年，总灌溉土地似乎增加了近三倍。农用工具、役畜和肥料方面都有进步，更不用说人口本身也有增长，增速是耕地面积增速的一半，因此增加了人均可用土地面积的比例。这种更加密集的农业生产为增长的人口提供食物，而人口为土地提供更多的劳动力和肥料。

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## Determining Dinosaur Diet

Determining what extinct dinosaurs ate is difficult, but we can infer some aspects of their dietary preferences. Traditionally, this information has been derived from direct evidence, such as stomach contents, and indirect evidence, such as establishing a correlation between particular body characteristics and diets of living animals and then inferring habits for dinosaurs.

Animals such as house cats and dogs have large, stabbing canine teeth at the front of the mouth and smaller, equally sharp teeth farther back in their jaws. Many of these animals are also armed with sharp claws. The advantage of teeth and claws as predatory tools is obvious. Now consider animals like cows, horses, rabbits, and mice. These animals have flat teeth at the back of the jaw that are analogous to and have the same function as grindstones. Unlike the meat-slicing and stabbing teeth of carnivores, the teeth of these animals grind and shred plant material before digestion.

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More clues exist in other parts of the skull. The jaw joint of carnivores such as dogs and cats has the mechanical advantage of being at the same level as the tooth row, allowing the jaws to close with tremendous speed and forcing the upper teeth to occlude against the lower teeth with great precision. In herbivorous animals, rapid jaw closure is less important. Because the flat teeth of herbivores work like grindstones, however, the jaws mush move both side to side and front to back. The jaw joints of many advanced herbivores, such as cows, lie at a different level than the tooth row, allowing transverse tearing, shredding, and compression of plant material. ■If we extend such observations to extinct dinosaurs, we can infer dietary preferences (such as carnivory and herbivory), even though we cannot determine the exact diet. ■The duck-billed dinosaurs known as hadrosaurs are a good example of a group whose jaw joint is below the level of the tooth row, which probably helped them grind up tough, fibrous vegetation.

■Paleontologists would like to be much more specific about a dinosaur's diet than simply differentiating carnivore from herbivore. ■This finer level of resolution requires direct fossil evidence of dinosaur meals. Stomach contents are only rarely preserved, but when present, allow us to determine exactly what these animals were eating.

In the stomach contents of specimens of Coelophysis (a small, long-necked dinosaur) are bones from juvenile animals of the same species. At one time, these were thought to represent embryonic animals, suggesting that this small dinosaur gave birth to live young rather than laying eggs. Further research indicated that the small dinosaurs were too large and too well developed to be prehatchling young. In addition, the juveniles inside the body cavity were of different sizes. All the evidence points to the conclusion that these are the remains of prey items and that, as an adult, Coelophysis was at least in part a cannibal.

Fossilized stomach contents are not restricted to carnivorous dinosaurs. In a few rare cases, most of them “mummies” (unusually well preserved specimens), fossilized plant remains have been found inside the body cavity of hadrosaurs. Some paleontologists have argued that these represent stream accumulations rather than final meals. The best known of these cases is the second Edmontosaurus mummy collected by the Sternbergs. In the chest cavity of this specimen, which is housed in the Senckenberg Museum in Germany, are the fossil remains of conifer needles, twigs, seeds, and fruits. Similar finds in Corythosaurus specimens from Alberta, Canada, have also been reported, indicating that at least two kinds of Late Cretaceous hadrosaurs fed on the sorts of tress that are common in today's boreal woodlands.

A second form of direct evidence comes from coprolites (fossilized bodily waste). Several dinosaur fossil localities preserve coprolites. Coprolites yield unequivocal evidence about the dietary habits of dinosaurs. Many parts of plants and animals are extremely resistant to the digestive systems of animals and pass completely through the body with little or no alteration. Study of coprolites has indicated that the diets of some herbivorous dinosaurs were relatively diverse, while other dinosaurs appear to have been specialists, feeding on particular types of plants. The problem with inferring diets from coprolites is the difficulty in accurately associating a particular coprolite with a specific dinosaur.

1. The word “Traditionally” in the passage is closest in meaning to

A. typically

B. naturally

C. originally

D. partly

2. According to paragraph 2, which of the following is true of the teeth of carnivores?

A Carnivores' teeth for grinding and shredding are located in the front of their jaws.

B Carnivore teeth are designed to break down food thoroughly before digestion.

C Carnivores have teeth at the back of their jaws that are as sharp as their front teeth.

D Carnivores have both sharp teeth for slicing meat and flat teeth for grinding meat.

3. In paragraph 2, the author compares the teeth of cows, horses, rabbits, and mice to grindstones in order to explain

A. how certain kinds of teeth aid digestion

B. how the teeth of some familiar mammals differ from those of dinosaurs

C. why the back teeth of herbivores are larger than those of carnivores

D. why the back teeth of carnivores are just as sharp as their front teeth

4. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. The advantage of bringing the upper teeth directly against the lower teeth is a more precise bite.

B. Animals whose jaw joint is at the same level as their teeth can bite quickly and accurately.

C. The location of an animal's jaw joint in respect to its teeth determines the speed at which it can close its jaws.

D. The carnivore jaw has the advantage of allowing the upper teeth to move with greater speed and precision than the lower teeth do.

5. The word “compression” in the passage is closest in meaning to

A. destruction

B. crushing

C. swallowing

D. removal

6. According to paragraphs 3 and 4, what can studies of living animals help scientists determine about individual dinosaurs?

A How the overall jaw size of a given dinosaur species relates to the type of food the species members ate

B Whether a given dinosaur generally ate plants or generally ate meat

C How much food a given dinosaur would have needed to eat to remain healthy

D How an inadequate diet may have affected a given dinosaur's skull and jaw

7. According to paragraph 5, all of the following support the claim that the adult Coelophysis sometimes ate young Coelophysis EXCEPT:

A Juveniles found in the body cavities of adults were too advanced in their development to be embryos.

B Juveniles of different sizes were found in the body cavity of the same adult.

C Juveniles found in the body cavities of adults were too large to be embryos.

D Juveniles found in the body cavities of adults were in unhatched eggs.

8. The word “restricted” in the passage is closest in meaning to

A. related

B. critical

C. common

D. limited

9. What explanation is given in paragraph 7 to support the idea that coprolites are a good source of information about what dinosaurs ate?

A. They are likely to be preserved because of their resistance to decay.

B. They contain some parts of plants and animals that are unchanged by the digestive process.

C. They are usually found in close proximity to other dinosaur fossils.

D. They are produced by both carnivores and herbivores.

10. The word “diverse” in the passage is closest in meaning to

A. healthy

B. varied

C. pure

D. stable

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11. According to paragraph 7, what has the study of coprolites revealed about dinosaur eating habits?

A. Herbivores consumed much larger quantities of food than other dinosaurs did.

B. The diets of some dinosaurs were limited to relatively few kinds of foods.

C. Some herbivores experienced digestion problems as a result of eating certain plants.

D. The diets of some dinosaurs changed as different plants became available to eat.

12. Which of the following questions is NOT answered in the passage?

A. Why did paleontologists once believe that Coelophysis gave birth to live young?

B. Why is it unusual for the stomach contents of dinosaurs to be preserved?

C. What are some dinosaurs in which the fossilized remains of plants have been found?

D. What difficulty do scientists face in using coprolites to draw conclusions about dinosaur diet?

13. Look at the four squares [█] that indicate where the following sentence could be added to the passage.

**Unfortunately, studies of living animals provide only a very general understanding of what various dinosaurs ate.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage

14. **Directions**: An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 3 points.**

**Scientists use both direct and indirect evidence to determine the dietary preferences of dinosaurs.**

●

●

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**Answer Choices**

A. Observations of fossilized remains indicate that most dinosaurs preferred to eat plants rather than animals.

B. Specific information about a dinosaur's diet can sometimes be obtained from the fossilized contents of its stomach.

C. A better understanding of how different dinosaurs reproduced and developed has helped paleontologists determine actual food requirements at different stages of the life cycle.

D. The shape of a dinosaur's teeth and the structure of its jaws indicate, as do the teeth and jaws of modern animals, the general kind of food the dinosaur ate.

E. Fossils formed from dinosaur's bodily waste can provide clues to what dinosaurs consumed, but such fossils cannot be easily associated with specific dinosaurs.

F. Generally speaking, dinosaurs that were herbivores had a more varied diet than did dinosaurs that were carnivores.

参考答案：1-5.A C A B B 6-10.B D D B B 11-13.B B C 14.B D E

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## **参考译文：确定恐龙的饮食**

要确定已经灭绝的恐龙吃什么是一件很困难的事情，但是我们能推测出它们在饮食上的一些偏好。传统上，这些信息来自直接证据，如胃内食物，以及间接证据，如通过在恐龙的特定身体特征和现今存活的动物的饮食习惯之间建立关系来推断恐龙的饮食习惯。

像家养的猫和狗这类动物，嘴前部的牙齿又大又尖，后部的牙齿要小一些但是同样锋利。这些动物中有许多都有着锋利的爪子。牙齿和爪子作为捕食工具的优势非常明显。现在再看牛、马、兔子和老鼠这些动物。它们后部的牙齿比较扁平，功能类似于研磨的石头。不像食肉动物的牙齿是刺进肉里并把肉撕开，这些动物的牙齿会将植物磨成碎块再消化。

头骨的其他部分存在更多线索。狗和猫这类食肉动物的颌关节和牙齿在同一高度上，这种机械上的优势能使上下颌快速闭合，使得上下牙齿咬合严密。对草食动物来说，快速颌闭合并不重要。由于食草动物的扁平牙齿像磨刀石一般，上下颌必须前后左右移动。许多高等草食动物，如牛，颌关节和牙齿的高度并不一致，这样它们就能横向撕裂、切碎和挤压植物。如果我们把这种观察方法应用到灭绝的恐龙身上，我们可以推断出恐龙的饮食偏好（如肉食还是草食），虽然我们无法确定准确的食物。鸭嘴龙便是一个颌关节比牙齿低的例子，这种高度不一致可能会帮助它们把坚韧的纤维植物磨碎。

古生物学家不只是想要区分恐龙是食草还是吃肉，他们还想知道恐龙的具体饮食。这种更精细的研究决心需要直接的恐龙食物的化石证据。胃里的食物很少能保存，但如果有，就能让我们确定恐龙到底吃什么。

腔骨龙（一种体型较小、脖子较长的恐龙）的胃内食物样本是同类恐龙的幼崽骨头。科学家一度认为这些幼崽骨头属于腔骨龙的胚胎，认为这种小恐龙是胎生而非卵生。进一步的研究发现，这些幼崽体积太大，而且发育良好，不可能是孵化前的幼崽。另外，这些胃内的幼崽残骸大小也不一。所有的证据都表明，这些都是猎物的残骸，成年腔骨龙中至少有一部分是吃自己的同类的。

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并非只有食肉恐龙才有胃内食物的化石。在一些罕见的情况下，鸭嘴龙的体内也发现有植物遗骸的化石或“木乃伊”（罕见的保存完好的标本）。一些古生物学家认为，这些食物是积累下来的食物而不是最后一餐。最著名的案例是施特恩伯格一家收集的第二具埃德蒙顿木乃伊。标本存放在德国森肯伯格博物馆内，在其胸腔内，是针叶、细枝、种子和果实的化石。加拿大阿尔伯塔的冠龙标本也报导了类似的发现，这表明至少有两种晚白垩纪的鸭嘴龙是以现在北半球森林中的常见树木为食的。

另一个直接的证据形式来自粪化石（身体排泄物的化石）。几个恐龙化石地点保存有粪化石。粪化石能明确说明恐龙的饮食习惯。很多植物和动物不容易被动物的消化系统消化，没有改变或者只有些许改变就排出体内了。对粪化石的研究表明，有些食草恐龙的饮食比较多样化，而另一些恐龙似乎专门吃某些特定的食物。从粪化石推断饮食偏好，困难在于如何准确知道哪种粪化石属于哪种特定的恐龙。

## Climate and Urban Development

For more than a hundred years, it has been known that cities are generally warmer than surrounding rural areas. This region of city warmth, known as the urban heat island, can influence the concentration of air pollution. However, before we look at its influence, let’s see how the heat island actually forms.

The urban heat island is due to industrial and urban development. In rural areas, a large part of the incoming solar energy is used in evaporating water from vegetation and soil. In cities, where less vegetation and exposed soil exist, the majority of the Sun’s energy is absorbed by urban structures and asphalt. Hence, during warm daylight hours, less evaporative cooling in cities allows surface temperatures to rise higher than in rural areas. The cause of the urban heat island is quite involved. Depending on the location, time of year, and time of day, any or all of the following differences between cities and their surroundings can be important: albedo (reflectivity of the surface), surface roughness, emissions of heat, emissions of moisture, and emissions of particles that affect net radiation and the growth of cloud droplets.

At night, the solar energy (stored as vast quantities of heat in city buildings and roads) is slowly released into the city air. Additional city heat is given off at night (and during the day) by vehicles and factories, as well as by industrial and domestic heating and cooling units. The release of heat energy is retarded by the tall vertical city walls that do not allow infrared radiation to escape as readily as does the relatively level surface of the surrounding countryside. The slow release of heat tends to keep nighttime city temperatures higher than those of the faster-cooling rural areas. Overall, the heat island is strongest (1) at night when compensating sunlight is absent; (2) during the winter, when nights are longer and there is more heat generated in the city; and (3) when the region is dominated by a high-pressure area with light winds, clear skies, and less humid air. Over time, increasing urban heat islands affect climatological temperature records, producing artificial warming in climatic records taken in cities. This warming, therefore, must be accounted for in interpreting climate change over the past century.

The constant outpouring of pollutants into the environment may influence the climate of the city. Certain particles reflect solar radiation, thereby reducing the sunlight that reaches the surface. Some particles serve as nuclei upon which water and ice form. Water vapor condenses onto these particles when the relative humidity is as low as 70 percent, forming haze that greatly reduces visibility. Moreover, the added nuclei increase the frequency of city fog.

Studies suggest that precipitation may be greater in cities than in the surrounding countryside; this phenomenon may be due in part to the increased roughness of city terrain, brought on by large structures that cause surface air to slow and gradually converge.This piling up of air over the city then slowly rises, much like toothpaste does when its tube is squeezed. At the same time, city heat warms the surface air, making it more unstable, which enhances risings air motions, which, in turn, aids in forming clouds and thunderstorms. This process helps explain why both tend to be more frequent over cities.

On clear still nights when the heat island is pronounced, a small thermal low-pressure area forms over the city. ■Sometimes a light breeze—called a country breeze—blows from the countryside into the city. ■If there are major industrial areas along the outskirts, pollutants are carried into the heat of town, where they tend to concentrate. ■Such an event is especially probable if vertical mixing and dispersion of pollutants are inhibited. ■Pollutants from urban areas may even affect the weather downwind from them.

1. The word “involved” in the passage is closest in meaning to

A. uncertain

B. complicated

C. common

D. clear

2. Paragraph 2 mentions all of the following as varying the importance of albedo and other factors

EXCEPT

A. seasons

B. soil depth

C. geographic location

D. the time of day

3. The word “retarded” in the passage is closest in meaning to

A. disguised

B. added to

C. made possible

D. slowed down

4. According to paragraph 4, how do pollutants reduce the distance it is possible to see?

A. They increase the amount of sunlight that reaches the ground.

B. They increase the relative humidity.

C. They form particles that irritate the eye.

D. They serve as nuclei around which water condenses.

5. Select the TWO answer choices that describe ways mentioned in paragraphs 2 and 3 in which solar energy affects urban and rural areas. To receive credit, you must select TWO answers.

A. Solar energy causes evaporation from vegetation and soil, producing a cooling effect.

B. Solar energy stored as heat is lost quickly when tall city buildings guide hot air up and away from the surface.

C. Solar energy increases the atmospheric pressure over open areas.

D. Solar energy is stored up in buildings and roads and emitted as heat during the night.

6. Paragraph 3 supports which of the following claims about the interpretation of temperature records?

A. The climate may not be warming as much as the increase of temperatures recorded in cities appears to suggest.

B. Records show that the increase in urban heat islands has had a significant warming effect on the global climate.

C. During most of the past century, temperature records have been misinterpreted.

D. Scientists will not be able to account for climate change over the past century until they learn more about the urban heat island.

7. All of the following are mentioned in paragraph 3 as contributing to an increase in the amount of heat within a city EXCEPT

A. home air conditioners

B. cars and trucks

C. streetlights

D. factory buildings

8. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect choices change the meaning in important ways or leave out essential information.

A. Until more studies are done, suggestions about the causes of precipitation in cities will focus on the roughness of terrain rather than on surface air and convergence.

B. Certain phenomena of city landscapes, such as large structures, cause surface air to slow and converge, which brings a change in weather patterns to cities and rural areas.

C. One reason why precipitation may be greater in cities than in the countryside is that large buildings that are found in cities cause surface air to slow and converge.

D. Studies that focus on large structures, which are only partly responsible for the increased roughness of city terrain, are incomplete in their explanation of increased precipitation.

9. Why does the author mention “toothpaste” being squeezed from a tube?

A. To compare the movement of toothpaste from a tube to the movement of precipitation from clouds

B. To suggest that the process of cloud formation is a simple, everyday experience

C. To help the reader visualize the process of air movement over a city

D. To contrast the slow rising of air currents with the rapid squeezing of toothpaste

10. The word “both” in the passage refers to

A. piling up and warming of air

B. clouds and thunderstorms

C. warm surface air and rising air motions

D. heat and instability

11. The word “pronounced” in the passage is closest in meaning to

A. examined

B. relative

C. strongest

D. darkest

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12. According to paragraph 6, the highest concentration of pollutants is likely to be found

A. in the center of the city

B. over industrial areas outside the city

C. in rural areas downwind of the city

D. high in the atmosphere during daylight hours

13. Look at the four squares [■] that indicate where the following sentence could be added to the passage.

**The resulting difference in atmosphere pressure between the city and the countryside can**

**cause air to shift.**

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

14. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some sentences do not belong in the summary because they express ideas that are not presented in the passage or are minor ideas in the passage. **This question is worth 2points.**

**Cities are generally warmer than the surrounding countryside, a phenomenon known as theurban heat island.**

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**Answer Choices**

A. In the countryside, much solar energy is used in evaporation, but in the city this energy builds up as heat.

B. Increased industrial and urban development has also increased average levels of humidity over the last century.

C. Pollution from cars and factories helps increase the amounts of fog and precipitation that occur in cities.

D. The urban heat island is strongest in the summer, when the days are long and the sunlight is intense.

E. Heat and air are trapped in the irregular spaces between buildings, which creates the atmospheric conditions that result in storms and winds.

F. Country breezes blow pollutants put from the cities into the surrounding countryside.

**参考答案:** 1-4.B B D D 5.A D 6-10.A C C C B 11-13. CA A 14.A C E

If you have any questions concerning the texts or the answers, feel free to contact Wechat: geeqi0805.

If you are tired of looking up TPO words in a dictionary, try*《新托福TPO阅读词汇速查速记》*!

## **参考译文：气候与城市发展**

一百多年来，人们都知道城市一般比周围的农村地区温度高些。这种地区性的温度升高，被称为城市热岛，可以影响空气污染的浓度。然而，在我们考虑它的影响之前，让我们先看看热岛实际上是如何形成的。

城市热岛的成因是工业和城市发展。在农村地区，很大一部分的太阳能被用于从植被和土壤中蒸发水分。城市中植被稀少、土壤裸露，大部分的太阳能被城市建筑和沥青路面吸收。因此，在温暖的白天，城市的蒸发散热较少，地表温度就比农村地区高。城市热岛的成因很复杂。位置、季节、一天当中的时间不同，以及城市和周围的环境之间的任何差异都可能是重要影响因素：比如反照率（地表反射率）、地表粗糙度、散热量、湿度，影响净辐射的微粒量和云滴的增长。

在夜间，太阳能（储存在城市建筑和道路的巨大热量）被慢慢释放到城市空气中。另外，城市的车辆、工厂、以及工业用和家用的制热和制冷系统也在夜间（和白天）释放出热量。释放出来的热能被高耸的城市墙所阻碍，使得红外线无法像周围的乡村相对较为平坦的地面那样容易散去。由于热量释放缓慢，使得城市夜间的温度比容易散热的农村地区要高。总体而言，热岛效应在三种情况下最强：（1）没有太阳光照射补给的夜间；（2）夜晚较长、城市产生更多热量的冬季；（3）微风、晴朗、干燥的高气压地区。随着时间的推移，气候温度记录中出现越来越多的城市热岛现象，城市出现了人工变暖的气候现象。因此，在解读过去的一个世纪的气候变化时必须考虑到这种温度升高。

不断向环境排放污染气体可能影响城市气候。某些粒子会反射太阳辐射，从而减少到达地面的阳光。有些粒子是形成水和冰的凝结核。当相对湿度低至70%时，水蒸气凝结在这些粒子上，就会形成阴霾，大大降低能见度。此外，凝结核的增加会增加城市出现雾的频率。

研究表明，城市的降水可能要比周边农村地区要多；出现这种现象的部分原因可能是大型建筑物使得地表空气缓慢、逐渐地汇聚在一起，使得城市地形粗糙度增加。城市上空堆积的空气慢慢地上升，就像挤牙膏一样。同时，城市的热量使空气受热，变得更加不稳定，加强了气流的上升运动，反过来有助于形成云或雷雨。这个过程帮助解释了为什么城市的云和雷雨更频繁。

扔掉字典，拿起《新托福TPO阅读词汇速查速记》，读懂原文。Wechat: geeqi0805

在晴朗平静的夜晚，热岛效应明显，城市会形成一个小的热低压区。有时微风——乡下风会从农村吹进城市。如果郊区沿线有大工业区，污染物被带入较热的城市，就会更加聚集。如果污染物在垂直方向上不能混合或者扩散的话，就更容易聚集了。从城市地区吹来的污染物甚至可以影响到它们的顺风方向的天气。

1. with respect to a particular place or situation. [↑](#footnote-ref-2)
2. 又称秘鲁寒流 [↑](#footnote-ref-3)