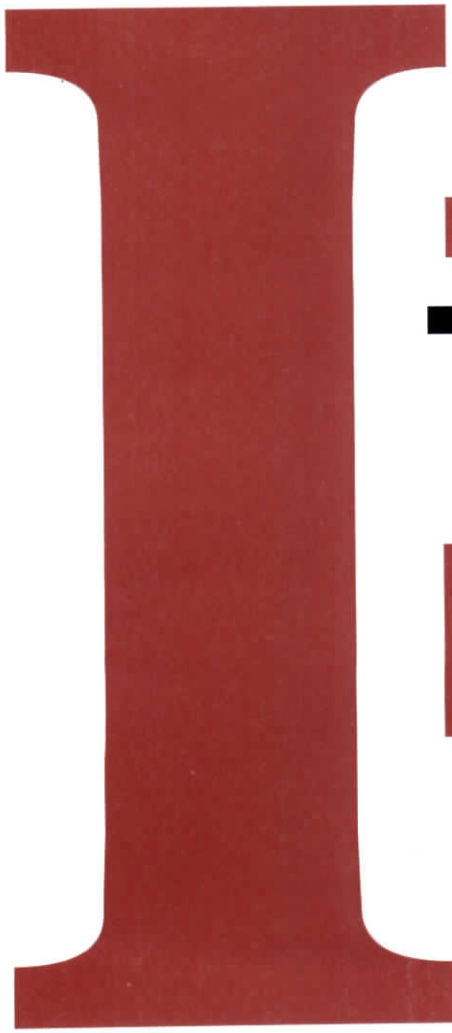
High Intermediate Course



NEW EDITION

TOEFL® *i*BT READING

LinguaForum

New Edition TOEFL *i*BT i-READING

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NEW EDITION

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Foreword /머리말/

TOEFL *i*BT의 네 가지 평가 영역인 독해, 청취, 말하기, 쓰기 중에서 읽기는 가장 기본적으로 갖추어야 할 능력이지만, 탄탄한 기초가 없으면 고득점을 받기 힘든 영역이다. 더욱이 독해는 사실적인 내용을 이해하는 능력뿐만 아니라, 글에 내포된 내용을 추론하는 능력, 글 전체에 대한 종합적인 이해능력 등 고차원적인 사고력이 필요하기 때문에, 직접 TOEFL 독해를 접해보면 의외로 고득점이 쉽지 않고 열심히 공부해도 빨리 점수가 오르지 않는다는 것을 알게 될 것이다. 게다가, 2006년부터 *i*BT 형식으로 바뀌면서, 지문의 길이도 훨씬 길어지고, 전에는 없었던 새로운 고난이도 문제유형이 첨가되어 학생의 부담을 가중시키고 있다.

급할수록 제일 필요한 것은 기본으로 돌아가는 것이다. 기본 실력이 갖추어지지 않은 상태에서 시험 점수를 빨리 올리겠다며 무작정 문제집을 많이 푼다고 해결될 일이 아닌 것이다. NEW EDITION TOEFL *i*BT i-READING은 바로 TOEFL 독해의 기본기를 다지는데 중점을 둔 입문서이다. 본서는 단문을 통한 문제 유형 연습, 중·장문을 통한 주제별 독해, 실전과 동일한 Actual Test를 통해 최종 실력을 점검하는 총 3단계에 걸친 독해학습을 유도하고 있다. 따라서 학생들은 단문, 중문, 장문을 차례로 접하면서 필수적으로 알아야 할 문제유형과 토플 기출 주제에 익숙해지는 것은 물론, 실전 감각까지도 자연스럽게 익힐 수 있을 것이다.

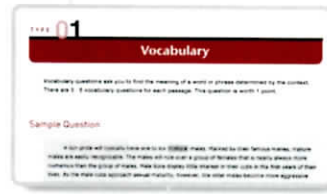
화려하게 꾸며놓은 건물도 기초가 튼튼하지 않으면 오래 버틸 수 없듯이, 기본기를 갖추지 않은 상태에서 우연히 점수가 높게 나왔다고 다음 시험에도 그 점수가 유지될 수는 없는 법이다. 그러나 많은 학생들이 그저 독해를 듣기, 말하기, 쓰기에 비해 고득점이 용이한 영역으로 막연하게 치부해 버리는 경향이 있어 안타깝다. 본 교재는 독해의 기초가 부족한 학생들에게 TOEFL 점수를 떠나 독해 자체의 실질적이고 효율적인 접근 방식을 체득하고 튼튼한 독해의 기초를 쌓을 수 있기를 바라는 마음에서 집필된 책이다. 부디 이 책이 많은 학생들에게 독해에 대한 새로운 시각을 길러주고 고득점의 지름길을 제시해 줄 수 있기를 조심스럽게 바래본다.

LinguaForum Research Center
TOEFL *i*BT 독해 연구팀

/이 책의 구성과 특징/ **Structure**

PART A Question Types

단문을 통해 문제 유형을 정확하게 이해하도록 하였다. 문제 유형의 특징과 문제 풀이 전략을 설명한 뒤, Basic Drill에서 각각의 문제 유형을 집중적으로 연습하고, Reading Practice에서 앞에서 배운 문제 유형을 복습할 수 있도록 하였다.



PART B Approaching Themes

■ Intensive Drill

TOEFL에서 다뤄지는 주제별로 구성된 다양한 지문을 통해 충분히 연습할 수 있도록 하였다.

■ Mini Test

500–600단어 내외의 지문을 통해 여러 가지 문제 유형을 골고루 다루어 부담 없이 TOEFL을 학습할 기회를 마련하였다

■ iBT Practice

TOEFL에서 자주 출제되는 주제의 지문을 실전과 동일한 길이와 문제로 구성하여, 실전감각을 키울 수 있도록 하였다.

■ Vocabulary Review

각 장에서 나온 주요 어휘를 문제 형식으로 복습하여 독해의 기초인 어휘 실력을 튼튼히 다지도록 하였다.

■ Useful Terms

주제별 빈출 어휘를 엄선하여 학습하게 함으로써, 학생들이 실전에서 낯선 주제를 접해도 당황하지 않도록 하였다.

PART C Actual Test

Actual Test를 2회분 수록하여, 실전에서의 자신의 예상 점수를 가늠해 보고 실전 적응력을 높일 수 있도록 하였다.

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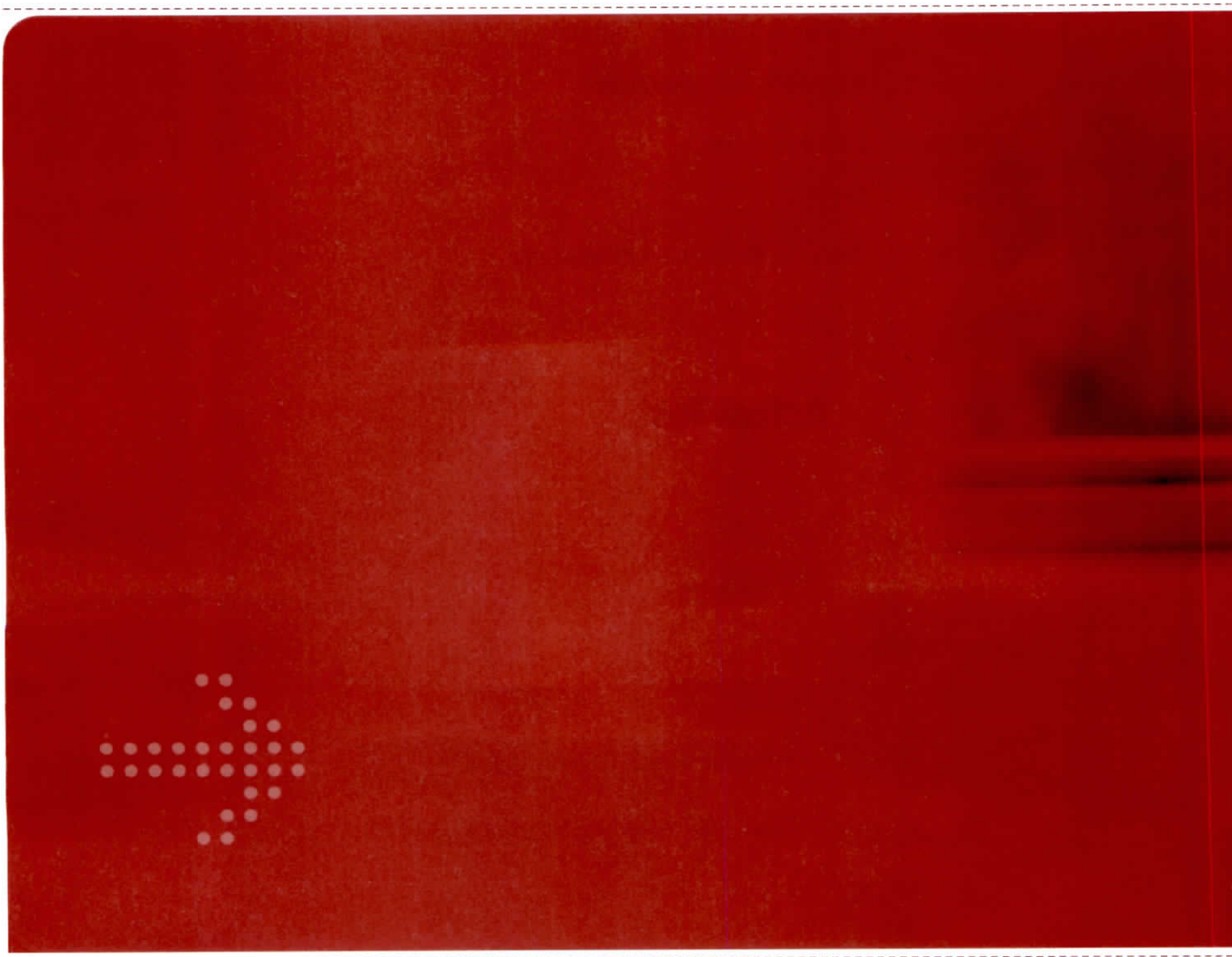
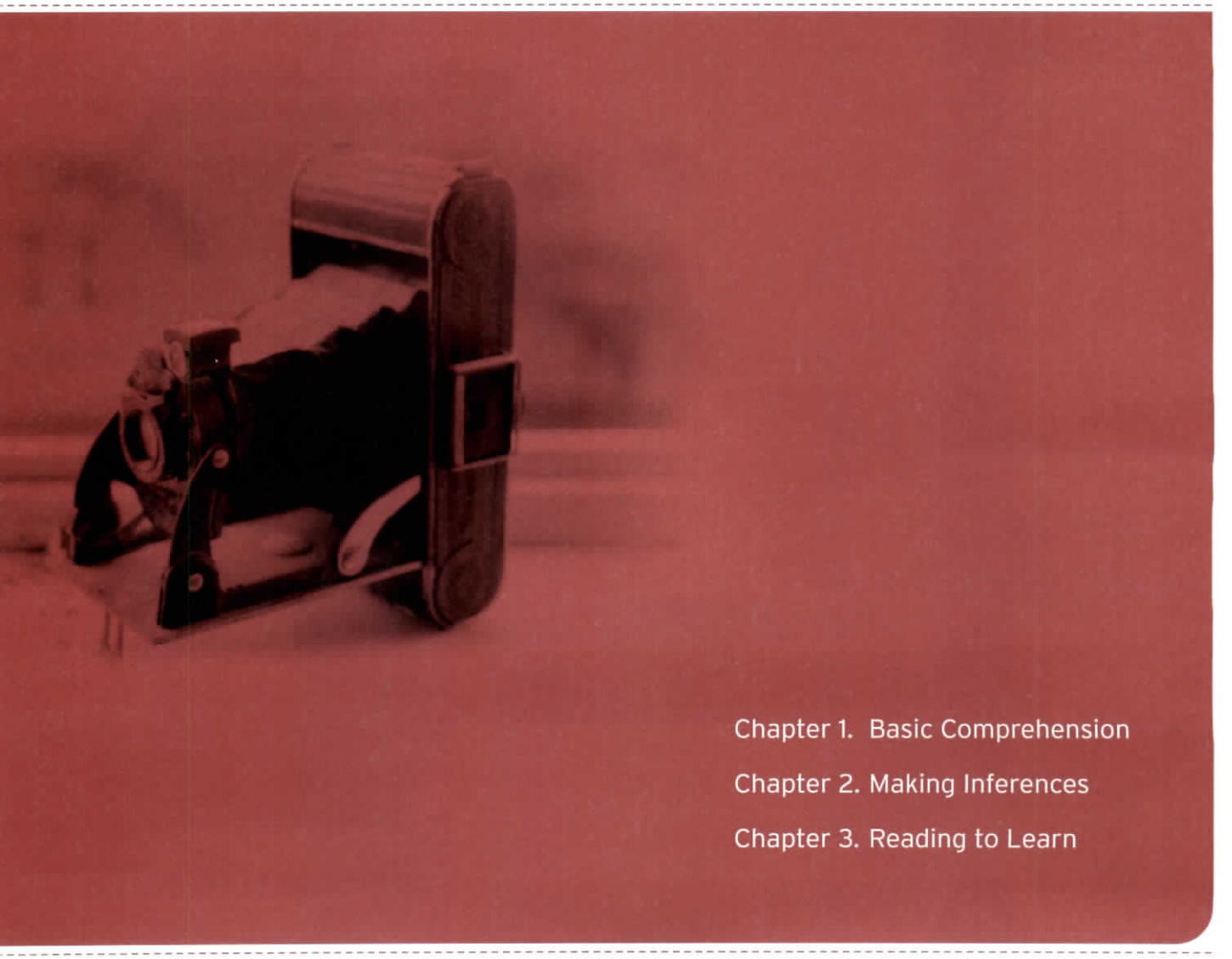
http://test.linguaforum.com 자료실에서 다양한 학습 자료를 볼 수 있습니다.

PART A



Question Types



Chapter 1. Basic Comprehension

Chapter 2. Making Inferences

Chapter 3. Reading to Learn

CHAPTER

01

Basic Comprehension

Type 1. Vocabulary

Type 2. Reference

Type 3. Sentence Simplification

Type 4. Factual Information & Negative Fact

- Reading Practice 1
- Reading Practice 2

Question Types

TYPE 01

Vocabulary

Vocabulary questions ask you to find the meaning of a word or phrase determined by the context. There are 3 – 5 vocabulary questions for each passage. This question is worth 1 point.

Sample Question

A lion pride will typically have one to six mature males. Marked by their famous manes, mature males are easily recognizable. The males will rule over a group of females that is nearly always more numerous than the group of males. Male lions display little interest in their cubs in the first years of their lives. As the male cubs approach sexual maturity, however, the older males become more aggressive and hostile towards them. At the age of two, the male cubs are expelled from the pride by the older males so that they will not become rivals for the females.

The word mature in the passage is closest in meaning to

(A) dominant
(B) aggressive
(C) fertile
(D) adult

Answer & Explanations

The answer is (D). The word mature means "grown-up," or "adult." You can infer its meaning from the phrase in the next sentence "Marked by their famous manes ..." because only grown-up male lions have manes.

Keys to Solution

❶ Remember that the vocabulary question asks for the meaning of a word as it is used in the context. Even if you know the dictionary definition of the word in the question, be sure to check the context.

❷ Examine its context for helpful hints. The common clues you can use in vocabulary questions are:

- **Definition, Restatement clues**
  In previous times, the primary mode of psychiatric treatment was therapy, in which the patient was encouraged to talk about and examine his or her emotional problems.

- **Synonym clues**
  Red wolves once roamed freely throughout the southern United States. Then came settlers who cleared the land for homes and farms, greatly reducing the wolves' habitat.

- **Example, Restatement Clues**
  The developed countries help build infrastructure for residents in poorer countries, by constructing schools, sewage disposal plants and roads.

- **Contrast, Antonym Clues**
  Psychiatric drugs originally intended to treat serious mental disorders are being used to address more trivial issues.

- **Inference Clues**
  The program was canceled after the reporters were found guilty of using a number of unethical methods to get the news.

How the Question is Worded

- **The word X in the passage is closest in meaning to**
- **Based on the information in the paragraph, the term X can be best described as**

1 Epic poems are long stories, told in rhymed verses, which usually tell of a war or the adventures of a great hero. They were one of the major forms of literature in the ancient world. In fact, epic poems probably predate writing, because they were originally **recited** orally, and only written down much later. The oldest known epic poem is the Sumerian *Epic of Gilgamesh*. As with many epics, its author is unknown because it was passed down orally for generations before it was written down. Therefore, epic poems are often best viewed as the work of a culture rather than of a single author.

The word recited in the passage is closest in meaning to

(A) composed (B) narrated (C) appreciated (D) taught

2 Map making, at least in the western world, did not advance much after the time of the ancient Greeks. The Europeans of the Middle Ages rejected the belief in a round Earth for religious reasons, and this doomed their maps to be hopelessly inaccurate. However, as the Middle Ages came to an end and trade and travel between different parts of the world became more frequent, there was renewed interest in map making. The methods of the ancient Greeks were studied and **refined**, and more accurate maps were made with the aid of technological innovations, such as the magnetic compass and other navigational aids. By the beginning of the 20th century, nearly the entire surface of the Earth had been accurately mapped.

The word refined in the passage is closest in meaning to

(A) enhanced (B) rejected (C) approved (D) accepted

3 One of the major areas of interest for anthropologists is how new ideas are introduced and adopted into a civilization. Some ideas may be invented independently by several different civilizations. For example, agriculture was developed independently in China, India, the Middle East, and South America. In each of these regions, civilizations developed agriculture on their own, without knowledge of the other civilizations or their activities. Other areas adopted agriculture through a process known as **diffusion**. As European civilizations came in contact with Middle Eastern civilizations, they saw the advantages to be gained from agriculture and adopted the technology. Agriculture spread from China to other parts of Asia in the same way.

Based on the information in the paragraph, the term diffusion can best be described as

(A) the production of new agricultural methods
(B) the continuous development of civilization
(C) the process through which new technologies are spread
(D) the process through which the advantages of a society are analyzed

4 The mechanism of trade in New England and the middle colonies differed from that of the South: their lack of staples to exchange for English finished goods was a relative disadvantage, but the abundance of their own shipping and **mercantile** enterprises worked in their favor. This was not to the liking of the British, who wished to ensure their own dominance in shipping and their importance as the sole lifeline to the colonies. After 1660, the English government raised prohibitive duties against certain major colonial exports: fish, flour, wheat, and meat, while leaving the door open to timber, furs and whale oil, products in great demand in the home country. This hit the New York and New England colonies especially hard, and in the years 1698-1717 they bought more from England than they sold there, resulting in an unfavorable trade balance.

The word mercantile in the passage is closest in meaning to

(A) navigational (B) investment (C) trade (D) manufacturing

5 Since it was first diagnosed in 1981, AIDS has steadily spread into an epidemic across the United States. There are approximately 1 million Americans, or 0.06% of the total population, currently living with HIV, the viral precursor to full blown AIDS. Those infections are unevenly distributed throughout society, however. African-Americans make up nearly 50% of all cases of HIV, despite the fact that they account for only 13% of the population. The statistics for African-American women are particularly grim, with African-Americans making up 72% of all female virus carriers. Infection rates among Latin-Americans, the other major minority group in America, are similarly **lopsided**.

The word lopsided in the passage in closest in meaning to

(A) severe (B) uneven (C) discouraging (D) unjust

6 One of the most famous architects in history, the American Frank Lloyd Wright is remembered both for his nontraditional approach to architecture and for emphasizing the **dictum**, "Form follows function." That motto is the basis of "functionalism," which gave rise to many buildings, such as Wright's own design for the Guggenheim Museum in New York City. One of the world's most famous art museums, the Guggenheim Museum is built around a great helical gallery several stories in height. The gallery consists of a broad ramp along which works of art are displayed. Thus, the building's form — a structure built around a broad, helical ramp — complements its function, which is to display a large number of exhibits within a limited space and in an easily accessible setting. It has become one of the landmarks of New York City.

The word dictum in the passage is closest in meaning to

(A) fact (B) belief (C) necessity (D) hope

TYPE 02

Reference

Reference words indicate a person, object, place, or idea that has already been mentioned in a passage. The most frequently used reference words are pronouns like *it*, *they*, and *those*. The words these pronouns represent are called referents, or antecedents. Reference questions test your ability to find the referent a reference word refers to. There are 0 – 2 reference questions for each passage. This question is worth 1 point.

Sample Question

An obvious result of a disappearing middle class is the growth of the lower and upper classes. First World nations are increasingly finding their populations separated into the rich and the poor, with fewer and fewer people in the middle. In 1970, if one compared the average salaries of people with a college degree and those without one, the difference would have been 17%. Today that difference is more than 50%.

The word one in the passage refers to

(A) salary
(B) college degree
(C) salary gap
(D) job

Answer & Explanations

The answer is (B). If you compare the phrase "people with a college degree" and "those without one", you can *understand* that "those without one" means "people without a college degree." Therefore, one refers to a college degree.

Keys to Solution

❶ Carefully read the sentence that contains the pronoun and check the surrounding text for the referent. The referent will not always be the choice closest to the reference word, and may appear before or after the pronoun. The correct referent will be the only logical replacement for the pronoun.

❷ Study the examples in which reference words are used.

- **Personal pronouns**
  Jazz is a mixture of many different kinds of music. It is a combination of the music of West Africa, the work songs the slaves sang, and religious music.

- **Demonstrative pronouns**
  Nearly every other animal has a relatively heavy coat of fur to protect it from the weather. When humans began changing their environment by wearing clothes and building homes, this became unnecessary.

- **Relative pronouns**
  Nylon had many advantages: it was tough and stiff; it tended to keep its shape; and moisture could not soak into it, which discouraged the growth of bacteria.

- **Other pronouns**
  The kit fox resembles its distant cousin, the gray fox. Both have thick coats and bushy tails.

- **Pro-forms**
  The Nile waters were found to be choked with plant matter. That awful condition was caused by a shortage of rainfall in the Nile's watershed.

How the Question is Worded

- The word X in the passage refers to
- The phrase X in the passage refers to

1 The first law of thermodynamics is one of the most fundamental laws of the physical world. The first part of the first law of thermodynamics is that energy must be conserved at all times. Simply put, energy cannot be created or destroyed. Energy may change forms, or it may be transferred from one object to another, but there is always the same amount of total energy. An important concept in understanding this is the concept of a closed system. A closed system is a set of objects that are not influenced by anything outside of that system. Within a closed system, energy cannot be created or destroyed, but energy may be added to or taken out of a closed system.

The word this in the passage refers to

(A) the transfer of heat
(B) the different forms of energy
(C) the creation of energy
(D) the conservation of energy

2 The countless number of stars in the universe makes the likelihood of other solar systems very probable indeed. Thus, the existence of other solar systems, in which a collection of planets revolves around a central star, has long been hypothesized by astronomers. Until very recently, however, this had never been confirmed. While no scientist has come up with a rigorous analysis demonstrating why the relationship between the Sun and the Earth should be unique, such intuitive arguments, although appealing, are not good enough for science. For decades, scientists have strived to demonstrate that other solar systems exist.

The word this in the passage refers to

(A) the universe
(B) the countless number of stars
(C) the existence of other solar systems
(D) the fact that planets revolve around stars

3 Marine organisms have developed some novel approaches to the art of survival while getting along with neighbors — especially big, hungry **ones**. The fishes and shrimps that specialize in cleaning associations are a good example. These small, colorful marine animals make a living by picking parasites and diseased tissue off larger fishes. Such small marine animals are especially common in very crowded environments such as coral reefs. Several species of wrasses, gobies and other fishes display cleaning behavior. The banded coral shrimp is among the best known of the cleaning shrimps. This cleaning behavior can be either a full-time or part-time job. Some cleaners do it all their lives, others only as juveniles.

The word ones in the passage refers to

(A) organisms
(B) approaches
(C) survival tactics
(D) neighbors

4 It is reasonable to suppose that speech was a gradual outgrowth of the system of communication used by our pre-human ancestors — calls, gestures, or a combination of the two. In order for human speech to arise from these systems, however, they first had to undergo significant development. Apes' calls are mutually exclusive; they cannot convey two ideas at the same time. For example, there may be one vocalization that means "food," and another that means "danger." If a chimp notices a ripe banana, but at the same time spots a leopard waiting to pounce, **it** can send only one of these messages to its fellows, because a call system lacks a way of combining the messages "food" and "danger." Speech, on the other hand, permits such combinations.

The word it in the passage refers to

(A) chimp
(B) banana
(C) leopard
(D) fellow

5 From the very start, the culture of the American colonies was significantly different from its English mother culture. Many of what are seen as "American values" were present from the time of the first colonies. A good example would be the importance that American culture places on independence and individuality. These were important values to the original colonists for a number of reasons.

The first would be the religion of the early settlers. It is well known that the first settlers were largely motivated by their desire for religious freedom. Specifically, they felt that church officials in England held too much power over the members of the church. The early settlers practiced a form of Christianity that taught that it was the individual's responsibility to develop his or her own understanding of religion. This was very different from the Anglican Church in England, where priests interpreted the Bible and told people what was right and what was wrong. Instead, the early settlers felt it was their duty to interpret the Bible for themselves. This naturally gave people a sense of individuality and independence.

The phrase The first in the passage refers to

(A) value
(B) reason
(C) colonist
(D) motivation

6 Eratosthenes, one of the fathers of Greek geometry, was born in Cyrene, a Greek city in Northern Africa. He was most interested in devising a system of latitude and longitude for navigation. Such a system would allow merchants to find their location accurately at sea. In order to do this, however, Eratosthenes first needed to know the distance around the Earth. At the time, this was impossible to measure through direct observation. Even if a voyager had been able to travel around the Earth in a straight line, the ancient Greeks had no method of measuring distance accurately enough to be useful over such a long voyage.

So instead, Eratosthenes turned to the properties of geometry to solve the problem. As a young man, he had noticed that at noon on the longest day of the summer, the sun did not cast a shadow in his hometown of Cyrene. This meant that the sun was directly overhead. Later, as he studied in Alexandria, he noticed that the sun did cast a shadow at that time on the longest day of the summer. Using a pole and string, he measured the angle of the shadow, which was about 7 degrees. From this, Eratosthenes knew that the distance from Cyrene to Alexandria was also 7 degrees of the Earth's 360-degree circle, or about 2% of the total distance around the Earth. Eratosthenes came up with a figure of 47,000 km as the distance around the Earth. The true distance is 40,008 km. The inaccuracy in his number comes from the fact that he could not accurately measure the distance between the two cities.

The phrase the problem in the passage refers to

(A) the inability to develop a reliable navigation system
(B) the inability to find practical uses for geometry
(C) the inability to directly measure the distance around the Earth
(D) the inability of ancient ships to travel in a straight line

TYPE 03

Sentence Simplification

Sentence simplification questions ask you to find the best restatement of key information from long and complex sentences. To answer these questions, you will need not only a firm grasp of English grammar, but also the ability to restate information without changing its meaning. There is 1 sentence simplification question for each passage. This question is worth 1 point.

Sample Question

Hummingbirds are a unique family of bird species. Found only in the Western Hemisphere, hummingbirds are the smallest birds in the world, with some species being as small as 6 centimeters and weighing as little as 5 grams. Like most small animals, hummingbirds lead extremely active lives. During flight, their heart rate can reach up to 500 beats per minute, and this means a hummingbird's daytime life is a nearly constant search for food, as it will eat up to 15 times in one hour and will consume its own body weight in nectar over the course of a day.

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) During flight, a hummingbird's heart can reach up to 500 beats per minute in its constant search for food.

(B) A hummingbird's heart beats very quickly during flight, so it must constantly search for food and eat its weight in food daily.

(C) A hummingbird's life is a constant search for food, and since it must eat 15 times an hour, it must fly very quickly.

(D) A hummingbird's heart rate will reach over 500 beats per minute unless it is able to consume its own body weight in nectar daily.

Answer & Explanations

The answer is (B). (B) best summarizes the key idea of the highlighted sentence. This sentence can be broken into several meaningful parts as shown below

① During flight, their heart rate can reach up to 500 beats per minute, and ② this means a hummingbird's daytime life is a nearly constant search for food, as it will eat up to 15 times in one hour and ③ will consume its own body weight in nectar over the course of a day.

"A hummingbird's heart beats very quickly during flight" restates the information ①, "so it must constantly search for food" restates the information ②, and "eat its weight in food daily" restates ③. The information "as it will eat up to 15 times in one hour" is omitted in the paraphrased sentence, but this information is unnecessary and therefore can be omitted.

Keys to Solution

❶ Determine the precise meaning of the highlighted sentence. Dividing the sentence into meaningful parts helps you to grasp its correct meaning.

❷ See if the sentence makes a reference to an idea outside of the sentence. If so, you need to find what this reference word indicates.

❸ Identify key ideas and eliminate unimportant information. Information that provides examples or equivalent ideas, such as appositive phrases, is unimportant information.

❹ Decide which answer choice best paraphrases only the key information from the original sentence. You need to understand how key ideas relate to one another.

❺ Eliminate answer choices if they

- leave out important pieces of information
- contain information that is not mentioned in the original sentence
- confuse the relationship between the ideas
- generally alter the meaning of the original sentence

How the Question is Worded

Which of the following best expresses the essential information in the highlighted sentence? *Incorrect* answer choices change the meaning in important ways or leave out essential information.

1 Setting tax policy is a crucial responsibility of the government, as these policies not only ensure the funding of government programs, but also have a significant impact on the economy in general. A good example of this comes from the early 80s, when America was faced with a serious recession. The government made significant cuts in the tax rates for companies, but not for regular citizens, even though regular citizens had little money at the time. The logic behind this was that cutting individual taxes would not help, because it would only increase the amount of money consumers had to spend, without fixing the problems in supply. By cutting taxes to companies, the government allowed those companies to use the tax money they saved to increase their supply.

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) Cutting taxes would not help because it would only increase the amount of money consumers had.
(B) The reasoning for this was that cutting taxes is meaningless because it would increase consumers' money but would not increase supply.
(C) The logic behind this was that cutting individual taxes would not fix problems in supply.
(D) The logic behind this was that cutting individual taxes would not increase consumer spending or fix problems in supply.

2 It has long been known that communities often choose courses of action that are either very damaging or even fatal to the community. For example, the society that lived on Easter Island continued to practice extensive logging, even though eventual deforestation of their island led to the destruction of their society. Today, many countries around the world continue to pollute the environment, despite well documented evidence that such pollution may make life much more difficult or even impossible in the future. Such self-destructive behavior may seem like madness, but it is explained by a branch of mathematics known as game theory. Game theory attempts to explain why individuals or groups make certain decisions. A basic assumption of game theory is that every decision maker acts in his or her own self-interest. People seek to maximize their own benefit, and the welfare of others is secondary. In such situations, individual interests often conflict with the interests of the group as a whole.

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) Today, many nations continue to pollute the environment for lack of well documented evidence regarding the effects.
(B) Many nations that pollute the environment are not well aware of their actions, yet continue to do so.
(C) Even though they know the future consequences of their actions, many nations continue to pollute the environment.
(D) It is well documented that many nations pollute the environment despite the fact that this will make life impossible in the future.

3 The payment of bride price (a sum of money or goods given to the family of the bride by the groom) has quite a number of effects on African society. First, the payment of bride price acts to increase the stability of African family structures. Sons are dependent on their fathers and older relatives to help them pay the bride price of their wives, and this generally leads to greater levels of obedience and respect. The negotiations between the two families concerning the bride price allow the parents and other family members to meet and get to know one another before the marriage. Finally, since the bride price must often be repaid in case of a divorce, the bride's family often works to make sure that any marital problems are solved quickly. Bride prices also work as a system of wealth distribution in African cultures. Wealthier families can afford to support the marriage of their sons, and thus their wealth is transferred to other families.

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) Obedient and respectful sons can rely on their fathers and elders to help them pay the bride price of their wives.
(B) Sons are dependent on their fathers and elders, and this makes them more obedient and respectful.
(C) Young men must obey their fathers and elders because they need their help to pay the bride price of their wives.
(D) Sons respect the fact that their fathers and elders will help them pay the bride price of their wives.

4 Psychopharmacology, the use of mood-altering drugs to treat psychiatric conditions, is a rapidly growing field of medicine. While the use of psychiatric drugs has been in existence for over fifty years, improvements in the understanding of brain chemistry and the consequent discovery of new drug types have greatly expanded their use, and there are now drugs available for the treatment of nearly every major form of psychiatric disorder. This has undeniably led to the improvement of countless lives, but the expanded use of drugs in treating the mentally ill may have unforeseen medical and social consequences.

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) Psychiatric drugs have been around for nearly fifty years, but the improvements they can make in brain chemistry have greatly expanded their use, and there are now drugs for most mental illnesses.
(B) Although these drugs are not new, discoveries relating to brain chemistry and the resulting development of new drugs have greatly expanded the use of psychiatric drugs to include treatment of most mental illnesses.
(C) Although psychiatric drugs are not new, improvements in brain chemistry have only recently allowed them to be used to treat most mental illnesses.
(D) While psychiatric drugs have existed for over fifty years, their expanded use and the invention of new drugs now allow doctors to treat nearly every form of mental illness.

5 Valley formation occurs through a number of different erosion mechanisms. Valleys can either be U-shaped or V-shaped, and a valley's basic shape depends on how it was formed. U-shaped valleys are typically much older than V-shaped valleys. U-shaped valleys form during ice ages. During these periods, glaciers will form in V-shaped valleys created in previous eras. The intense weight of the glacier will cut into the valley, and the slow movement of the glacier means that most of its erosive force is directed to the sides of the valley rather than to the bottom. This produces a valley that has steep sides and a wide bottom. In addition to their shape, these glacial valleys can be identified by the presence of rivers or streams that are far too narrow to explain the erosion of the valley. These streams are the remainders of the streams that cut the original V-shaped valley that existed before glacial erosion.

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) Glaciers remove an intense weight from the valley because their lack of speed means that they direct most of their force to the sides.

(B) Because of its slow movement, the erosive forces created by the intense weight of the glacier will be directed horizontally rather than vertically.

(C) The intense weight of the glaciers means that they will only move at a slow pace and will cut the sides of the valley rather than the bottom.

(D) A glacier will cut the sides of a valley rather than the bottom because its intense weight resists the downward force of erosion.

6 The concept that language determines, or at least influences, our thoughts is known as linguistic determinism. The theory was first presented in the West by Wilhelm von Humbolt, a famous German linguist of the 19th century. His ideas were later expanded upon by Franz Boas, who, through his study of various languages around the world, came to realize how complete and total the differences between those various languages could be. This gave rise to the belief that if languages were so radically different, then the thoughts allowed by those languages must be quite different as well. The assumption was that in order to think something, a person had to be able to say it.

The concepts of linguistic determinism were most clearly focused in the work of Edward Sapir and his protégé Benjamin Whorf. Although Sapir and Whorf never developed an explicit theory of linguistic determinism, the ideas expressed in their numerous writings have come to be known as the Sapir-Whorf hypothesis. The Sapir-Whorf hypothesis is a less rigid theory of linguistic determinism than the earlier theories of the German linguists. **Whereas earlier linguists had claimed that thoughts are impossible without language and therefore controlled by language, Sapir and Whorf claimed that thoughts were merely influenced by language.** This difference gave rise to competing theories of strong and weak linguistic determinism.

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) While earlier linguists felt that it would be impossible to control our thoughts without language, Sapir and Whorf were not influenced by these ideas.

(B) Although Sapir and Whorf claimed that language affects thinking, they felt the earlier claims about language and thinking were impossible.

(C) Earlier linguists had claimed that thoughts and language were always connected, but Sapir and Whorf argued that this connection was not that influential.

(D) Although earlier linguists had claimed that thoughts could only exist through language, Sapir and Whorf argued that language only helped to shape our thoughts.

TYPE 04

Factual Information & Negative Fact

Both factual information and negative fact questions are based on information that is directly stated in the passage. Factual information questions ask you to choose an answer that is correct according to the passage. Negative fact questions ask you to choose an answer that is untrue according to the passage. Each passage has 3 – 6 factual information questions and 0 – 2 negative fact questions. Both question types are worth 1 point.

Sample Question

The most important scientific tools for astronomers are telescopes. This is proven by the fact that the first major discoveries about the solar system, those of Galileo, accompanied the invention of the telescope. As telescopes have increased in power over the centuries, they have allowed astronomers to make more and more discoveries about the nature of the universe. The first telescopes used glass lenses to focus their light, but most modern telescopes now use mirrors as their major light collectors. In a lens telescope, the light must pass through the lens, so the lens must be entirely perfect. But in a mirror telescope, the light simply bounces off the mirror. This means that only the surface of the mirror must be perfect, making it much easier to manufacture large mirrors. Making larger and larger mirrors for telescopes is important because a telescope's power is directly proportional to the size of its mirror. Therefore, the primary concern for astronomers is to get the largest mirror possible for their telescope.

1 Which of the following is true of lens telescopes?

(A) They were easier to make.
(B) They were more powerful.
(C) They capture light more effectively.
(D) The lens needs to be flawless.

2 According to the passage, all of the following are true of telescopes EXCEPT:

(A) In modern days, mirrors are used to gather lights instead of lenses.
(B) Mirror telescopes require a mirror with a perfect surface.
(C) Lens telescopes present no problems in manufacturing.
(D) The power of mirror telescopes increases with the size of the mirror.

Answer & Explanations

1-(D). The passage says that lens used in telescopes must be perfect so that light can pass through them.
2-(C). The passage implies that a lens telescope is more difficult to manufacture than a mirror telescope.

Keys to Solution

Factual Information

❶ Identify the key word in the question, and scan the passage for this word or corresponding idea. Carefully read the related information.

❷ The correct answer is a restatement of particular information from the passage. Therefore, while the wording may be different, the similar ideas should be apparent.

❸ Exclude answer choices that contain

- information that is contradicted by the passage or not mentioned in the passage
- information that is stated in the passage but is irrelevant to the question

Negative Fact

❶ Identify key words from the question, then scan the passage to find these key words in their original context.

❷ As with factual information questions, the correct answers will be paraphrased. It is important to recognize corresponding ideas.

❸ Use the process of elimination. By identifying correct statements of information one by one, you will eventually find the incorrect one.

How the Question is Worded

Factual Information

- According to the paragraph, which of the following is true of X?
- According to the paragraph, X did Y because

Negative Fact

- According to the passage, which of the following is NOT true of X?
- The author's description of X mentions all of the following EXCEPT:

1 People who eat meat usually get enough protein and the correct balance of amino acids. People who are vegetarians, whether for philosophical, aesthetic, or economic reasons, have to be careful that they get enough protein, and in particular, the essential amino acids. Increasing recognition of the role of plants as a major source of amino acids for human populations has led agricultural scientists to develop high-protein strains of food plants and plants with essential amino acids, such as "high lysine" corn.

What kind of plants are the scientists now trying to develop for vegetarians?

(A) Plants without amino acids
(B) Plants that offer nutrients similar to those in meat
(C) Plants that produce higher calories than meat
(D) Plants with no calories

2 Acid rain is rain that has unusually high levels of acid in it, and is a result of air pollution. When fossil fuels are burned, they release chemicals containing sulfur and nitrogen into the air. Once in the air, these chemicals combine with water vapor to form sulfuric and nitric acids, which then return to Earth when it rains. Since it is the result of burning fossil fuels, acid rain presents the greatest problems in industrial nations that rely heavily on coal as a source of energy. More advanced nations, such as the United States and many parts of Western Europe, have developed technology that reduces the amount of sulfur and nitrogen released from their power plants. They are therefore at least partially able to control their acid rain problems.

According to the paragraph, advanced nations are less susceptible to acid rain because

(A) they consume less energy
(B) they have the technology for cleaner energy production
(C) they have the technology to separate the acid from the rain
(D) they have stronger environmental laws

3 Modernism was probably the most influential intellectual and artistic movement of the 20th century. Modernism is difficult to define because it has many aspects, but it is essentially the complete rejection of the artistic values of the previous centuries. Artists like Picasso abandoned traditional attitudes towards perspective and realism, and created highly fragmented and abstract works. Similarly, many writers abandoned traditional structures of writing. T.S. Eliot dispensed with structure and organization in his poetry to create "free verse" poetry, which followed none of the established poetic rules. In the sphere of music, composers began to experiment with new sounds, focusing on the destruction of harmony rather than the creation of it.

According to the paragraph, what is a common characteristic in all forms of modernism?

(A) The rejection of artistic tradition
(B) The strong influence of intellectuals
(C) A fear of experimentation
(D) A lack of any attempt to define its purpose

4 To the naked eye, planets and stars may appear to be similar, but they are really very different. Stars are very hot and shine with their own light, whereas planets are much cooler and do not shine on their own. The light one can see from a planet is actually reflected sunlight. As the sun's light hits a planet, some of it is reflected back into space. So while it appears that planets shine with their own light, this is really just an illusion.

Planets maintain the same orbit century after century through a delicate balance of speed and gravity. As the planets orbit around the sun, their circular motion tends to push them outwards. Anyone who has ridden a merry-go-round has experienced the same effect. That outward push is exactly *balanced by the* sun's gravity, which pulls the planets towards the sun. This balance keeps the planets in their assigned orbits.

Many of the planets also have moons that travel around them as they travel around the sun. Earth has one moon. Mercury, Venus, and Pluto have none. Jupiter, in contrast, has twelve moons. Mars and Neptune have two. Uranus has five, and Saturn has nine.

All of the following are true of planets EXCEPT:

(A) They produce their own light.
(B) They travel in fixed orbits.
(C) They are affected by the sun's gravity.
(D) They are visible by reflected sunlight.

5 During the advent of the Industrial Revolution, widespread social acceptance of child labor meant that children made up a large percentage of those who moved from the farm to the factory. In 1833, nearly two-thirds of the factory workers in Leeds, a major industrial center in England, were under the age of 15. Nor was England the only nation where children formed a majority of the factory workforce. As the Industrial Revolution spread throughout Europe and the United States, so did this new form of child labor. Child labor in Industrial Revolution factories, however, quickly proved to be far less benign than child labor on the homestead. With no legal safeguards, children working in the factories of this time were little more than the property of indifferent factory owners. It was typical for a child to work more than ten hours a day under miserable conditions for 30-40% of the wages paid for an adult. Furthermore, children were subjected to harsh punishments when they failed to keep pace with older workers. Children were routinely whipped, dunked in cold water, or subjected to other inhumane punishments when they failed to meet their work quotas. Children who ran away to escape such treatment were occasionally chained to their work stations.

The author mentions all of the following as hardships for child laborers during the Industrial Revolution EXCEPT:

(A) long work hours
(B) low wages
(C) severe punishments
(D) random firings

6 Map making, or cartography, is an activity of vital importance for human civilization. Maps improve the speed and safety of travel, allow civilizations to set the boundaries of their territories, and occasionally by their absence inspire further exploration of the world. The first known maps date to around 7000 BC. Considering that earlier civilizations were hunter-gatherers with no cities or towns to mark on their maps, this seems logical. The earliest maps are indeed maps of cities, and may have been used by city planners. World maps at this time were next to useless. Early civilizations knew very little about the wider world around them. Long distance travel was extremely difficult, and so the world maps of early civilizations were based largely on their religious beliefs.

The first civilization to take a scientific approach to map making was the ancient Greeks. The ancient Greeks, incidentally, were also the first ones to have an accurate view of the shape of the world. This knowledge was a crucial element in the Greek system of map making. It was the Greeks who first developed the system of latitude and longitude that we still use on maps today. Understanding that the world was a sphere allowed the Greeks to divide their maps according to a 360 degree system. This turned the world into a grid, on which they could precisely describe any location. While the Greek system of map making was a good one, Greek maps were still quite inaccurate because they had no accurate means of measuring distance at the time.

According to the passage, all of the following are results of map making EXCEPT:

(A) increased international trade
(B) faster, safer travel
(C) the ability to mark territory
(D) motivation for exploration

Solar Activity

Like Earth, the sun has several different forms of visible activity, or weather. But unlike Earth, the sun's weather is created by forces deep within the sun rather than in its atmosphere. The sun is made of electrically charged particles, which create a strong magnetic field around the sun. Because the sun rotates slightly faster at its equator than it does at its poles, this magnetic field slowly gets pulled out of balance. A helpful analogy is to think of the sun's magnetic field as a giant rubber band. As the sun rotates, the rubber band slowly twists, becoming tighter and tighter.

It is this rising imbalance in its magnetic field that gives the sun its first form of weather. As the magnetic field of the sun gets twisted, it gets focused on one part of the sun's surface, resulting in an area where the magnetic field is much stronger than on the rest of the sun. This incredibly strong magnetic field prevents heat from rising up from the center of the sun to this area of the surface. The result is an area of the sun's surface which is cooler than the rest of the surface. Because they are cooler than the rest of the sun, these sunspots appear to be darker. These dark spots can be several times the size of Earth, and astronomers have noticed them for hundreds of years. Sunspots appear to follow an 11 year cycle of activity. Although no one has been able to adequately explain the causes for this cycle as of yet, it seems that the height of the cycle represents the time of greatest imbalance in the sun's magnetic field, resulting in more sunspots.

➡ Eventually, the magnetic field around a sunspot will become so twisted that it will snap. All the energy that has been stored in the twists of the magnetic field will be released in one moment. The result is a huge jump in temperature called a solar flare. In as little as ten seconds, the temperature will rise to as much as 20 million degrees, up from about 1 million. Solar flares also release huge amounts of radiation, primarily in the form of x-rays, into space. When this radiation reaches the Earth, it can damage satellites and affect weather patterns.

1 The word **imbalance** in the passage is closest in meaning to

(A) power
(B) rotation
(C) uncertainty
(D) inequality

2 How does the sun's magnetic field create **sunspots**?

(A) It limits the light emitted by the sun.
(B) It focuses the sun's charged particles in one area.
(C) It prevents the internal heat of the sun from rising.
(D) It makes some areas of the sun's surface larger than others.

3 The word **adequately** in the passage is closest in meaning to

(A) sufficiently
(B) scientifically
(C) easily
(D) productively

4 The word **it** in the passage refers to

(A) sun spot
(B) magnetic field
(C) energy
(D) radiation

5 All of the following are true of solar flares EXCEPT:

(A) They are the final result of the imbalances in the sun's magnetic field.
(B) They result in a rapid increase in the surface temperature of the sun.
(C) They have little effect on the Earth because of their distance.
(D) They release large amounts of X-rays into space.

Paragraph 3 is marked with an arrow [➡].

The Robber Barons

➡ As an economic system, capitalism assumes that open markets and free competition are always of benefit to the customer. The idea is that in order to compete in an open market, a company must offer higher quality products at a lower cost than its competitors. The result of this competition is that the consumer gets the best possible product at the lowest possible cost. Another assumption of capitalism is that governments must refrain from regulating or interfering in the business practices of companies because this prevents free competition. The problem, however, is that this system relies on companies operating in an honest and ethical manner, which is not always the case.

➡ In the 19th century, America was still a developing nation in many ways. The Industrial Revolution was rapidly transforming much of the nation. However, the US was still a rustic, backward nation when compared with the great nations of Europe. Much of the country's territory was undeveloped and lacked even basic infrastructure, such as usable roads and electricity. Therefore, the focus of the United States during this period was on development, and the men driving this development were the robber barons.

The robber barons were not actually nobility. They were the leading businessmen of the time. They owned the factories, shipyards, and railway companies that built the infrastructure America lacked, and they became very rich doing this. The robber barons got their name from the fact that many of the business practices they used were dishonest, and sometimes even criminal. Willing to do whatever was necessary to ensure their dominance in business, the robber barons bribed officials, threatened competitors, took advantage of their employees, and cared little for the environmental impacts of their industries. In creating their vast business empires, the robber barons routinely engaged in anti-competitive business practices to destroy their competitors. The result was that their brand of capitalism was not beneficial to the consumer. Without the threat of real competition, the robber barons were able to set prices as they liked, and they had no real pressure to improve the quality of their products.

1 According to paragraph 1, in what way does capitalism benefit the customer?

(A) It ensures that businesses operate in an ethical manner.
(B) The competition it creates ensures lower prices and higher quality products.
(C) It prevents the government from interfering in business.
(D) It increases the level of competition among customers for high quality products.

Paragraph 1 is marked with an arrow [➡].

2 The word **refrain** in the passage is closest in meaning to

(A) prohibit
(B) acknowledge
(C) resist
(D) institute

3 The phrase **this system** in the passage refers to

(A) government regulation
(B) capitalism
(C) beneficial business practices
(D) operating in an ethical manner

4 According to paragraph 2, what difficulty did America face in the 19th century?

(A) It lacked effective forms of business management.
(B) It lacked the territory to become a developed nation.
(C) It could not deal with the rapid transformations of the Industrial Revolution.
(D) Large portions of its territory were far less developed than Europe.

Paragraph 2 is marked with an arrow [➡].

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 robber barons used a number of dishonest methods to make sure that they were at the top of their businesses.
(B) The robber barons bribed officials and threatened other businesses because they were dominant in their businesses.
(C) Although they bribed officials and damaged the environment, the robber barons were willing to do whatever was necessary in business.
(D) The robber barons were willing to do anything in order to continue bribing officials and threatening their competitors.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. d_____ : *n.* cutting down all trees in an area
2. l_____ : *n.* the imaginary line around the earth that represents distant from the equator
3. l_____ : *n.* imaginary line that crosses from the North Pole to the South Pole
4. p_____ : *n.* an organism that lives on or in another organism in order to get food from it

B Choose the right meaning for the words in bold.

1. Because of **unforeseen** events, we had to change the date of the company's move to a new building.
   (A) unexpected (B) invisible (C) unnoticeable (D) unrealistic

2. Conditions that are **unfavorable** for some businesses are very good for other businesses with different needs, markets, and products.
   (A) ideal (B) normal (C) rare (D) disadvantageous

3. The discovery of a small planet around a distant star **confirmed** that the theory of planet formation was correct.
   (A) questioned (B) contradicted (C) raised (D) proved

4. The cost of a new car was **prohibitive**, so the family bought a used car at lower cost instead.
   (A) fair (B) expensive (C) normal (D) changing

C Choose the right word for the blank in each sentence.

1. Anyone who comes in _____ with an infected person is at risk of becoming ill and should see a doctor.
   (A) formation (B) consequence (C) acceptance (D) contact

2. Because the tumor was in an _____ location, doctors could not remove it by surgery and instead used other treatments.
   (A) circular (B) durable (C) inaccessible (D) rustic

3. The athlete was _____ to so many injuries that he had to retire from his sport.
   (A) contributed (B) subjected (C) motivated (D) transferred

4. To _____ sales, the company advertised its new product heavily on a number of popular websites on the internet.
   (A) devise (B) maximize (C) emphasize (D) predate

CHAPTER

02

Making Inferences

Type 5. Inference

Type 6. Rhetorical Purpose

Type 7. Sentence Insertion

- Reading Practice 1
- Reading Practice 2

Question Types

TYPE 05

Inference

Inference questions test your ability to understand information that is only implied, not directly stated in the passage. Inferences can be made by using a set of facts directly stated in the passage to draw logical conclusions. There are 0 – 2 inference questions for each passage. This question is worth 1 point.

Sample Question

Midden analysis is the analysis of the trash piles of ancient civilizations. What people throw away can tell archaeologists a great deal about a culture. Animal bones and vegetable remains can provide important clues about the diet of ancient peoples. Discarded tools tell us of their occupations. Broken pottery, scraps of clothing, and other personal objects can tell us of their lifestyles. Furthermore, midden analysis can often tell us a great deal about the habitat in which a people lived. Chemical analysis of plant matter, for example, provides information regarding temperatures, average rainfall, and other climatic information about the time period.

What can be inferred from the passage?

(A) Middens only exist in certain climates.
(B) Climate affects the chemistry of plants.
(C) What people throw away changes in different climates.
(D) Middens are generally layered according to temperature changes.

Answer & Explanations

The answer is (B). We know the fact that chemicals in plant matter tells us information about climate in the period when the plant lived. We can infer from this fact that climate has an effect on the chemistry of plants.

Keys to Solution

❶ Find a key word in the question and scan the passage for the key word or corresponding idea. Read the related information carefully.

❷ It is essential to have a thorough understanding of the passage. An inference should always be made based on the facts stated in the text. An incorrect understanding of the text will only lead to incorrect inferences.

❸ Do not look for answer clues outside of the passage. Personal experiences, beliefs, or values will not help you make correct inferences. Everything you need to solve the problem is provided in the passage.

❹ Familiarize yourself with various types of inference questions, and use different strategies depending on the question.

- Some inference questions are based on a single statement, or connections between several statements in the same part of the passage.
- Some inference questions ask you to find a conclusion that is implied throughout an entire paragraph, or several paragraphs.
- Some inference questions may ask you to predict a possible outcome by applying rules, laws, or principles discussed in the passage.

How the Question is Worded

- Which of the following can be inferred about X?
- The author of the passage implies that X
- Which of the following can be inferred from paragraph 1 about X?

1 Core sampling is an essential tool for scientists wishing to investigate the geologic history of the Earth. In core sampling, a hollow drill is used to drill into the Earth. The material contained in the hollow section of the drill can then be brought up and studied. Core sampling can be conducted in any area (and with any material) where the Earth is stable enough to form layers. A good example would be the ocean floor. On the ocean floor there is almost no activity to disturb the layering process. There are no waves or human activity to disturb the sediment. Therefore, sediment builds up in progressive layers, with each layer being older than the one on top of it.

From the passage, it can be inferred that core sampling

(A) is a relatively new technique in geology
(B) is not very useful near human population centers
(C) was first developed for deep sea exploration
(D) can be performed even in cases of mixed sediment

2 In chemistry, a redox reaction is one in which one chemical is oxidized (loses electrons) and one chemical is reduced (gains electrons). Redox reactions are some of the most common chemical reactions in the natural world and are the result of the differences in the electronegativities of two chemicals. Electronegativity is a chemical property which describes the ability to draw electrons from other chemicals. Chemicals that have a strong ability to take electrons from other chemicals are said to be highly electronegative, while those that tend to lose electrons easily are said to be electropositive.

A common example of a redox reaction would be the formation of rust. Rust forms when iron, a highly electropositive metal, comes into contact with water. When this happens, iron loses electrons to the oxygen atoms in water. The oxygen atoms and the iron are then bound together to form a new chemical compound, iron oxide (rust). The formation of rust happens more quickly in salt water because salt water is more electrically conductive than regular water and thus allows the electrons to move from the iron atoms to the oxygen atoms more easily. Because many metals are highly electropositive, they also undergo similar chemical reactions when exposed to water. Aluminum, for example, will react to form aluminum oxide, another common form of rust.

What can be inferred about oxygen?

(A) It is necessary for all redox reactions.
(B) It is present in higher concentrations in salt water.
(C) It is an electronegative chemical.
(D) It will only react with metals.

3 The art form of the opera was first developed in the Italian city of Florence during the 1590s. At the time a group of composers and artists known as the Camerata were interested in injecting story telling into music. They were inspired by the belief that the great tragic plays of ancient Greece had been sung rather than simply acted. Another motivation may have been the desire of the composers to find an alternative to the production of music for the Church, which they found rigid, conventional, and oppressive. This is supported by the selection of material for the opera. Early composers took their material from the mythologies of ancient Rome and Greece, which were full of plots, betrayals, and love affairs. From the very beginning, the sobriety of the Church had little place in opera.

It can be inferred from the passage that early operas

(A) were always performed in Greece
(B) rarely, if ever, dealt with religious topics
(C) placed more importance on creativity than quality
(D) were only made by the most talented composers

4 The properties and chemical composition of sea water can change drastically with changes in temperature and salinity. Both temperature and salinity (the amount of salt that is dissolved in sea water) affect the density of water. In turn, density affects the ability of a substance to float. Less dense substances will rise above denser substances, as is seen with oil and water. These two facts account for the fact that the ocean has two distinct layers, surface water and deep water, which are separated by the thermocline.

Sea water is not perfectly clear; sunlight only penetrates through the first few hundred feet of sea water. As a result, all of the sun's heat is absorbed by this upper layer of sea water. Wave action mixes this water together fairly evenly, and so the temperature is fairly uniform. Beyond the reach of sunlight and wave action, however, the temperature of the ocean drops rapidly, more than 20°C in a few hundred feet. Beyond this point, the temperature of the water continues to drop, but at a far slower rate. The result is two layers of water with very different densities. The layer of rapid temperature change that separates these two layers is called the thermocline. Nearly 90% of the world's water is below the thermocline, but the vast majority of sea life lives above the thermocline.

Based on the information in the passage, what can be inferred about water below the thermocline?

(A) It exists mostly as ice.
(B) It has a higher density.
(C) No life can survive below it.
(D) It is only a small fraction of the Earth's water.

5 The custom of paying a bride price before marriage is still a well-established part of many African cultures. In paying a bride price, the family of the groom must provide payment to the family of the bride before the marriage is allowed. The bride price can vary greatly from culture to culture in Africa. In the Zulu *and Swazi tribes* of southern Africa, the bride price often takes the form of cattle. The actual payment of money sometimes takes place, but payment in goods is more frequent. The amount paid in a bride price can also vary. In modern times the bride price is occasionally quite small, and its value is mainly symbolic. However, the bride price can still be quite high, especially among prominent or highly traditional families.

There are a number of justifications used to explain the payment of bride price. The first is that the bride price represents an acknowledgement of the expense the bride's family has gone to in order to raise her and bring her up as a suitable bride for the groom. It also represents payment for the loss of a family member, since the bride will officially become a member of her husband's family and will leave her own. On a deeper level the bride price represents payment for the fact that the bride will bring children into the family of the groom, thereby increasing the wealth of the family. This concept is reinforced by the fact that the bride price must often be returned if the bride fails to bear children.

It can be inferred from paragraph 2 that African families

(A) place great importance on childbirth
(B) never see their daughters after marriage
(C) pay the bride price on the day of the wedding
(D) place more value on men than women

6 One of the most curious aspects of the enslavement of Africans in the New World is that they wrote about the severe conditions of their bondage. In the long history of human bondage, it was only the black slaves in the United States who created a body of literature that both testified against their captors and portrayed the urge of every black slave to be free and literate. Hundreds of ex-slaves felt compelled to tell their tales in anti-slavery lectures in the North and in the written form of the autobiographical narrative. As several scholars have shown, there is an inextricable link in the Afro-American tradition between literacy and freedom. As Ishmael Reed put the matter in his fictional slave narrative, *Flight to Canada* (1976), the slave who somehow learned to read and write was the first to run away.

There were several reasons for the tendency of literate slaves to run away. First of all, the slave who could read and write had a much higher chance of reaching the North than the slave who could not. Literate slaves could read maps and plan their route more carefully. They could also write themselves fake passes which explained why they were away from their master's plantation. Aside from these practical advantages that literacy provided, it often provided the motivation to run away as well. Literate slaves were able to read for themselves. This allowed them to see past the lies of their masters, who had taught them that slavery was their natural place in the world. The realization that this was not the case often brought the first thoughts of running away to the North.

Which of the following can be inferred about African slaves in America?

(A) They didn't want to take revenge on their masters.
(B) Chances of illiterate slaves' successful flight were very low.
(C) Many slaves were able to read or write.
(D) Their conditions were worse than those of slaves in the past.

TYPE 06

Rhetorical Purpose

It is the job of every writer to effectively and efficiently convey understanding of the subject to the reader, whether the purpose of the text is to inform, criticize, or even entertain. To achieve this, various rhetorical methods may be employed. For example, the writer may give examples, use allegories, or make comparisons and contrasts, all in the name of making the message clear. In *i*BT TOEFL reading, rhetorical purpose questions usually ask what kind of role a specific detail plays in relation to a paragraph, and how it aids in the audience's understanding of the subject. Along these same lines, you may also be asked to identify rhetorical relationships between paragraphs or within the passage as a whole. There are 0 – 2 rhetorical purpose questions for each passage. This question is worth 1 point.

Sample Question

It has long been an accepted fact that changes in environment can have a great impact on evolution. Changes in environment present new challenges that a species must adapt to or face extinction. Instances illustrating this fact are numerous. Climatic changes 64 million years ago led to the extinction of the dinosaurs and the emergence of mammals. Rapid changes in the African climate led early hominids to develop larger brains that would later characterize them as human. The introduction of antibiotics in medicine has led some diseases to evolve so that they are more resistant to these medicines. These are just a few of the ways in which environmental changes help drive evolution.

Why does the author discuss antibiotics?

(A) To explain how humans treat certain diseases
(B) To give an example of how an organism can adapt to changes in its environment
(C) To discuss how the creation of medicine can sometimes endanger human health
(D) To show that the effects of evolution are not always positive

Answer & Explanations

The answer is (B). The main idea is that the organism inevitably has to adapt to environmental changes. All of the examples illustrate ways to adapt to the challenges caused by environmental changes.

Keys to Solution

❶ Read the question and locate the section of the passage that contains that particular information. As you read, figure out how this information relates to the main idea. For example, the question may deal with information that:

- exemplifies or supports a main idea
- clarifies an unfamiliar concept that a paragraph discusses
- refutes or supports a certain argument
- compares or contrasts one thing with another
- provides a solution or answer to a problem

❷ It is very helpful to familiarize yourself with various ways of organizing ideas in a passage.

- definition
- comparison and contrast
- problem and solution
- cause and effect
- classification

❸ Memorize expressions frequently used in answer choices.

- to give / provide an example of
- to argue
- to contrast A to/with B
- to compare A to/with B
- to note
- to show / illustrate / demonstrate
- to emphasize
- to identify
- to describe
- to suggest
- to give evidence that
- to explain
- to differentiate
- to support

How the Question is Worded

- **The author discusses X in paragraph 1 in order to ...**
- **Why does the author mention X in paragraph 1?**
- **In paragraph 1, the author uses Y as an example of ...**
- **In paragraph 1, the author explains the concept of X by ...**

1 The Earth's magnetic field is roughly in line with its axis of rotation, and in places extends for tens of thousands of miles beyond the Earth. The magnetic field of the Earth, however, is not entirely stable. Each year the exact location of the magnetic poles can drift up to 15 km. Any number of factors can lead to local or temporary disturbances in the magnetic field. Furthermore, the overall strength of the Earth's magnetic field is currently weakening. Finally, there is considerable evidence that the Earth's magnetic field has undergone a large number of major shifts and reversals throughout the history of the Earth.

The author discusses the instabilities in the Earth's magnetic field by

(A) mentioning current decreases in its size
(B) giving examples of magnetic fluctuations
(C) explaining the role of the axis of rotation in creating instabilities
(D) mentioning various theories of what causes those instabilities

2 The French colonial empire began with the discovery of the New World at the end of the 1400s. The French had gotten off to a slow start because of a series of wars with Spain. Eventually, however, France established colonies in the Caribbean as well as in both North and South America. France lost much of its North American territory to England in the French and Indian Wars of the 1750s, and it lost Haiti, its most prized colony in the Caribbean, to a slave revolt in 1801. When it sold the remainder of its North American territory to the US in the Louisiana Purchase of 1803, it appeared that France was losing interest in its American colonies. Actually, chaos at home made it impossible for France to keep control of its colonies. The French Revolution, the rise of Napoleon, and the resulting European wars required all of France's attention and resources.

Why does the author mention Napoleon?

(A) To better illustrate the true reasons for France's withdrawal from its American colonies
(B) To better demonstrate his ineffectiveness as the leader of a colonial power
(C) To discuss his role in enabling the Louisiana Purchase
(D) To explain the return of France to active colonization

3 Thousands of years ago, human beings lived in dark, dank caves. Today, some people are living in light, dry ones. Why are people moving back into caves? Will you be living in a cave someday? A cave may not be everyone's idea of a dream home, but it can offer an alternative to other types of housing.

In fact, building underground is not a new idea. Subterranean factories are standard in Sweden. In Japan, it is also a regular practice to build shopping areas below ground. In addition, Kansas City, Missouri, is home to the world's largest underground business complex, known as **Subtropolis**. If living, working, and shopping underground seem plausible to you, there may be a cave in your future.

Why does the author mention Subtropolis in Kansas City?

(A) To contrast it to the subterranean factories in Sweden
(B) To stress that building underground is not an uncommon practice
(C) To explain why some people prefer to live underground
(D) To argue that subtropolises will be widespread throughout the world in the future.

4 Cultivation theory, first developed by sociologist George Gebner in the 1960s, attempts to explain the effects that mass media have on the attitudes of the public. In its simplest form, cultivation theory says that mass media, such as television and radio, help to form our view of the world. Our understanding of how the world works and our feelings about the world are heavily influenced by mass media.

According to cultivation theory, the more a person is exposed to mass media, the more that person relies on mass media for an understanding of reality. This is important because what is shown as reality in the mass media is often quite different from what actually happens in the real world. For example, if a person watched a great number of **police dramas** on TV, that person might believe that police are frequently involved in gun battles with criminals. But in real life, most police go through their entire careers without ever firing their weapons. This is just one example of how mass media can give the public an inaccurate view of reality. In another example, television typically shows characters that are attractive and wealthy, leading to the unrealistic expectation that most people in real life should be attractive and wealthy also.

The author mentions police dramas in order to

(A) suggest a cause for the violence in society
(B) illustrate how mass media creates inaccurate views of reality
(C) illustrate the negative effects of violent TV shows
(D) suggest that people should not watch such TV shows

5 The end of the American Civil War was supposed to bring freedom to the African-American slaves; and for a while it did. After the war, the southern states were controlled by the Northern army in a military government. During this time, African-Americans enjoyed relatively equal treatment in the South. As the southern states were slowly readmitted into the Union and the Northern army withdrew, however, many of the freedoms that African-Americans had gained were again taken from them.

The first attack on African-American freedoms came in the election of 1876. White southerners used violence and intimidation to keep African-Americans from voting in this election. The result was a southern government that was entirely white and hostile to African-Americans. Southern states quickly passed a number of laws intended to keep African-Americans from enjoying the freedoms they had won. Informally known as the Jim Crow laws, these laws basically separated whites and African-Americans in the South. African-Americans were prohibited from eating in the same restaurants, going to the same schools, or even using the same water fountains as whites.

The most damaging laws to African-Americans, however, were the voting laws. The southern states passed laws requiring literacy tests and a special voting tax for all voters. While some African-Americans could pass the literacy test, few could afford to pay the voting tax. These two laws were very effective in limiting the political power of African-Americans. In 1900, Alabama had 181,000 African-Americans who were old enough to vote, yet only 3,000 were actually registered to do so. The voting laws ensured that African-Americans had no voice in government and no effective way to fight against their unfair treatment.

Why does the author mention African-American voters in Alabama in paragraph 3?

(A) To suggest that the Jim Crow laws were most severe in Alabama
(B) To show the effectiveness of the Jim Crow laws in excluding African-American voters
(C) To show that while African-Americans had large numbers, they lacked political organization
(D) To better illustrate the small proportion of the African-American population that could read and write

6 Establishing the dates for the artifacts they find is one of the chief jobs of archaeologists. Modern archaeologists have a number of highly accurate scientific methods to determine the date of an artifact, but in the early days of archaeology, this was mainly done through guesswork. The first attempt to develop an organized system for dating artifacts came in 1820, when Christian Thomsen, a Danish archaeologist, suggested his three-age system. The basis of Thomsen's dating system was the examination of tools found at an archaeological site. According to Thomsen, all early cultures had progressed from first using stone tools to bronze tools and finally to iron tools. Thus, if bronze tools were found at a site, an archeologist could say with certainty that the site came after the Stone Age but before the Iron Age. Analyzing the sophistication with which tools were made could help further identify the time period for a site. High quality stone tools would indicate the site came from the late Stone Age, while simpler stone tools would suggest it came from the early Stone Age.

Thomsen's dating system, however, has a number of problems. First, while his system is helpful for dating sites within the same culture, it is not very effective in dating sites from multiple cultures. Different civilizations adopted the new technologies of bronze and iron at different times, and one culture may have still been in the Bronze Age while another culture had already progressed to the Iron Age. Furthermore, some civilizations never adopted these technologies, or skipped steps. The peoples of the Sahara, for example, went directly from using stone tools to using iron tools, skipping the Bronze Age entirely. Another example would be the Maya civilization in Central America, which never progressed beyond stone tools.

Why does the author mention The peoples of the Sahara ?

(A) To show that Thomsen lacked knowledge of African cultures
(B) To prove that the three-age system is flawed
(C) To explain why the Bronze Age should be eliminated from the three-age system
(D) To suggest that these cultures were more advanced than those Thomsen studied

TYPE 07

Sentence Insertion

Sentence insertion questions ask you to determine the most logical place where a given sentence should be put. These questions present an extra sentence in bold and ask you to place it in one of four possible places, marked by squares [■]. Select the square that represents the most logical place for the insertion sentence. There is 1 sentence insertion question for each passage, and it is always the next-to-last question. This question is worth 1 point.

Sample Question

The horseshoe crab is one of the world's oldest creatures. A But now these crabs may be in danger. B Each spring they come onto shore during the high tide to lay their eggs. C At the same time, thousands of sea birds arrive to feast on the crab eggs. D Now, however, there are fewer crabs making the journey to land. As horseshoe crabs make good fishing bait, fishers come to the shores and scoop up the female crabs before they can lay their eggs. The fishing business may be taking as many as two million crabs each year from eastern shores.

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

In fact, they predate the time of the dinosaurs.

Where would the sentence best fit?

Answer & Explanations

The answer is square A. The first sentence says that the horseshoe crab is one of the oldest creatures. The insertion sentence emphasizes the first sentence by saying it is older than the dinosaurs. Therefore, the insertion sentence should be placed after the first sentence.

Keys to Solution

❶ Reading passages in the TOEFL *i*BT are written coherently and have a logical flow, with or without the insertion sentence. Don't waste time looking for spots where the sentence will clear up an illogical or incoherent discussion. Instead, look for places where it simply provides additional relevant information.

❷ See if there are any reference words such as pronouns and pro-forms in the insertion sentence. Reference words provide hints for the correct location because they refer to previously mentioned nouns and ideas. Look for such referents in surrounding sentences, and these will indicate where the insertion sentence belongs.

❸ See if there are any transitional words or phrases in the insertion sentence. Such transitions indicate the function of an insertion sentence, like explaining a sequence or providing an example. Examine the context of the discussion and determine where such transitions logically fit.

❹ Double-check the passage after inserting the extra sentence. Read it again to make sure that the passage makes sense with the insertion sentence. If the flow is illogical or unnatural, find another place to put the insertion sentence.

How the Question is Worded

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

[You will see a sentence in bold]

Where would the sentence best fit?

Basic Drill

1 Stoicism was one of the many philosophical movements which originated in Athens during its golden age. First formulated by Zeno of Citium in 301 BC, stoicism stresses indifference to both pleasure and pain, whether in a physical or emotional form. Stoics hold that reason should be the sole guide of one's actions, and that passions, such as pleasure and pain, cloud one's reason. **A** Stoics train themselves to lead a materially simple life. **B** Luxuries are to be avoided. **C** Similarly, stoics seek to lead an emotionally simple life, free of emotional entanglements. **D** Stoics taught themselves to live apart from their society, at least in an emotional sense.

Choose the correct square [■] where the given sentence should be added.

To a stoic, the ability to think clearly is the greatest of all virtues, and anything that impairs this ability should be avoided.

2 Although the works of James Fenimore Cooper are generally considered to be of low literary quality today, Cooper's novels have an important place in the history of American literature for a number of reasons. First, his hero, Natty Bumppo, served as a model for later heroes in American fiction. Even more than 150 years later, one can still see Bumppo's qualities of rugged individualism mirrored in the modern action heroes of books and films. Secondly, Cooper's novels awakened a hunger for truly American novels. Before Cooper's time, American readers had generally looked to European authors as the source of much of their literature. These novels naturally dealt with European issues rather than American ones. **A** After the success of Cooper's novels, however, Americans were no longer content with this situation. **B** They began to demand novels that took place in American settings and dealt with American issues. **C** Therefore, Cooper's novels were influential in promoting the growth of American literature in general. **D**

Choose the correct square [■] where the given sentence should be added.

In short, they wanted novels for Americans, written by Americans.

3 The ideas of Charles Darwin had significant effects well beyond the areas of biology and ecology. The basic premise of Darwin's ideas — the concept that organisms must adapt or face extinction — made its way into the social theories of the 19th century as well. **A** Social Darwinism, the adaptation of Darwin's ideas to human societies, was the dominant social philosophy of the 19th century. **B** In its basic form, Social Darwinism claimed that the same forces which cause the evolution of organisms caused the evolution of societies as well. **C** According to this view, it was natural that societies which were better adapted to the pressures of the era would advance and oppress those which were not so well adapted. **D** Therefore, every society was locked in a struggle for supremacy against its neighbors.

Choose the correct square [■] where the given sentence should be added.

Simply put, Social Darwinism stated that the rise and fall of cultures was governed by the survival of the fittest.

4 The forest canopy is defined as the upper reaches of the forest. A It is composed of large, slow-growth trees, which rise high above the forest floor and then spread their branches over a wide area. B Examples of canopy trees would be pines, oaks, and redwoods. C They rise as a straight column of wood for many feet, and then, at their tops, branch out to spread a heavy layer of leaves. D In this way, canopy trees are able to absorb the largest amount of sunlight. In fact, canopy trees have such a monopoly on sunlight in the forest that they are responsible for nearly 90% of all photosynthesis that occurs.

Choose the correct square [■] where the given sentence should be added.

What distinguishes these trees is that they have little or no leafage at their lower levels.

5 In a direct democracy, the power of decision making lies directly with the public. The public chooses its leaders, votes on its laws, and is actively involved in the major decisions of society. The power of a direct democracy is based on three principles: the power of initiative, the power of referendum, and the power of recall. A The power of initiative is the power to raise issues that should be voted on. B In a direct democracy, any citizen can, in theory, suggest a new law or policy. C In practice, issues are usually raised through petitions. D The power of referendum is simply the power to approve or reject initiatives through a direct vote. In this way, citizens in a direct democracy are actively involved in creating their own laws. The final principle of a direct democracy is the power of recall. Under the power of recall, the public has the right to remove government officials it is unhappy with. This means that the leaders of the nation are directly responsible to the public, since they can basically be removed from office at any time.

Choose the correct square [■] where the given sentence should be added.

If a citizen can get a certain number of signatures for his or her idea, that person can force the society to vote on the idea.

6 An important idea in economics is Say's Law of Markets, which attempts to explain recessions. Recessions are temporary downturns in the economy characterized by increased unemployment, decreased production of goods, and decreased spending by consumers. A If people lack money, they cannot buy the products that factories produce. B In turn, factories become unprofitable and are forced to reduce their workforces, leading to increases in unemployment and further drops in consumer spending. C The traditional view of recessions holds that they are the result of a lack of money. D According to Say, the true cause of recessions is problems in supply. Specifically, he felt that most recessions start because there is a lack of supply, or that the wrong goods are being supplied. This creates an overabundance of some goods and a lack of other goods. In this case, consumers want to buy products, but they are not being supplied with the products they want to buy. The result is a drop in overall consumer spending, which then worsens the effects of the recession.

Choose the correct square [■] where the given sentence should be added.

In 1803, however, French economist Jean-Baptiste Say suggested another explanation.

Atmospheric Circulation

Much of the world's weather is determined by two atmospheric cells: the Hadley cell and the Polar cell. Cells are atmospheric cycles that are driven by thermal energy. As the sun heats the air near the surface of the Earth, that air begins to rise. At a certain point, however, this air encounters a barrier and cannot rise any further. As new air is heated and begins to rise, the warm air near this barrier is pushed sideways, since it cannot move vertically anymore. As it moves, it begins to lose its heat, until it once again begins to sink towards the Earth, pushing the cooler air below it sideways and forming a circular movement of air, which is called a cell.

The Hadley cell begins about 5 degrees north or south of the equator, where the sun's heating effect is the strongest. The high temperatures near the equator allow the air to pick up tremendous amounts of moisture from the oceans before it begins to rise. The energy contained in the warm, moist air causes violent thunderstorms which transport that energy high into the atmosphere. As the warm, moist air begins its horizontal movement, it begins to lose energy in the form of heat. By the time it reaches a latitude of about 30 degrees north or south, it has lost enough heat energy to once again sink towards the Earth. In the last part of the cycle, the air flows back towards the equator to begin the cycle again. An important effect of this is that the Hadley cell creates the strong **trade winds** that early sailors used to cross the seas.

A The Polar cell begins at much higher latitudes, where the air is considerably cooler and drier. **B** At about 60 degrees north or south, the air still has enough heat to drive a cell cycle. **C** As the air rises, it encounters a similar barrier and begins to move laterally instead of vertically. **D** By the time it reaches the North or South Pole, it has lost nearly all of its heat and sinks back down to the Earth. The major difference is that the air was never warm enough to pick up much moisture, so this part of the cycle involves much less water loss than it does in the Hadley cell. The major effect of the Polar cell on weather is that it creates the jet stream, the strong eastern wind pattern that controls much of the weather at northern and southern latitudes.

1 What can be inferred from the passage about the movement of air?

(A) Air near the equator moves faster than air near the Poles.
(B) Cool air tends to sink below warm air.
(C) The loss of moisture tends to slow the movement of air.
(D) The movement of air is influenced by changes in weather patterns.

2 Why does the author mention **trade winds**?

(A) To discuss the discovery of the Hadley cell
(B) To illustrate the dangers of the thunderstorms in the Hadley cell
(C) To further illustrate the weather effects created by the Hadley cell
(D) To indicate the areas where Hadley cells most frequently occur

3 What can be inferred from the passage about the Polar cell?

(A) It is less useful to sailors than the Hadley cell.
(B) It is not as clearly understood as the Hadley cell.
(C) Its air currents move more slowly than those of the Hadley cell.
(D) It creates fewer thunderstorms than the Hadley cell.

4 How does the author explain the movement of air in the Hadley cell and the Polar cell?

(A) By discussing how each cell influences the other
(B) By discussing the role of heat in the movement of the air
(C) By contrasting the direction of movement within each cell
(D) By explaining how weather can disrupt the normal movement in each cell

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

Although these atmospheric conditions are somewhat different, the mechanics that drive the Polar cell are the same as those for the Hadley cell.

Where would the sentence best fit?

White's Law

➡ White's law, named after the famous anthropologist Leslie White, is a theory which attempts to explain how the availability of energy affects the speed of advancement in civilization. A White's law basically states that civilization evolves as the amount of energy harnessed per person is increased, or as the efficiency of energy usage is increased. B

➡ The basic assumption of White's law is that out of the three major aspects of civilization (technological, sociological, and ideological), the technological aspect plays the primary role in driving the evolution of civilization. C White thought that the purpose of all technology is to help overcome the challenges of survival. D Farming technology provides us with greater amounts of food, and housing technology provides us with shelter. Since all technology requires some form of energy to operate, greater amounts of energy should allow us to use greater amounts of technology, which in turn should allow society to advance more. The same would be true of more efficient energy usage. If technology is created that uses less energy, that should have the same basic effect as increasing the total amount of energy available.

White distinguished five different stages in the evolution of civilization, according to the different forms of energy used to power technology. In the first stage, energy is provided by our own muscles. Humans in this stage of development must do all of their own work. In the second stage of development, humans begin to use animals to power their technology, as a farmer does when he uses a horse to pull his plow. The third stage occurs when humans begin to use plants as a source of power. White identified this stage with a huge increase in the efficiency of farming. In the fourth stage, humans begin to rely on natural resources such as coal and oil as their primary source of energy. In the final stage, nuclear power is utilized to provide energy.

1 According to paragraphs 1 and 2, all of the following affect the advance of civilization EXCEPT

(A) the total amount of available energy per person
(B) the utilization of technology
(C) the forms of energy available
(D) the efficiency with which energy is used

Paragraphs 1 and 2 are marked with arrows [➡].

2 In paragraph 2, the author discusses the assumptions that White made about civilization in order to

(A) stress the importance of technology in modern civilization
(B) illustrate the weaknesses in White's theory
(C) demonstrate the logic behind White's theory
(D) explain why some civilizations are more advanced than others

Paragraph 2 are marked with arrows [➡].

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) Since all technology needs energy to work, the availability of technology should increase with that of energy, which will allow further developments in civilization.
(B) In order to allow societies to advance in turn, greater amounts of energy are needed to operate the increasing amount of technology those societies produce.
(C) Better technology, which is needed to allow society to advance more, will require greater amounts of energy to operate.
(D) Because the operation of technology requires the formation of energy, further advances in society are only allowed by greater amounts of energy.

4 The word **distinguished** in the passage is closest in meaning to

(A) defined (B) studied (C) hypothesized (D) differentiated

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

The full theory is complex, but it can be simplified into the following statement.

Where would the sentence best fit?

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. m_____ : *n.* an exclusive control over something
2. r_____ : *n.* a situation where people vote to make an important political decision
3. r_____ : *n.* removal of an official from a government position by vote
4. p_____ : *n.* a document signed by many people that demands some action from the government

B Choose the right meaning for the words in bold.

1. The man who is going to give a lecture today is a **prominent** figure in politics.
   (A) well-known (B) innovative (C) long-standing (D) skilled

2. Wind power is a pollution-free source of energy but is difficult to **harness** in places without steady winds.
   (A) provide (B) conserve (C) waste (D) use

3. The **emergence** of new political parties is a common occurrence in some countries but is relatively rare in others.
   (A) plan (B) duty (C) expectation (D) rise

4. The release of large bubbles of gas from under the mud caused a **disturbance** on the ocean floor.
   (A) explosion (B) split (C) disruption (D) pollution

C Choose the right word for the blank in each sentence.

1. A resource may be abundant, yet be very hard to _____ because expensive equipment is needed to use it.
   (A) utilize (B) establish (C) penetrate (D) fulfill

2. Archeologists concluded that the _____ found near the city were made in the Bronze Age.
   (A) artifacts (B) occupations (C) canopies (D) captors

3. This machine has a _____ to become too hot, so be sure that you always watch its temperature carefully.
   (A) sobriety (B) composition (C) tendency (D) factor

4. A substance like sugar will _____ easily in water, but a substance like oil will remain separate from water.
   (A) absorb (B) inject (C) investigate (D) dissolve

CHAPTER

03

Reading to Learn

Type 8. Prose Summary

Type 9. Schematic Table

- Reading Practice 1
- Reading Practice 2

Question Types

TYPE 08

Prose Summary

Prose summary questions ask you to complete a summary of a passage. In these questions, you will be given an introductory sentence and six statements. From these six statements, you must select three statements to create a summary of the passage. The Prose summary question is worth 2 points.

Sample Question

Bird Migration

Every spring and fall, you can probably look up into the sky and see large flocks of birds either coming or going. This habit of flying south for the winter and north for the summer is called migration, and most birds do it. Birds migrate for a number of reasons. One reason is of course to escape the harsh conditions of winter. Although they have feathers, most birds are poorly equipped to deal with extremely cold temperatures. Their nests are open to the wind and snow, and do little to keep the birds warm. Furthermore, birds often find it extremely difficult to gather enough food during the winter. By flying south into warmer climates during the winter, birds avoid the cold temperatures and food shortages that other animals have to endure during the winter months. Another reason is mating. Many birds will only lay their eggs in certain places and at certain times of the year. So, migration also occurs at mating times.

One of the amazing things about birds is the distances and the accuracy with which they migrate. Many birds are able to find their way back to the exact same spots year after year, despite having flown thousands of kilometers. The bar goose, for example, migrates over 30,000 kilometers each year without losing its way.

In order to travel such long distances without getting lost, birds use a variety of methods to help them navigate. One of the most important of these methods is the use of landmarks. From high in the air, birds have an excellent view of the land below them. They can see mountains, rivers, and other natural land features, and use them to find their way. Birds also have small bits of metal in their brains. This helps them to sense the Earth's magnetic field and determine the direction in which they are flying.

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 birds fly south for the winter and north for the summer in a pattern called migration.

(A) Birds migrate both to escape winter conditions and to arrive in the proper places during the mating season.

(B) Birds must migrate because the insects they eat burrow themselves deep in the ground during the winter.

(C) Many birds are unable to mate or lay their eggs if they have not migrated to the proper place.

(D) Birds are able to migrate incredibly long distances without getting lost along the way.

(E) Birds use landmarks easily seen from above and a kind of internal compass to help them navigate.

(F) The navigation systems of birds are far more advanced than any system that humans have developed.

Answer & Explanations

Answer Choices (A), (D) and (E) summarize paragraph 1, 2, and 3 respectively. (B) is not mentioned. (C) is only a minor detail mentioned in paragraph 1. (F) is not accurate information.

Keys to Solution

❶ As you read the passage, take notes on important facts and details.

❷ The introductory sentence provided in the prose summary question directly states the main idea of the passage. Select statements that directly relate to the introductory sentence.

❸ Make sure you can distinguish between major ideas and minor ideas. Major ideas are important pieces of information that directly support the main idea. Minor ideas are details irrelevant to the main idea. Select only the major ideas for your summary; exclude minor ideas.

❹ Before answering the prose summary question, skim the first few sentences of each paragraph. Relevant major ideas can usually be found at the beginning of each paragraph. Also, make sure that you can recognize these major ideas when they are paraphrased or worded differently.

❺ You can recognize incorrect statements and eliminate them if they

- are not mentioned in the passage or directly contradict information in the passage
- are only minor details in the passage

How the Question is Worded

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 Dark Age of Greece

Many civilizations undergo a series of high points and low points during their history. Among early civilizations, we call the low points "dark ages," because civilizations often dropped to such a low level that it is hard to get an accurate picture of their history during these periods. During a dark age, a civilization may not have produced monuments, statues, or other objects which we use to learn about early civilizations.

One of the most important dark ages was the dark age of Greece, which lasted from about 1100 BC to 900 BC. Prior to that time, Greece had a highly advanced society called the Mycenaean civilization. The Mycenaeans were a trading civilization, and they did much to spread their culture across the eastern Mediterranean. In fact, the Mycenaean civilization was so important that when it collapsed in the 12th century BC, most other civilizations in the region collapsed as well. The next 200 years are like a blank page to historians, and we know very little about this period. One major reason for this is that writing basically stopped. The collapse of the Mycenaeans brought an end to writing in the area, and thus an end to the written records historians rely on.

The little that we know about this period has been learned from archaeology. It seems that civilization became much less advanced. The pottery from this period is much simpler and less artistic. This suggests that there was a lack of wealthy people to buy higher quality products. Another interesting point is that most of the large cities of earlier time periods appear to have been abandoned in favor of much smaller settlements. This would suggest a large decrease in population, possibly due to a widespread lack of food and consequent starvation.

Sometime around 800 BC, the Greeks began to emerge from this dark age, most probably due to the influence of other civilizations. They had lost their early writing system, but began to use the writing system of the Phoenicians at this time. They began constructing larger cities and trading with their neighbors again. Over the next 300 years, their civilization continued to rise, and their dark age was forgotten.

1 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 dark age of Greece was a period of collapse in civilization which lasted from 1100 BC to 900 BC.

(A) Many early civilizations underwent dark ages, but Greece never recovered from its dark age.

(B) The dark age of Greece, started by the collapse of the Mycenaean civilization, included most of the civilizations of the eastern Mediterranean.

(C) Despite the loss of writing and the end of large scale construction, historians could gain information regarding the dark age of Greece.

(D) The dark age of Greece seems to have been characterized by a lack of development and significant drops in population.

(E) Many pieces of evidence suggest that there was a huge increase in population during the dark age of Greece.

(F) The Greeks could emerge from their dark age with the help of the Phoenicians.

The Energy Budget

The Earth has three major naturally occurring energy sources: solar radiation, tidal energy caused by the moon's gravitational pull on the oceans, and internal heating caused mostly by the radioactive decay of metals deep inside the Earth. Of these three sources, solar radiation accounts for 99.97% of all the energy available on Earth. In fact, the amount of energy contributed by tidal action and internal heating is less than the annual fluctuation in solar radiation. The total amount of incoming energy and the amount of energy either used or emitted into space are roughly equal. This balance is called the energy budget.

Of all the solar energy that reaches the Earth, 6% is reflected back into space by the upper atmosphere. Another 20% is reflected by the tops of clouds, and 4% is reflected from the surface. This means that 30% of all the solar energy reaching the Earth immediately escapes back into space. Out of the remaining 70%, 19% is absorbed into the atmosphere (3% by clouds and 16% by atmospheric gases and dust). That means that 51% of all solar energy is absorbed by ground sources.

The 70% of the solar energy that is absorbed by the Earth must also eventually be released into space, or the temperature of the Earth would continuously rise. This energy is released through indirect radiation. All ground heat is eventually radiated back into the atmosphere, where it eventually radiates back into space. Indirect ground radiation happens through three processes. The surface radiates 21% of the solar energy it absorbs directly as heat. Another 23% is transferred back into the atmosphere through the evaporation of surface water. The remaining 7% is lost as the ground heats the air near the surface.

This complex balance of incoming and outgoing energy is controlled by a number of factors. One such factor is the reflectivity of different surface materials. For example, ice reflects about 35% of solar energy, while forests only reflect 5%. Therefore, environmental changes, such as the melting of glaciers and deforestation, can affect the Earth's energy budget. In addition, gases in the atmosphere, most notably carbon dioxide, play an important role in the absorption of solar energy, so changes in their levels affect the energy budget as well.

2 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 energy budget is the balance of the input and output of energy from the Earth.

(A) All solar energy must either be immediately reflected back into space or transferred back into space through indirect radiation to maintain the energy budget.

(B) Although other sources contribute minor amounts to the total input energy of the Earth, most energy comes from the Sun.

(C) Only 70% of all solar energy is absorbed by the Earth's atmosphere and surface levels.

(E) Environmental changes which affect the reflectivity of ground surfaces or the absorption ability of the atmosphere can greatly affect the energy budget.

(E) Clouds play an important role in reflecting and absorbing solar energy, and are vital to the energy budget.

(F) Solar energy absorbed by ground surfaces can be radiated back into space through three atmospheric processes.

Working Memory

The development of the first computers in the 1960s had important influences on psychology. As computers became more advanced and began to "think" in more complex ways, psychologists began to make a comparison between the workings of computers and the workings of the human brain. Many of these comparisons have turned out to be wrong; the human brain is quite different from a computer. But the comparison between human memory and computer memory has stood up to rigorous testing.

A computer has two forms of memory. Its hard drive stores all the information in the computer over long periods of time. Its RAM (Random Access Memory) stores the files that the computer is actually using at that time. Once the computer stops using a file, it is "forgotten" by its RAM memory and returned to the hard drive. The human brain works in a similar way. Psychologists call our "hard drive" long-term memory, and our "RAM" working memory.

Working memory serves a number of functions. This is where new information is stored before it is processed into long-term memory. Working memory also allows us to call up information from our long-term memory when we need to use it. For example, a person's address is stored in his or her long-term memory, but it is called up to working memory when that person fills out an envelope at the post office. Working memory also allows us to integrate old information with new information. If a person studied sociology several years ago, all that information would be in long-term memory. If that same person takes a new sociology class, some of that old information will be called up to working memory, so connections can be made between the new and the old information.

With so many important jobs to do, working memory plays a vital role in our intelligence. Just as a computer's performance is partially limited by its RAM capacity (computers with too little RAM cannot run larger, more complex programs), so too our ability to process and handle information is partially determined by our working memory. A person who can store more pieces of information in working memory can work with more information at one time. They can also make a greater number of connections between new and old information. Therefore, a higher capacity for working memory boosts human mental performance just as more RAM does for a computer.

3 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

Psychologists have made a strong connection between the structure of computer memory and human memory.

(A) While computer and human memory work in the same way, most of the other parts of the human brain are very different from computers.

(B) One of the strongest likenesses between computer and human memory is the likeness between RAM and working memory.

(C) Working memory is what is used to handle information, while long-term memory is what is used to store information.

(D) Working memory is essential when a person studies new subjects or reviews old subjects.

(E) Working memory has a strong relation to intelligence because of its role in processing information.

(F) Making connections between different pieces of information is the most important function of working memory.

Vestigial Organs

Vestigial organs are parts of the body which serve no apparent purpose. They are essentially evolutionary leftovers. At some point, they served a purpose in the ancestors of an animal, but as the animal evolved into a new species, that function became unnecessary. Vestigial organs are often small in size and hidden within the body. A study of the human body reveals a number of such organs.

The appendix is a small organ attached to the large intestine. It serves no purpose in the human body, as is proven by the fact that, very rarely, people are born without an appendix and lead normal, healthy lives. In fact, the only effect the appendix has on the body is negative, since it can sometimes become infected and require surgery. The appendix is thought to be the remnant of an organ in some plant-eating mammals that allows them to digest hard plant matter such as bark. According to this theory, as our ancestors slowly evolved and their diet changed, this organ was no longer necessary. It slowly decreased in size and ceased to serve any purpose. The coccyx, or tailbone as it is more commonly known, is another vestigial organ in humans. The tailbone is located at the bottom of the spine. As its name implies, it resembles the beginning of a tail. Scientists suspect that this is what remains of the tail our ancestors lost as they slowly evolved from other species of monkeys.

Humans also have vestigial reflexes. Like vestigial organs, these are reflexes that no longer serve any useful purpose. One good example would be goose bumps, the little bumps that appear on the skin when one is cold or frightened. In animals that have fur, this reflex serves two purposes. First, it causes the fur to rise, making the animal appear larger and more intimidating. Animals use this reflex to scare off potential attackers, as a cat does by raising its fur when it sees a dog. The other function is to raise the fur to create multiple layers of fur during cold weather, thus keeping the animal warm. Since humans have lost their fur through evolution and only have thin hairs on their legs and arms, this reflex no longer serves any useful purpose.

Vestigial organs, and to a lesser extent vestigial reflexes, are important to science. First, they provide some of the most definitive proof for the theory of evolution. It would be hard to explain the presence of vestigial organs in animals without resorting to the theory of evolution. Another important use in science is that they allow scientists to discover which animals once had the same evolutionary ancestors. For example, the presence of the appendix and the tailbone in both humans and apes strongly suggests we share the same evolutionary origin. Whales have small vestigial leg bones which link them to land mammals such as cows and rhinos. Thus, vestigial organs provide important clues to understanding the chain of evolution.

4 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

Vestigial organs and reflexes are organs and reflexes that serve no purpose in an organism.

(A) Humans have the highest number of vestigial organs because they are the most evolved species on the planet.

(B) The creation of vestigial organs and reflexes is a natural consequence of the process of evolution.

(C) Vestigial organs and reflexes slowly lose their functions as environmental changes eliminate their necessity.

(D) The presence of the appendix and the coccyx in humans links them to monkeys.

(E) The study of vestigial organs and reflexes is most useful in mammals like humans, apes, whales, and land animals.

(F) Scientists use vestigial organs and reflexes to trace the evolutionary origins of different species.

TYPE 09

Schematic Table

A schematic table question asks you to categorize specific facts in the passage. This question presents a chart with two or three categories, and you must place five or seven statements in their appropriate categories. A schematic table question with five correct answers is worth three points, and one with seven correct answers is worth four points.

Sample Question

Separation of Powers

One of the central ideas behind the United States government is the separation of powers. All powers of the central government are divided among three co-equal departments — the executive, the legislative, and the judiciary. The idea of dividing the powers of the government like this was to ensure that no one body could take control and override the will of the people. For the founding fathers of the United States, protecting America from tyranny was one of the most important goals.

The executive branch is headed by the President of the United States. Today, the President's power has grown much from what it was when America was first founded. For example, America's first President had only four Cabinet departments — State, Treasury, War, and Justice. Today, there are 15 departments and over 50 major agencies.

The legislative branch of government is the Congress. This is the part of government responsible for making the laws of the land. The American Congress is divided into two parts — the House of Representatives and the Senate. The House of Representatives has 435 members who are elected on the basis of population. The Senate has 100 members, 2 per state regardless of state size. Together, these two bodies balance the will of the majority with the needs of individual states.

The judicial branch of the United States government is the Supreme Court. There are nine members of the Supreme Court, including the Chief Justice. The Supreme Court is the only one of the three branches that is not directly elected. Instead, the President nominates a person to the court and the Senate confirms the nomination. Once appointed, Supreme Court justices can serve for life.

Directions: Select the appropriate phrases from the answer choices and match them to the category to which they relate. TWO of the answer choices will NOT be used.

Answer Choices

(A) Has 12 major agencies
(B) Headed by the President of the United States
(C) Has nine members
(D) Headed by the Congress
(E) Has much more power
(F) The only branch that is directly elected
(G) Consists of the House of Representatives and the Senate

The Executive

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The Legislative

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The Judiciary

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Answer & Explanations

(B) and (E) fall into the category of the executive, (D), (G) The legislative, and (C) the judiciary. The executive is headed by the President, and has more much more power than the legislative or judiciary. The legislative is headed by the Congress, and consists of two parts: the House of Representatives and the Senate. The judiciary has nine members and is the only branch that is not directly elected.

Keys to Solution

❶ A passage will likely contain a schematic table question if it is organized in the following ways.

- compare - contrast
- classification
- problem & solution
- cause & effect

❷ Take notes as you read, as specific details are found throughout the passage. Noting them will save you time because you won't have to reread everything. Especially, note how these details fit into categories that are discussed.

❸ Look for keywords in answer choices and scan sections where these keywords appear.

❹ Remember that several answer choices will paraphrase ideas from the passage. Make sure you recognize similar ideas that are worded differently.

❺ Eliminate answer choices that

- directly contradict the passage or are not mentioned in the passage
- do not belong in any of the categories

How the Question is Worded

Directions: Select the appropriate phrases from the answer choices and match them to the source of fresh water to which they relate. TWO of the answer choices will NOT be used.

The Bone Record of Human Ancestors

Archaeologists and anthropologists interested in tracing the evolution of the human species must rely largely on what is commonly called the bone record. The bone record is the collection of fossilized bones gathered from different sites. By dating these bones and placing them in chronological order, scientists can trace both the evolution and movement of the human species.

The first bones in the bone record belong to a species named *Australopithecus*. *Australopithecus* first emerged about 4.4 million years ago, and is the first human ancestor to definitively diverge from the ape species. The primary distinction between apes and *Australopithecus* is that *Australopithecus* was a fully bipedal creature; it walked in an upright manner on two feet. While some apes are able to stand upright, they only do so for short periods of time. The brain of *Australopithecus* was only about 35% of the size of a modern human's, and its intelligence was probably not much higher than a chimpanzee's. *Australopithecus* was also much smaller than modern humans. Typical heights for the species were about 1.2 to 1.4 meters, with males being significantly larger than females. *Australopithecus* did not make tools, but it did use rocks and sticks to reach for food, to crush nuts, and for other purposes. Because of its small size and lack of weapons for defense, *Australopithecus* was a common prey for lions and the other predators of western and southern Africa, where it lived.

The bones of *Australopithecus* begin to disappear from the bone record around 1.8 million years ago, when the species was quickly replaced by the more advanced *Homo erectus*. *Homo erectus* was a much more "human" species. It stood at around 1.75 meters, about the same height as the average modern human. Its brain was about 75% of the size of a modern human's, and this larger brain size allowed it to fashion a number of stone tools and weapons. With its larger size and new weapons, *Homo erectus* quickly went from being hunted to being the hunter. *Homo erectus* was a far more successful species than *Australopithecus,* and spread from Africa into southern Europe and Asia. *Homo erectus* still was not fully human, however. The structure of its vocal cords suggests that it was incapable of forming speech and was limited to grunts and growls for communication.

1 **Directions:** Select the appropriate phrases from the answer choices and match them to the species of human ancestor to which they relate. TWO of the answer choices will not be used.

Answer Choices

(A) Roughly the same size as modern humans
(B) Able to make its own tools
(C) Females smaller than males
(D) Defenseless against predators
(E) Entirely a meat eater
(F) More similar to apes than humans
(G) Able to stand upright only for a short time

Australopithecus

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Homo erectus

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The Split of the Christian Church

The division of the Christian churches has its roots in the division of the Roman Empire. The Christians in the Latin-speaking Western Empire slowly began to drift apart from the Greek-speaking Christians of the Eastern Empire. While the gaps between these two groups steadily grew over the next 700 years, they were still technically members of the same Christian faith. In 1054, however, the Christian church was irrevocably split into the Western Catholic Church and the Eastern Orthodox Church.

The causes for this split were numerous. Certainly, the language barrier between the two churches played a major role, but there were other, more decisive factors in the breakup of the Christian church. The issue of the power of the Pope was one such issue. The early Christian church was ruled by 5 prelates, or church fathers. These prelates were stationed in the five most prominent cities of the Roman world, with the Roman prelate receiving the most honor. In the early church, while the Roman prelate had been entitled to a greater amount of the respect, all 5 prelates wielded the same amount of power within the church. As the divisions between eastern and western Christians grew, the Roman prelate began to claim authority over his four eastern colleagues. The eastern prelates rejected the supremacy of the Roman Pope, and this was the first major source of tension within the church.

The other factor leading to the Great Schism of 1054 was a more complex issue of religious belief. Since the earliest days of the church, people had debated the exact nature of Christ. Was Christ a man, or was he a god? If he was a god, was he the equal of his father, or was he a lesser god? To solve such difficult questions, the Christians had developed a complex belief called the Trinity. The idea of the Trinity maintained that the three divine beings mentioned in the Bible — the Father, the Son (Christ), and the Holy Spirit — were in fact different aspects of the same God. They were at once divided and the same. The Western church, under the guidance of the Pope, had explicitly stated this to be true. The Eastern prelates, however, were not as vocal on the matter. They preferred to leave their beliefs unstated. These two differences ultimately led to the split of the Christian church in 1054.

2 **Directions:** Select the appropriate phrases from the answer choices and match them to the group of Christians to which they relate. TWO of the answer choices will NOT be used.

Answer Choices

(A) Wanted equality among the prelates
(B) Accepted the Bible as the only authority
(C) Spoke Latin
(D) Belief in the Trinity not explicitly stated
(E) Did not acknowledge the power of the Pope
(F) Developed the concept of Trinity
(G) Actively pushed for a split in the church

Western Christians

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Eastern Christians

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Ancient Greek and Elizabethan Theater

The two most famous and most productive periods in the history of Western theater were the periods of ancient Greek theater and Elizabethan theater. The performance of Greek plays grew out of religious ceremonies, in which the tales of legendary heroes were sung to the gods. The Greek plays were likewise dedicated to the gods, most specifically to Dionysus.

Playwriting in ancient Greece was a highly honorable profession. The best playwrights of the day were recognized as leading citizens. Their efforts were supported by wealthy nobles. This was necessary because their plays were only performed once and admission was free, since they were performed as part of a religious festival. The plays were performed in huge, open air amphitheaters. These large constructions, which could hold tens of thousands of people, were the first buildings specifically constructed to amplify sound. Making sure the actors could be heard was a major challenge in Greek theater. In addition to the design of the amphitheaters, the Greeks used a chorus in their plays. The chorus was a group of actors whose only job was to narrate the action in the play. The chorus spoke in unison, so their voices gained the strength of numbers. The Greeks also simplified the action on stage so that the audience could focus on only one or two people at a time. Aside from the chorus, Greek plays only used three actors, and all three actors were rarely on stage at the same time.

Elizabethan theater is most closely associated with the plays of William Shakespeare, but there were a great number of excellent English playwrights at this time. Queen Elizabeth loved the theater, and with her support, theaters began to appear in nearly every major city. While theater enjoyed widespread popularity, both with the queen and with the general public, it was strongly condemned by the church. Plays, even the most serious ones, often included highly sexual jokes to entertain the less educated members of the audience. Elizabethan theater was also quite violent. The ancient Greeks never included fight scenes in their plays; any violence in the story took place offstage. Elizabethan theater, however, included elaborate swordfights. Many of the changes that had occurred in the theater were the result of economics. Unlike the plays of the Greeks, plays during the Elizabethan period were performed for profit, and so the playwrights had a definite interest in giving the public what it wanted in their plays.

3 **Directions:** Select the appropriate phrases from the answer choices and match them to the period of theater to which they relate. TWO of the answer choices will not be used.

Answer Choices

(A) A religious event
(B) Written partly to entertain the less educated
(C) Supported by the church
(D) Playwrights were highly respected
(E) Format designed to improve audibility
(F) Motivated by financial gain
(G) Plays written by the nobles

Ancient Greek Theater

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Elizabethan Theater

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Associative and Imitative Learning

Most animal species are capable of at least some level of learning. Animal learning mechanisms appear in large part to be quite similar to the learning mechanisms of human infants. While explicit instruction is nearly impossible, most animals are capable of learning through association and imitation.

Associative learning is the most widely known form of animal learning. In associative learning, the animal begins to associate a particular action with a particular outcome. The most famous example of this is that of Pavlov's dogs. In Pavlov's famous experiment, his dogs began to associate the ringing of a bell with the result of being fed. In time, they began to get excited merely by the ringing of the bell, even if they weren't fed. This kind of learning is common in the wild. For example, a bear that breaks into a beehive to get the honey may receive many painful stings. If this happens several times, the bear may begin to associate beehives with pain and begin to avoid them. Another example comes from the island of Koshima, where Japanese scientists were studying macaques, a species of monkey. The scientists left potatoes on the beach for the monkeys each morning. Eventually the monkeys began to associate the action of going to the beach (which they didn't do before) with the finding of food. Now the macaques on Koshima walk down to the beach each morning.

Another type of learning common in animals is imitative learning. Unlike associative learning, imitative learning does not rely on the animal's personal experience. Imitative learning may occur simply by watching others. After the macaques on Koshima learned to walk to the beach for food, they saw one macaque washing her potatoes in the ocean before eating them. Slowly the other macaques began to imitate her behavior, and now all the macaques on the island wash their potatoes before eating them. The macaques have also developed a taste for salt and even dip their potatoes into the water between bites. The macaques also picked up a number of new behaviors from imitating individuals in their species. The macaques now go down to the beach to splash and swim in the ocean on especially hot days. They were not rewarded for this behavior by the scientists, so they could not have possibly learned this through associative learning. The only explanation is that they saw one of their members splashing in the water and learned from his example that splashing in the water helps to cool their bodies down. Thus, imitative learning is thought to be an important mechanism in the development of new behaviors in a species.

4 **Directions:** Select the appropriate phrases from the answer choices and match them to the type of learning to which they relate. TWO of the answer choices will not be used.

Answer Choices

(A) Present in most animals
(B) Learning through personal experience
(C) Helps to develop new behaviors in species
(D) Learning the result of the animal's expectations
(E) Relies on one animal to display behavior
(F) Rarest type of learning for animals
(G) Learning through human instruction

Associative Learning

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Imitative Learning

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Both

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Social Acculturation

Social acculturation is the process through which immigrants or minority groups adapt and eventually integrate into the larger or dominant culture of their society. The standard model for social acculturation was first proposed by Kalvero Oberg in 1954. Oberg described social acculturation as a four-step process: euphoria, frustration, negotiation, and assimilation. The euphoric stage typically only lasts for several weeks. In this stage, nearly everything about the new culture is seen in a positive light. The euphoria that people often feel in this stage is strongly related to a sense of novelty. New experiences are often greeted with enthusiasm, and the first few weeks in a new culture are typically nothing but a string of novel experiences.

➡ Once the initial period of novelty has worn off, immigrants often experience a period of frustration. Immigrants must relearn most of the skills that are needed in everyday life. Language is obviously the greatest part of this process, but even in situations where the immigrant is fluent in the new language, a learning curve still exists. Immigrants are typically unaware of, or at least not totally familiar with, the cultural practices of their new society. They may lack knowledge that is considered common sense in the new culture, and this can make even simple tasks such as going to the doctor more difficult. Individuals in this stage often express their frustration by finding fault with the society around them and treating their mother culture with feelings of nostalgia. They may be reluctant or unwilling to take part in the new culture and may seek to close themselves off from it as much as possible.

The phase of frustration can vary greatly for different people because they can have very different personalities. Indeed, some never progress beyond this stage. Eventually, however, most people enter the stage of negotiation, in which they learn to adapt and deal with the problems that they experience in the new society. Slowly, they become more familiar with the culture and more proficient at social tasks. There may be some temporary slippage back into the frustration stage when they are confronted with a particularly challenging social situation, but for the most part, immigrants tend to continue to make forward progress once they have entered this stage.

➡ In the final phase, assimilation, the immigrants become fully integrated into their new culture, to the point where they can be seen as typical members of that society. Assimilation can take an extremely long time, and may not even occur in the lifetime of first generation immigrants. In many cases it is only the children of immigrants, who have been born in that culture, who can be said to have truly assimilated.

1 In paragraph 2, all of the following are mentioned as effects of the stage of frustration EXCEPT

(A) a withdrawal from society
(B) criticism of one's new society
(C) nostalgic memories of one's former culture
(D) a refusal to perform even simple chores

Paragraph 2 is marked with an arrow [➡].

2 The word **some** in the passage refers to

(A) stages
(B) people
(C) personalities
(D) cultures

3 The word **proficient** in the passage is closest in meaning to

(A) familiar
(B) engaged
(C) skilled
(D) adjusted

4 According to paragraph 4, the stage of assimilation often only occurs after

(A) an immigrant has completely mastered the language
(B) young immigrants become adults
(C) a second generation is born in the new culture
(D) immigrants have made the decision to interact with the new culture

Paragraph 4 is marked with an arrow [➡].

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

Social acculturation is the process through with immigrants adapt to a new culture.

(A) During the process of social acculturation, immigrants progress through various stages in which they may feel positively or negatively towards the new culture.
(B) The process of social acculturation was first developed by Karl Oberg in 1954 to help immigrants assimilate into new cultures.
(C) Though not everyone experiences the process of social acculturation at the same rate, everyone experiences the same general stages.
(D) In the first stage of social acculturation, immigrants are often impressed by the novelty of the new culture.
(E) Many immigrants never reach the final stages of social acculturation and return to their mother cultures out of discouragement.
(F) In the process of social acculturation, the immigrant attempts to deal with the challenges of living in an unfamiliar environment.

Tikopia and Easter Island Societies

The challenges faced by the Easter Island and Tikopia societies were some of the most extreme that have confronted any society in the history of human civilization. Located on small, isolated islands, as both societies were, nearly every social pressure, from resource allocation to population control, was exacerbated by their isolation. Yet despite facing similar environmental pressures, the Tikopia have survived for nearly 3,000 years, while the Easter Island society completely failed in the late 1500s. The answer to the different fates of these two societies lies primarily in their management of resources.

While Tikopia society has a very high population density, its total population is small enough that all members of the society know each other personally. The Tikopia have a powerful sense of the common good of their society, and all decisions are considered in respect to how they will affect the society as a whole. In addition, the Tikopia have long understood that their island simply cannot support a larger population, and have important cultural taboos designed to ensure population stability. The Tikopia feel it is immoral to have large families, and practice extensive family planning, even resorting to infanticide in earlier times.

The Tikopia also have strict rules designed to prevent the overexploitation of their limited resources. If a person wishes to catch or eat fish, he or she must first seek the permission of the chief to prevent the depletion of fish stocks. **A** Land resources are just as tightly controlled. **B** A survey of the plants on Tikopia will reveal that nearly every plant is utilized by the islanders in some way. **C** The trees on the island all produce edible fruit and have been cultured in such a way to replicate the natural tree cover of the rainforest, creating an extremely efficient and environmentally friendly agricultural system. **D**

➡ Easter Island society, in contrast, is a lesson in overexploitation, poor resource planning, and negligent environmental practices that eventually doomed the society. Easter Island society was a typical Polynesian culture in that it had an elite, royal class of chiefs who lived far above the standards of the rest of society. Enormous amounts of manpower went into meeting the needs of the chiefs, and first among those needs was the construction of moai, the giant stone heads for which Easter Island is now famous. Moai were built essentially as a form of competition between rival chiefs, with larger moai signifying greater power. Monument construction required cutting down large numbers of trees to transport and lift the huge stone blocks. Trees were also heavily harvested for the construction of canoes, and for use as firewood. The result was massive deforestation. By 1500, the large palms used in canoe and monument construction were gone, and these activities stopped. Within another 100 years, the island had been completely deforested, and the islanders were reduced to using grasses and leaves for their cooking fires. Deforestation also led to massive soil erosion, which reduced crop yields, and the disappearance of migrating bird species, eliminating an important source of protein. Without the food resources to feed the population, Easter Island society collapsed.

1 The word **exacerbated** in the passage is closest in meaning to

(A) represented
(B) confronted
(C) worsened
(D) exemplified

2 Based on the information in paragraph 4, what can be inferred about Easter Island society?

(A) Its population growth was unprecedented in island societies.
(B) It was governed by rival chiefs.
(C) Most aspects of life were tightly controlled.
(D) The construction of the moai was its only cultural achievement.

Paragraph 4 is marked with an arrow [➡].

3 The author mentions the **moai** in order to

(A) discuss the greatest achievements of Easter Island society
(B) provide an example of the poor resource decisions made by Easter Island society
(C) illustrate the intense rivalry between the Tikopia and Easter Island societies
(D) discuss the construction methods of the Easter Islanders

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

In fact, this system is so advanced and environmentally sound that modern day ecologists are seeking to replicate it in other parts of the world.

Where would the sentence best fit?

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the society to which they relate. TWO of the answer choices will not be used.

Answer Choices

(A) Geographically isolated
(B) Highly stratified society
(C) Maximized use of all available resources
(D) Concern for community a defining characteristic
(E) Greater number of resources on which to rely
(F) Made little use of existing resources
(G) Manpower and resources put to uses not essential for survival

Tikopia
•
•

Easter Island
•
•

Both
•

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. d _____ : *n.* decrease of something
2. b _____ : *a.* two-legged
3. a _____ : *n.* distribution
4. p _____ : *n.* animal that hunts and eats other animals in order to survive

B Choose the right meaning for the words in bold.

1. One way to find the correct answer to a question on the test is to **eliminate** all wrong answers.

   (A) get rid of (B) question (C) skip (D) take into account

2. There is a danger that much of the land used for farming will be lost **irrevocably** if soil erosion continues uncontrolled.

   (A) temporarily (B) irreversibly (C) considerably (D) slowly

3. Because the artist could not use ordinary materials to make a sculpture, she had to **resort to** unusual materials.

   (A) abstain from (B) rely on (C) give way to (D) care for

4. It was easy for the students to see where the air currents **diverged**, because water vapor formed clouds there.

   (A) separated (B) gathered (C) circulated (D) swept away

C Choose the right word for the blank in each sentence.

1. A chart called a timeline shows events in _____ order, from the beginning to the end of a period.

   (A) chaotic (B) temporary (C) rotational (D) chronological

2. _____ in a certain area does not always mean that one is considered a native of that area.

   (A) Settlement (B) Absorption (C) Density (D) Radiation

3. During the economic recession, _____ loss of business may be harmful to shops and force some of them to close.

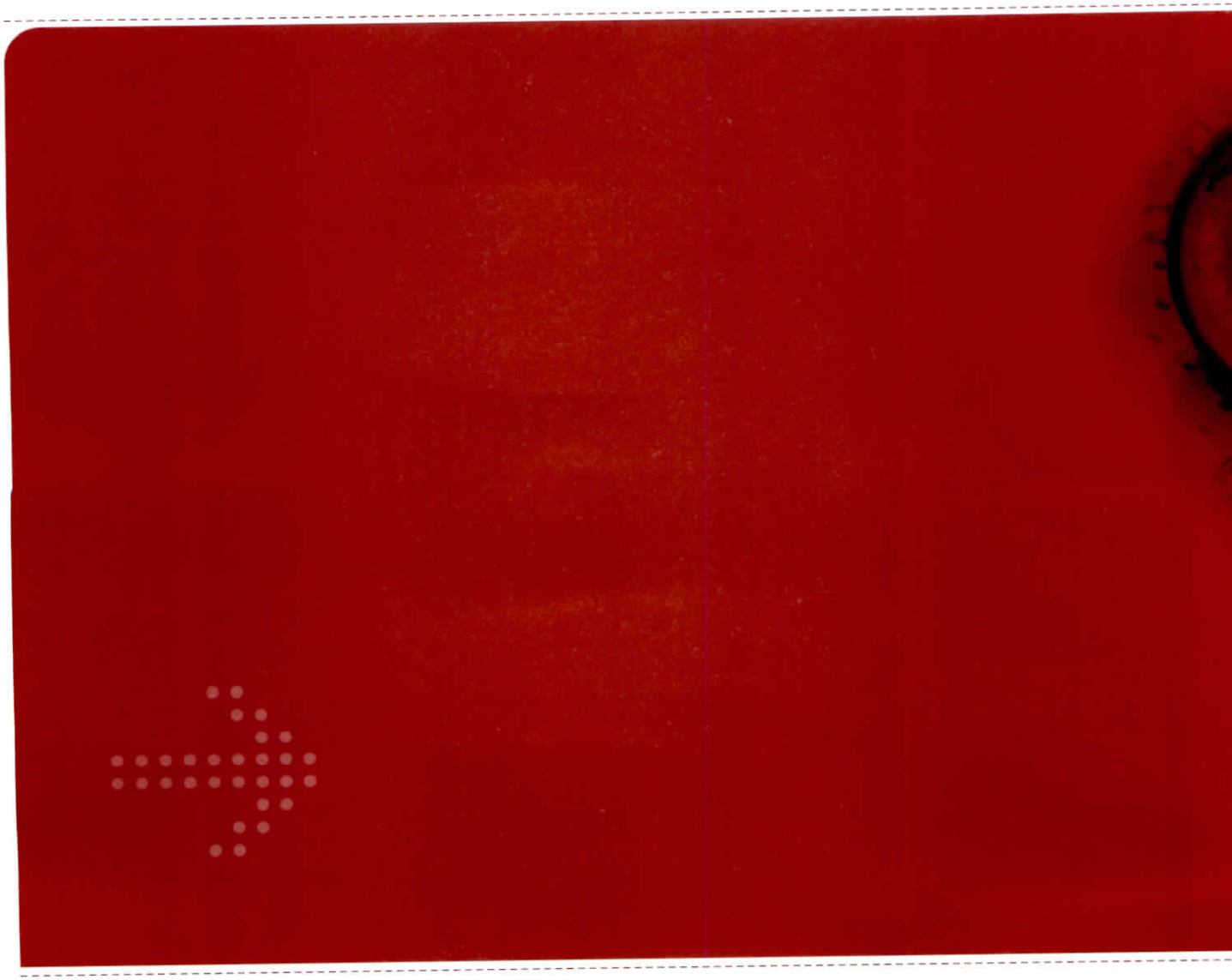
   (A) consequent (B) imitative (C) reluctant (D) proficient

4. Fog often formed in this part of the ocean, and could make it difficult for ships to _____

   (A) collapse (B) migrate (C) integrate (D) navigate

Memo

PART B



Approaching Themes

Chapter 4. Social Science
Chapter 5. General Biology
Chapter 6. Physical Science & Technology
Chapter 7. History & Anthropology
Chapter 8. Earth Science
Chapter 9. Art
Chapter 10. Zoology, Botany & Entomology

CHAPTER

04

Social Science

- Thomas Malthus and Population Control
- Pastoralism and Horticulture
- Slums of the Industrial Revolution
- Memory
- Adam Smith and *The Wealth of Nations*

Approaching Themes

Thomas Malthus and Population Control

Thomas Malthus was a 19th century British scholar who did influential work in the field of demography, the mathematical study of populations. His most famous work, *An Essay on the Principles of Population*, has influenced countless scientists since its first publication. In this essay, Malthus argued that population growth would always exceed man's ability to produce enough food and other goods to support the population. He believed that population would always grow to the farthest limits of subsistence, but that destructive forces such as war or famine would keep it from growing any farther. Malthus argued that this phenomenon was responsible for the high rate of poverty during his time, since a limited food supply had to continually provide for a growing population. If population were in line with production, however, then society as a whole would experience greater well-being.

➡ To this end, Malthus argued for population control as a means of righting the balance between population growth and food supply. In *Principles of Population*, he stated that natural forms of population control often worked, to a degree. Human vice, or moral weakness, whether in the form of violent crime or life-threatening habits such as alcoholism, would often be enough to do the unpleasant job of keeping the population from growing beyond the point of subsistence. However, if this failed, then the consequences would become far worse. Widespread famine, deadly diseases, and even plagues would then step in to decrease the population. The conditions of overpopulation and the spread of poverty and poor living conditions would be such that these forces would occur quite naturally. Malthus went so far as to argue that the Black Death of the Middle Ages was a plague brought on by an unsafe surge in the European population.

To an extent, Malthus believed that these tragedies could be avoided if man were to conduct his own sort of population control. He had a number of suggestions for how societies could control their population to avoid famine or plague. One of them was the teaching of moral restraint in regard to sexual activity. In his day, it was believed that producing many children made a nation strong, and that it should be allowed to go on unchecked. Malthus argued that such population growth had quite the opposite effect, and believed that the people, especially poor people, should be conditioned to avoid most relationships that might lead to having children. In addition, Malthus did not rule out the possibility of controlled breeding among people. He proposed the idea that the most healthy and intelligent people be allowed to breed with few limits, while strict limits should be placed on the poor and less fit. In this way, the population could be managed and a stronger breed of people could be created that were less likely to drain society of its resources.

- **demography** *n.* study of human populations
- **publication** *n.* making of printed material such as books
- **famine** *n.* extreme food shortage
- **right** *v.* to return something to a normal, desirable state
- **vice** *n.* immoral habit or conduct
- **alcoholism** *n.* addiction to alcohol
- **subsistence** *n.* continuing to exist
- **restraint** *n.* act of limiting or controlling something
- **rule out** *v.* to exclude
- **breeding** *n.* reproduction; mating and giving birth to offspring
- **drain** *v.* to use something up; to deplete some resources gradually

[Fact]

1 **According to paragraph 2, why would population not surpass subsistence levels?**

(A) It would only then be limited by available resources.
(B) It would begin to decrease after it finally peaked.
(C) It would eventually be checked by natural forces.
(D) It would create a large population of poor people.

Paragraph 2 is marked with an arrow [➡].

[Rhetorical Purpose]

2 **Why does the author mention the Black Death?**

(A) To illustrate a past event that helped to influence the present population
(B) To explain the basic premise of Malthus's essay *On the Principles of Population*
(C) To show that unchecked population growth always leads to natural disasters
(D) To give an example of how Malthus thought nature could control overpopulation

[Simplification]

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) Malthus disagreed with popular opinion, claiming that breeding should be discouraged, especially among the poor.
(B) Malthus believed that by discouraging breeding among the poor, it would be possible to strengthen the nation.
(C) Malthus supported programs that limited breeding, believing that population growth might avert certain kinds of disasters.
(D) Malthus was in agreement with the social policies of his day that promoted national strength through breeding.

[Inference]

4 **According to the passage, it can be inferred that Malthus believed**

(A) the more ill and poor people are in a country, the more resources will be wasted.
(B) marriage between poor people should be banned.
(C) rich people had a better sense of morality.
(D) artificial population control was unnecessary.

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

Thomas Malthus believed that unchecked population growth would lead to disaster, and some controls were necessary.

(A) Unhealthy living conditions such as those suffered by the poor were *breeding grounds* for diseases.
(B) The basis of Malthus's theory was the idea that human population will always grow to the farthest limits of the food supply, endangering society.
(C) Malthus's work encouraged leaders to change their attitudes toward human reproduction.
(D) Malthus posited that nature had its own means of controlling population but that these were not always effective.
(E) To ensure the well-being of society, Malthus argued, it is necessary to control population growth through artificial means, including controlled breeding.
(F) Malthus's work in the study of populations has influenced countless other scientists, among them Charles Darwin.

Pastoralism and Horticulture

Scientists believe that the earliest agrarian societies practiced what is known as mixed farming, raising both plants and animals for food and other essential products. As civilizations grew more populous, the need for crops and meat increased dramatically. Over time, the theory goes, the demands of managing both of these practices became too great, and they split into two specialized types of agriculture: pastoralism and horticulture.

Pastoral farming is an area of agriculture that consists of raising and breeding livestock such as cattle, sheep, or goats. Pastoral societies are known to inhabit less fertile lands, since historically the most fertile lands were reserved for growing crops. In these outlands, the herds feed on forage like grass and different types of brush. Such resources are unusable to humans, but they are still more than adequate for nourishing livestock, from which farmers cultivate meat, milk, hides, wool, and other important staples of life. [A] However, since the land used by pastoralists is of relatively poor quality, pastoral farming is often associated with nomadism, or moving from place to place in search of better resources. [B] When important resources like grass or water are used up in one area, as often happens, farmers move their herds to areas with new sources of food and water. [C] They often have a range of pastures to which they can move their herds, often spanning areas of hundreds of miles. [D]

➡ By contrast, societies based on horticulture are generally stationary, as they must always be near the crops that sustain them. However, some early horticultural societies did migrate with the seasons, farming crops in two different locations according to what type of plants the soil and climate of each place could support. Otherwise, societies that rely on horticulture for subsistence are among the most stable. In some areas, farmlands are not readily available, and must instead be created. The most common method for clearing farmland is fire, by which forests and grasslands can be quickly cleared. In addition, fires help to make farmland more fertile by putting more nutrients into the soil. Farmers may also move certain crops to different fields each year, a practice known as crop rotation, to keep the soil healthy. The crops can be consumed, traded, or even used to pay taxes or marriage dowries, depending upon the culture.

A common assumption is that pastoral and horticultural societies are self-sufficient and cultivate their food sources only for their own consumption. However, there is a long-standing historical relationship between pastoralist societies and those that practice exclusive horticulture. This relationship is based on the trading of plants and livestock products, providing each party with the resource they lack. A horticultural society requires sources of protein to supplement its vegetables and fruits, while pastoralists trade for the vitamins and nutrients of plants, which their meat lacks.

- **agrarian** *a.* relating to farming
- **agriculture** *n.* producing crops and raising livestock
- **pastoralism** *n.* way of life depending on livestock
- **horticulture** *n.* cultivating plants
- **livestock** *n.* animals such as cows and sheep that are raised on a farm
- **fertile** *a.* able to produce good crops
- **nourish** *v.* to give food
- **nomadism** *n.* a way of life, moving seasonally from place to place to search for food and water for humans and their livestock
- **sustain** *v.* to support
- **migrate** *v.* to move to another region or country
- **crop rotation** *n.* changing crops each year in order to improve soil quality
- **dowry** *n.* bride's family's gift to bridegroom's family
- **self-sufficient** *a.* able to provide necessary things without help from others
- **cultivate** *v.* to plant and grow crops
- **exclusive** *a.* focused on only one thing
- **supplement** *v.* to add something

[Reference]

1 The word **they** in the passage refers to

(A) livestock
(B) farmers
(C) humans
(D) resources

[Vocabulary]

2 The word **stationary** in the passage is closest in meaning to

(A) mobile
(B) healthy
(C) settled
(D) practical

[Negative Fact]

3 What is NOT true of Horticulturalists?

(A) Some of them migrated seasonally.
(B) They practiced crop rotation in order to keep soil fertile.
(C) Their crops were not only used as a source of food, but also for many other purposes.
(D) They burned their farms in order to eliminate harmful insects.

Paragraph 3 is marked with an arrow [➡].

[Insertion]

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

This allows farmers to rotate their herds to new grazing lands on at least a seasonal basis.

Where would the sentence best fit?

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the farming practice to which they relate. TWO of the answer choices will not be used.

Horticulturalists	Pastoralists
•	•
•	

Both
•
•

Answer Choices

(A) Lifestyle is one of constant movement
(B) Greater chance at amassing wealth
(C) Must sometimes modify land for use
(D) Trade with others to meet all needs
(E) Wrongly assumed to be self-sufficient
(F) Used fertile lands
(G) Strictly hierarchical society

Slums of the Industrial Revolution

➡ During the Industrial Revolution, England's towns and villages were transformed over just a few decades into major industrial centers. Factories were built in towns such as Manchester and Birmingham due to their access to shipping routes, and these factories required a great deal of workers. These were often people whose former trades had been taken over by machines, leaving them out of work and desperate for income. While the upper-class factory owners lived in large houses outside the city, the workers generally lived together in filthy apartment houses at the city's center, near their places of work. Factory owners would often set up "company towns": sections of the city in which the apartment buildings, grocery stores, and schools were all owned by the factory owners. Whatever money the workers were able to earn was often paid right back to the factory owners in the form of rent and food bills.

Because of the massive influx of workers moving from the country into the industrial centers, tenements went up all over the industrial centers to house workers, but the residents there faced squalid living conditions. The houses were very small, sometimes housing many families in one large apartment, or single families in one small room. In addition, houses were built side by side in very close quarters, making for dirty, crowded neighborhoods known as slums, which were characterized by high crime rates and poor living conditions. The neighborhoods would often have little better than open sewer systems. Several neighbors often had to share the same toilet facilities as well. The growth of such tenements was such that it put a special strain on the cities' water and sewage systems, so that it was not uncommon for sewage to be running into the streets and the yards of the tenement houses. Given these living conditions, it is not surprising that disease sprang up quickly in these areas due to sewage problems and contaminated water, and spread rapidly from one person to another due to the close proximity in which everyone lived. Large numbers of workers died from cholera and typhoid spread through bad water, as well as smallpox.

➡ Conditions did slowly improve throughout the 19th century as the government intervened and introduced several reforms. Parliament member Michael Thomas Sadler was a major supporter of workers' rights, and authored the Sadler Report in 1832 to show the government that factory owners were engaging in terrible abuses of workers, including women and children. In addition to reducing the average workday and limiting child labor, Sadler worked to ensure that factory owners provided their workers with decent living conditions, as well as education for their children. Further reforms limited the number of homes that could be built in a specific area. The Public Health Act of 1875 forced towns to pave and clean the roads, and a combination of gas lighting and new police forces improved the safety conditions on the streets. Closed, underground sewer systems were finally built, and all water was filtered for purity. New regulations also sought to help the poor and unemployed, providing soup kitchens for those who could not afford to feed themselves.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. influx	(a) closeness in distance or time
2. proximity	(b) to become involved in a difficult situation in order to solve it
3. intervene	(c) to pollute
4. contaminate	(d) arrival of a large number of people
5. desperate	(e) in great need

1 **According to paragraph 1, many people came to work in factories because**

(A) they did not receive a proper education
(B) their homes were already in the city
(C) they were not qualified to do anything else
(D) their jobs were lost to machine labor

Paragraph 1 is marked with an arrow [➡].

2 **The word squalid in the sentence is closest in meaning to**

(A) sufficient
(B) miserable
(C) modest
(D) persistent

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) Poor sanitation and overcrowding led to the rapid spread of diseases through tenements and slums.
(B) Living conditions allowed for diseases to spread quickly among those with poor sewage systems.
(C) Slums were major breeding grounds for diseases because people lived so closely with one another.
(D) Typhoid and cholera were two serious diseases spread by infections from overflowing sewage.

4 **According to the passage, what can be inferred about the factory towns of the Industrial Revolution?**

(A) The living conditions were regulated by the government.
(B) Crime rates had been high long before the factory towns were built.
(C) The sudden population growth overwhelmed their resources.
(D) Some of the factory towns were owned by factory workers.

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Industrial Revolution caused a mass migration of workers into the cities, where for years living conditions were no better than slums.

(A) Factory owners could afford to live in large houses outside the cities, while workers had to be close to the factories.
(B) Workers were housed in tenements — small, cheaply built apartment houses that were often crowded and dirty.
(C) Filthy living conditions in the slums contributed to high crime rates and the spread of deadly diseases.
(D) Reforms led by the government resulted in significant improvements in the lives of factory workers.
(E) Workers flocked to the cities despite having to live in slums because most industries were centralized there.
(F) Government regulations later required factory owners to provide children with an education.

Memory

The exact workings of memory are still largely a mystery to scientists. The study of memory includes both psychology and neurology, as the storing of memories has both mental and biological components. In the past few decades, researchers have learned a great deal about how memory works, most notably that the process of creating memories can be separated into three stages or types: sensory memory, short-term memory, and long-term memory. The first of these three, sensory memory, is by far the most fleeting and insubstantial of the three stages. Sensory memory is different from what is usually thought of as memory, in that it refers to the ability to retain important information while ignoring everything else. In this way, it is closely related to attention and concentration. When one is focusing most of his or her attention on a specific task, for instance, any stimulus not related to that task is unlikely to be noticed, though it may superficially be perceived. This filter of sorts is very helpful in eliminating sounds or sights that may distract from the task at hand, thereby increasing one's ability to concentrate on what is most important at that moment.

➡ When pertinent information is allowed into one's consciousness, however, it becomes the domain of the short-term memory. Short-term memory has been shown to have a duration of just a few seconds to a few minutes, and is most useful in quickly recalling information most relevant to specific tasks, so for information to be successfully retrieved from the short-term memory, it must be used within a very brief time period, or else the memory will decay. One example is reading a phone number from a phone book and then looking away to dial the number on a phone. **A** If a distraction comes in the middle of this process, it takes only seconds for the memory of the phone number to disappear. **B** One way that the effectiveness of short-term memory can be increased is by sorting information into small clusters. **C** In the example of the telephone number, a person who tries to remember the number in its entirety will more quickly forget it before dialing. **D** However, if this same person memorizes the number in groups of digits rather than a whole, then the memory is likely to endure longer.

➡ Long-term memory is much more complex, as it can retain many decades worth of information. Long-term memories may be very old, such as the recollection of a childhood birthday party, or they may be recent, such as the top story on the morning news. This represents two distinct types of memories: episodic and semantic. Memories of events such as a party are called episodic memories, because they recall episodes from one's experience. Of course, there are also memories that are not connected to some specific time, place, or event. These are called semantic memories, and can include a wide variety of factual information such as the rules of grammar or the lyrics to one's favorite song. Memories that are stored for the long term can be one or the other, and are often some mixture of the two as well. Distinctions between these two different types of memories serve as a kind of filing system that allows the brain to more easily recall individual memories.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. pertinent	(a) to recall something from memory
2. retrieve	(b) not profoundly
3. superficially	(c) to get rid of
4. eliminate	(d) relevant to a topic that is being discussed

1 According to the passage, all of the following are true of **sensory memory** EXCEPT:

(A) It is helpful in filtering out information that is irrelevant.
(B) It lasts only temporarily compared to long-term or short-term memory.
(C) It is often overwhelmed in the presence of too much stimulation.
(D) It improves concentration by ignoring most distractions.

2 The word **it** in the passage refers to

(A) task
(B) stimulus
(C) attention
(D) memory

3 In paragraph 2, why does the author use the example of the phone number?

(A) To frame a discussion of how short-term memory helps with everyday tasks.
(B) To show how repeating information can help one remember it better.
(C) To give an example of a situation in which long-term memory is useful.
(D) To explain the limits of short-term memory and how to improve it.

Paragraph 2 is marked with an arrow [➡].

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

This involves breaking down large amounts of information into small parts that are easier to digest.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

Creating memories is a complex process that involves three components: sensory memory, short-term memory, and long-term memory.

(A) Information directly related to carrying out particular tasks can be stored and retrieved for a maximum of a few minutes.
(B) Memories that persist for a few hours to many years are often associated with either important experiences or helpful information.
(C) Memories of specific events in one's life tend to be easier to store for long periods than some factual information.
(D) The longer one stores a memory, the more vivid and accessible that memory becomes over time.
(E) The brain is able to ignore information that it does not need at a given moment in order to retain information that is most useful.
(F) More information can be remembered temporarily if it is broken down into smaller pieces that are easier to recall.

Adam Smith and *The Wealth of Nations*

➡ In 1776, the same year America gained independence from the British, philosopher Adam Smith wrote a book that would earn him a permanent place in history, as well as the title of the "father of modern economics." The book that made him such an esteemed figure was *The Wealth of Nations*, in which he outlined his theories on "political economy" — the ways in which human behavior, market factors, government regulation, and several other factors drive business and commerce. Smith's work laid the foundation for the modern study of economics, most notably the classical school of economics, from which principles of capitalism and the free market economy originated. More than an economist, however, Smith had a keen interest in human nature, and it was his study of the interaction of human nature with social institutions that led to his groundbreaking work in economics.

➡ At the age of 14, Smith began a long and intensive study of philosophy at the University of Glasgow, in his home country of Scotland, later moving to Oxford. Upon graduating, he obtained his first job as a lecturer. It was through his lectures that he gained much positive attention from both his students and his contemporaries, eventually becoming a professor of moral philosophy back at the University of Glasgow. It was in this subject that he published his first book, *The Theory of Moral Sentiments*, which dealt mainly with his ideas about human nature. He believed it was an unchanging and universal characteristic of human beings that could be used to predict the behavior of people within societies. Smith wrote of how humans seemed to possess two different, seemingly contradictory tendencies: on one hand, they are passionate beings driven by self-preservation; on the other hand, they are rational beings with the ability to discern right from wrong. These two opposing forces seemed to regulate one another in human behavior, he said, since passionate, self-interested beings were still capable of establishing organized institutions for the betterment of all men.

➡ The ideas put forth in *The Theory of Moral Sentiments* would lay the groundwork for his study of political economy later on. In fact, it can be said that *The Wealth of Nations* was not its own separate economic treatise, but rather a continuation of the philosophical writings of his earlier work. Smith expanded on his idea of the duality of human nature to examine the workings of the ideal society in terms of its economy. According to his theory, the best society was one in which its participants were dependent upon one another to meet their economic needs. Smith envisioned what he called a "system of perfect liberty," in which the market was left untouched by government institutions, and the terms of business were determined instead by "natural" forces. Economic factors like supply and demand would serve as an "invisible hand" that could guide the markets toward prosperity without any need for government regulation. A This idea would later become known as *laissez-faire* capitalism. B

➡ Under these circumstances, Smith argued, people can improve their own lot while also improving society. C This is because the capitalist system exploits the duality of human nature, as discussed in his previous book. D According to Smith's model, competition would become the factor that balances man's selfish tendencies with his more rational ones. Because individual producers would be forced to compete with one another both for business and for good labor, prices would be determined by

what consumers were willing and able to pay, and wages determined by how much workers are willing to sell their labor for, which would help commerce. The combined effect would create a healthy and robust economy driven both by consumers' freedom of choice and by producers' desire to outcompete other businesses to achieve unlimited wealth. In this way, self-interest could actually work for the good of society on the whole. Unfortunately, time proved Smith's theories somewhat idealistic, as fierce competition would lead to such villainy as the labor abuses of the Industrial Revolution just decades later. However, despite the introduction of some government regulation, the basic tenets of Smith's philosophy still underpin the economic policies of most civilized nations today.

1 The word **esteemed** in the passage is closest in meaning to

(A) talented
(B) unusual
(C) respected
(D) enduring

2 According to paragraph 1, Smith defined political economy as

(A) the measure of business and commerce in an economy
(B) the ways human nature can change social institutions
(C) the guiding of market activity by an invisible hand
(D) the interaction between people, markets, and government

Paragraph 1 is marked with an arrow [➡].

3 The word **contradictory** in the passage is closest in meaning to

(A) fascinating
(B) conflicting
(C) doubtful
(D) practical

4 According to paragraph 2, the primary concept addressed in Smith's first book is

(A) social behavior
(B) political economy
(C) human nature
(D) government institutions

Paragraph 2 is marked with an arrow [➡].

5 According to paragraph 3, Adam Smith saw humans as contradictory beings because

(A) they seek self-interest and at the same time have moral discernment
(B) they seek freedom and at the same time try to establish social order
(C) they behave individually as well as collectively
(D) they want to make equality in society and at the same time, seek to climb up the social ladder

Paragraph 3 is marked with an arrow [➡].

6 The word **treatise** in the passage is closest in meaning to

(A) essay
(B) process
(C) system
(D) directive

7 The phrase **these circumstances** in the passage refers to

(A) the restrictions required for a healthy economy
(B) the tendency for the individual to act selfishly
(C) the idea that people have a double nature
(D) the freedom of the market to regulate itself

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

(A) Producers that compete for labor and business would set prices at whatever level would bring them the most profits.
(B) If businesses were forced to compete with one another, prices and wages would be determined by what consumers were able to demand.
(C) Competition between businesses would establish prices and wages that largely favor consumers and workers, which in turn would benefit commerce.
(D) Consumers set prices and wages for themselves because producers are intent upon competing with one another for business and labor.

9 Why does the author mention **labor abuses of the Industrial Revolution**?

(A) To suggest that Smith's ideas were open to abuse by immoral people
(B) To argue that Smith's idea is a realistic option in modern economics
(C) To illustrate inhumane aspects of the Industrial Revolution
(D) To show that market forces alone can prevent labor abuses

10 The word **tenets** in the passage is closest in meaning to

(A) formulas
(B) principles
(C) mistakes
(D) interests

11 According to paragraph 4, what can be inferred about the economy envisioned by Smith?

(A) It is too dependent upon the government in order to function properly.
(B) It relies on unbroken trust between producers and consumers.
(C) The system does not take very poor people into account.
(D) It has still never been put into practice successfully.

Paragraph 4 is marked with an arrow [➡].

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

For example, producers and consumers would have to work together to make sure goods were both bought and sold.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

13 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

In *The Wealth of Nations*, Adam Smith drew from his philosophy of human nature to describe the ideal economic system.

(A) Smith's interest in political economy led him to write *The Theory of Moral Sentiments*, which had a significant impact on his later works.

(B) Smith described human nature as having two competing tendencies: one driven by passion and self-interest, and another by reason and sympathy.

(C) During Smith's travels across Europe, he was influenced by some of the continent's greatest political and economic theorists.

(D) Smith's theory is based on the idea that competition between producers could balance passion with reason, and benefit both consumers and producers.

(E) In *The Theory of Moral Sentiments*, Smith outlined an economic system that would influence the development of *laissez-faire* capitalism later on.

(F) The most prosperous society, Smith asserts, is one in which market factors are determined solely by the interaction of individual consumers and producers.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. d _____ *n.* study of human populations
2. b _____ *n.* reproduction; mating and giving birth to offspring
3. p _____ *n.* closeness in distance or time
4. s _____ *a.* able to provide necessary things without help from others
5. i _____ *n.* arrival of a large number of people

B Choose the right meaning for the word in bold.

1. Literacy **underpins** the growth of a modern industrial economy because printed instructions are essential to teaching special skills.

   (A) maintains (B) prevents (C) experiences (D) helps

2. A society may **possess** characteristics that strengthen it in the short term but weaken it in the long term.

   (A) have (B) develop (C) identify (D) change

3. If poisonous waste **contaminates** a body of water, then the pollution may have serious effects on societies in that region.

   (A) increases (B) pollutes (C) turns off (D) follows

4. The American armed forces use reserves to **supplement** the strength and abilities of the army, navy, and air force.

   (A) recover (B) find (C) use (D) enhance

C Choose the words in the box to fill in the blank. You may have to change the word forms.

recollect	alcohol	superficial	prosper

1. Centuries after Europeans introduced them to strong drinks such as whiskey, _____ remains a serious problem among Native Americans.

2. Because _____ is relative, a country may seem wealthy by one standard but poor by another standard.

3. Although America was _____ the same country between 1945 and 1955, technology changed the nation in deep and lasting ways.

4. People who think the 1950s were happy in America have no _____ of what that time was really like.

D Choose the right word for the blank in each sentence.

1. When a fight between two student groups at the university became too intense, the administration was forced to _____.

   (A) spring up (B) rule out (C) intervene (D) surge

2. From 1863 to 1865, the southern armies waged a _____ defense against the much stronger northern forces.

   (A) desperate (B) complex (C) episodic (D) semantic

3. Starting in the 19th century, public education in the United States _____ the development of an advanced industrial society.

   (A) consumed (B) transformed (C) conducted (D) nourished

4. The building of railroads across the United States laid the _____, so to speak, for a truly unified nation.

   (A) regulation (B) foundation (C) combination (D) duration

Useful Terms

Economics

- ☐ market economy
- ☐ planned economy
- ☐ supply and demand
- ☐ goods and services
- ☐ production
- ☐ allocation
- ☐ consumption
- ☐ opportunity cost
- ☐ business cycle
- ☐ bankruptcy
- ☐ depression
- ☐ inflation
- ☐ investment
- ☐ speculation
- ☐ stock and bond
- ☐ principal and interest
- ☐ surplus and deficit
- ☐ tariff
- ☐ budget
- ☐ revenue
- ☐ expenditure
- ☐ currency
- ☐ monopoly and oligopoly

Geography

- ☐ topography
- ☐ rugged
- ☐ upland
- ☐ plateau
- ☐ canyon
- ☐ gorge
- ☐ ridge
- ☐ delta
- ☐ sandbar
- ☐ lagoon
- ☐ archipelago
- ☐ peninsula
- ☐ tributary
- ☐ estuary
- ☐ hot spring
- ☐ geyser
- ☐ canal
- ☐ agriculture
- ☐ pastoralism
- ☐ nomadism

Psychology

- ☐ subconscious
- ☐ behaviorism
- ☐ stimulus and response
- ☐ conditioning
- ☐ motivation
- ☐ perception
- ☐ sensory memory
- ☐ short-term memory
- ☐ long-term memory
- ☐ unconscious
- ☐ id, ego, superego
- ☐ catharsis
- ☐ concentration
- ☐ distraction
- ☐ hallucination
- ☐ introspective
- ☐ recollection
- ☐ retrieve
- ☐ cognition
- ☐ egocentrism

Politics

- ☐ referendum
- ☐ suffrage
- ☐ petition
- ☐ recall
- ☐ absentee vote
- ☐ plurality
- ☐ unanimous
- ☐ sovereignty
- ☐ autonomy
- ☐ appointment
- ☐ cabinet
- ☐ separation of powers
- ☐ checks and balances
- ☐ legislature
- ☐ judiciary
- ☐ administration
- ☐ public opinion
- ☐ freedom of assembly
- ☐ freedom of the press
- ☐ freedom of association

CHAPTER

05

General Biology

- Autotrophs and Heterotrophs
- Viruses and Bacteria
- Andreas Vesalius
- Cell Structure
- Circadian Rhythm

Approaching Themes

Autotrophs and Heterotrophs

One of the most fundamental distinctions that can be made between various organisms is the method in which they get the energy needed to survive. Some organisms combine inorganic molecules to create simple sugars and carbohydrates, which can later be broken down to produce energy. Such organisms thus produce their own fuel, and for this reason are known as autotrophs. Other organisms get their fuel by consuming and digesting the organic molecules created by autotrophs. These organisms are known as heterotrophs.

➡ By simple reasoning, we know that autotrophic organisms must have been the first forms of life to emerge on the planet; hetertrophs simply could not have survived if there were no autotrophs to provide the fuel they need. There are two sub-categories of autotrophs, classified by the energy source they rely on. The most familiar to us in the modern world are photoautotrophs. These are organisms which utilize the power of sunlight to combine inorganic molecules. All plants, algae, and some forms of plankton are photoautotrophs. These organisms form the base of the world's food chain by synthesizing the organic molecules that sustain nearly all other forms of life on earth.

As essential as photoautotrophs are to the modern food chain, however, it is unlikely that they were the first forms of life. That distinction most likely belongs to chemoautotrophs, life forms that use chemical energy to synthesize organic molecules. Today, chemoautotrophs are most commonly found in extremely inhospitable environments, like near volcanic vents at the bottom of the ocean, or in caves miles below the surface of the earth. Billions of years ago, however, conditions on the surface of the earth were much different, and chemoautotrophs may have thrived in these harsh environments.

➡ As a general rule, heterotrophs are much more advanced than autotrophs. Most heterotrophs have complex anatomical structures including bones, muscles, central nervous systems, and sense organs – all of which are entirely absent from autotrophic organisms. Even single-celled heterotrophs are generally more complex than their autotrophic cousins. This complexity is necessary because heterotrophs must actively seek out food sources. Insects must be able to crawl along the forest floor or fly to reach new sources of food. Similarly, a tiger must be able to first sense its prey, and then chase it down. Thus, the biological complexity of heterotrophs evolved directly out of their need to seek out new food sources.

- **fundamental** *a.* most basic and important
- **inorganic** *a.* not derived from any living things
- **molecule** *n.* the smallest unit of a substance
- **carbohydrate** *n.* a compound containing carbon, hydrogen, and oxygen
- **synthesize** *v.* to combine various components into a new thing
- **sustain** *v.* to support; to provide nourishment
- **inhospitable** *a.* harsh, difficult to live in
- **anatomical** *a.* of or about the bodily structure
- **complexity** *n.* the state of being difficult to understand

[Fact]

1 According to paragraph 2, photoautotrophs are characterized by

(A) their status as the first life forms on earth
(B) their use of light as an energy source
(C) their single-celled forms
(D) their reliance on other life forms as food sources

Paragraph 2 is marked with an arrow [➡].

[Negative Fact]

2 What is NOT true about autotrophs?

(A) They are the oldest life forms on earth.
(B) They use chemicals to sustain their life.
(C) They do best in extreme conditions.
(D) They belong to the category of heterotrophs.

[Vocabulary]

3 The word **thrived** in the passage is closest in meaning to

(A) survived
(B) existed
(C) evolved
(D) prospered

[Rhetorical Purpose]

4 In paragraph 4, why does the author mention insects and tigers?

(A) To emphasize the diversity of heterotrophs
(B) To explain why heterotrophs possess complex anatomies
(C) To contrast between well-known autotrophs and a well-known heterotroph
(D) To explain the role of heterotrophs in the food chain

Paragraph 4 is marked with an arrow [➡].

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

All organisms on earth can be classified as either autotrophic or heterotrophic organisms.

(A) Autotrophs can be subdivided into two categories according to whether they use chemical or solar energy to synthesize their fuel.
(B) There is still some debate as to whether chemoautotrophs or photoautotrophs were the first organisms on earth.
(C) Autotrophs include all plants, algaes, and some tiny sea creatures.
(D) Heterotrophs must feed on materials produced by autotrophs, and are more advanced for this reason.
(E) Although chemoautotrophs played a key role in the early history of life on earth, they are reduced to a few ecological niches today.
(F) In the modern food chain, neither autotrophs nor heterotrophs can survive without the other.

Viruses and Bacteria

Bacteria and viruses are often spoken of in similar terms, especially in regard to their ability to cause disease. However, beyond this common trait, the two differ in a number of important ways. For instance, bacteria are living organisms, and as such can survive independently of other living things. Viruses, on the other hand, are inactive unless they find their way into a living host, at which time they are able to grow and reproduce.

One major difference between bacteria and viruses is their composition. Bacteria are the simplest forms of life on Earth, but are rather complex in their make-up when compared to viruses. Like any cell, a bacterium is surrounded by a protective wall, or membrane, that holds its contents together. Inside the membrane is a bundle of DNA that carries the bacterium's genetic information. Viruses are similar in that they also contain genes in the form of either DNA or RNA, though in far smaller quantities. In viruses, however, these materials are contained not in a cell membrane, but in a thinner outer coating of proteins.

➡ Bacteria and viruses also differ greatly in their methods of reproduction. Again, it is the bacterium's status as a single-celled living organism that sets it apart from the virus. Bacteria reproduce asexually through cell division. Once they grow to a certain size, the DNA inside splits into two identical structures, and slowly the cell breaks apart, with one group of DNA in each new cell. Reproduction of bacteria is limited, however, to the nutrients available in the environment. Viruses, on the other hand, cannot reproduce until they have latched onto a host. After a virus attaches itself to a host cell, the virus works its way into the cell through the membrane. As the virus's protein shell dissolves, the genetic information in the virus is released into the cell where it can reproduce and spread. Viruses will continue to reproduce rapidly until the host's resources have been completely used up, at which time they can simply find a new host.

A Diseases caused by viruses range from the common cold to HIV, and can be either temporary and relatively harmless or life-long and potentially deadly. B While there is no real cure for viral diseases, vaccines and antiviral drugs can help. C Vaccines introduce a very small portion of the virus into the body, so that if a person does come in contact with the virus, he or she is already immune to its effects. D Antiviral drugs have only come into being in the last 20 years or so, and work by halting the reproduction of the virus rather than killing it. Bacterial infections are far easier to treat; antibiotic drugs work with the immune system to quickly kill most infections.

• **inactive** *a.* not doing anything • **reproduce** *v.* to give birth to offspring • **composition** *n.* the way something is made • **protective** *a.* preventing someone or something from being damaged • **membrane** *n.* a thin covering of a cell • **set something apart** *v.* to make something different from something else • **asexually** *ad.* without fusion of male and female sex cells • **identical** *a.* the same • **latch onto** *v.* to hold tightly to something • **host** *n.* an organism where a smaller organism lives as a parasite • **dissolve** *v.* to mix with liquid • **harmless** *a.* not causing damage • **infection** *n.* getting a communicable disease

[Reference]

1 The word **its** in the passage refers to

(A) cell
(B) bacterium
(C) membrane
(D) make-up

[Simplification]

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.

(A) As the cell grows larger, it splits into two separate cells, each with identical genetic material from the original cell.
(B) When the cell splits in two, it grows large enough so that its DNA can replicate and create a new cell.
(C) DNA is replicated within the cell, at which point the cell grows larger and eventually splits into two different cells.
(D) Cells reproduce by dividing themselves into two separate cells with different genetic materials.

[Inference]

3 In paragraph 3, what is implied about the reproduction of viruses?

(A) It always reproduces the same number of viruses.
(B) It occurs through the division of a single cell.
(C) It can go on indefinitely if there is a host.
(D) It cannot occur outside a host cell.

Paragraph 3 is marked with an arrow [➡].

[Insertion]

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

Most types of bacteria are beneficial to humans, and not all viruses carry disease, but both can be harmful when they disrupt the normal functioning of the human body.

Where would the sentence best fit?

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to either viruses, bacteria, or both. TWO of the answer choices will not be used.

Virus	Bacteria	Both
•	•	•
•	•	

Answer Choices

(A) Cannot reproduce outside of a host
(B) Antibiotic drugs are used to treat diseases
(C) Contain bundles of DNA at their center
(D) Single-celled organisms that can live independently
(E) Reproduce by inserting its DNA or RNA into a cell
(F) Lack an outer coating to protect its genetic material
(G) Do not disrupt normal functioning of the human body

Andreas Vesalius

➡ The study of human anatomy would not be as advanced as it is today without the contributions of early biologist Andreas Vesalius, whose work during the 16th century challenged several moral and social boundaries in pursuit of knowledge. Before Vesalius' research was published, knowledge of human anatomy was no more advanced than it had been in late Roman times. Rules imposed on scientific research by the Catholic church made it unlawful to dissect a human corpse, so scientists could not observe first-hand what goes on inside the human body. Vesalius would find a way around these laws to produce the first accurate records of humans' internal anatomy, including, among other things, the workings of the circulatory system, as well as the structure of muscles and the human skeleton.

Vesalius began his career in science as a professor at the University of Padua in Italy. He made an instant impression on his students and his colleagues with his unique teaching style, in which he used his own drawings of human anatomy as visual aids for his students. These would later become famous when he published them in his many books on anatomy, though the graphic and often disturbing nature of the images made him a controversial figure in his time. Vesalius also broke new ground by being the first professor to actually dissect the animals being studied. This kind of work was usually reserved for laboratory assistants. His passion for the subject simply would not allow him to stand on the sidelines; involvement in every aspect of teaching and presenting anatomy was the only way in which he wished to work.

During this time, he began to study the work of another famous biologist, Galen, whose research from the ancient Roman period had remained unquestioned for centuries. Like Vesalius, Galen was constrained by the laws of his time, and gained his knowledge of anatomy from the dissection of monkeys instead of humans. As such, he generally assumed that the anatomy of a monkey was no different than that of a human, which Vesalius believed led to many misconceptions about human anatomy. It was these misconceptions that Vesalius wished to correct in his own research. Vesalius used his contacts in the legal system, most notably a judge who was familiar with his work, to gain the ability to legally dissect human bodies. The one condition was that he only work on the bodies of convicted criminals. A system was devised whereby Vesalius could obtain corpses of executed prisoners from the local prison.

With the ability to dissect human bodies, Vesalius respectfully but firmly disproved many of Galen's ideas, for example, the assertion that blood vessels originate in the liver. His work proceeded at a rapid pace, and his writings on human anatomy soon made up a volume-sized work, *De humanis corporis fabrica*, which also included his many detailed drawings and written versions of his famous university lectures. Published in 1543, this work quickly became the primary textbook for students of biology. The accurate descriptions of each and every organ, bone, muscle, and appendage of the human body made it the premier source of anatomical knowledge for generations to come. For his distinguished work, Vesalius was appointed physician to Holy Roman Emperor Charles V.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. boundary	(a) accepted by everyone
2. unlawful	(b) limit
3. controversial	(c) explanation that gives details about something
4. unquestioned	(d) causing disagreement
5. description	(e) illegal

1 **According to paragraph 1, Vesalius made important discoveries regarding all of the following EXCEPT**

(A) the human skeleton
(B) groups of muscles
(C) the human brain
(D) the circulatory system

Paragraph 1 is marked with an arrow [➡].

2 **The word These in the passage refers to**

(A) Students
(B) Colleagues
(C) Drawings
(D) Books

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) Vesalius was dissatisfied with the work of his assistants, and so had no other choice but to take their responsibilities upon himself.
(B) Vesalius' passion for the subject of anatomy compelled him to perform all the duties associated with teaching.
(C) Vesalius' unique teaching style allowed him to rely on the work of his assistants to help him teach and present his research in anatomy.
(D) Vesalius would not teach at the university unless he was allowed to participate in all parts of the teaching process.

4 **The word constrained in the passage is closest in meaning to**

(A) challenged
(B) encouraged
(C) limited
(D) fascinated

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

Andreas Vesalius made unmatched contributions to the field of anatomy, though his methods were sometimes controversial.

(A) Prior to Vesalius' research in human anatomy, it was widely believed that blood vessels originated in the liver.
(B) Vesalius was permitted to dissect human bodies, but only those of convicted and executed criminals.
(C) Vesalius found a way around the laws of his day and became the first European biologist to routinely dissect human corpses for study.
(D) Galen based his knowledge of human anatomy on the dissection of monkeys, which led to many false assumptions.
(E) Many misunderstandings of human anatomy persisted since Roman times, but Vesalius' research brought the study of anatomy up to date.
(F) Vesalius caused controversy during his career as a college professor due to his use of detailed drawings of human anatomy and his preference for dissecting his subjects himself.

Cell Structure

Cells are often called the building blocks of life, as they are the smallest functional unit of all life on Earth. Some life forms, like bacteria, consist of only one cell, while the human body is estimated to contain over 100 trillion cells. While every cell is a mostly autonomous unit, cells can also join with one another or work in cooperation to make up extremely complex forms of life. Cells in mammals, birds, and other animals can vary in size and shape, depending upon their function or the organism in which they are found, but all are composed of the same basic parts.

➡ Every cell has a protective covering that holds together its many parts and prevents interference from outside forces. This is called the cell membrane, and may be thought of as the skin of the cell. [A] The cell membrane is selectively permeable — this means that it can choose to let some materials pass through it and to block other materials. [B] Attached to the cell membrane is the cytoskeleton, a rigid structure that helps the cell maintain its shape. [C] Like a human skeleton, the cytoskeleton forms a defensive grid-like pattern around the cell that holds the membrane in place and protects the internal components of the cell. [D] The cytoskeleton may serve other purposes as well: it may contain what are called flagella, small hairs that help the cell move through external liquid.

Inside the cell membrane is a fluid called cytoplasm, which surrounds and cushions all of the internal cell parts. Located within the cytoplasm are organelles, small parts of the cell that serve specific functions to promote the cell's well-being. What organs are to the human body, organelles are to the cell. Of these several organelles, one of the most significant is the mitochondrion. Mitochondria are often called the power plants of the cell, as they produce the energy needed by the cell. They do this by taking various nutrients from the cytoplasm, which they use as their "fuel," and mixing them with oxygen in a process called cellular respiration. The result is the creation of another substance, called ATP, which provides the cell with ample energy to survive by regulating its internal metabolism.

The most important part of the cell as a whole is the nucleus, or the control center of the cell. Kept safe within the nucleus is the genetic information that determines every characteristic and trait of that cell. The nucleus is constructed much like a smaller cell within the larger cell. It is protected by a double-layered cell membrane that separates the material inside from the cytoplasm floating around it. It also has its own type of skeleton, called a nuclear lamina, which gives support to the structure of the nucleus. The nucleus transmits genetic information through pores in the membrane to other parts of the cell to inform the formation, maintenance, and reproduction of the cell as a whole. When the cell reproduces, it is this important DNA that determines how all future cells will look and function.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. permeable	(a) to build or form something
2. attach	(b) preservation of something
3. construct	(c) allowing substances to pass through
4. maintenance	(d) to protect something against impact
5. cushion	(e) to fix something to a place

1 The word **autonomous** in the passage is closest in meaning to

(A) reliant
(B) independent
(C) significant
(D) essential

2 According to paragraph 2, all of the following are true of the cytoskeleton EXCEPT:

(A) It helps the cell keep its shape.
(B) It is attached to the cell membrane.
(C) It has pores that allow nutrients to enter.
(D) It protects the cell from internal damage.

Paragraph 2 is marked with an arrow [➡].

3 Why does the author mention **power plants**?

(A) To explain the significance of organelles
(B) To illustrate the function of mitochondria
(C) To show how much energy a cell requires
(D) To prove that cells are self-sufficient

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

In this way, the cell is able to absorb the nutrients it needs without letting in unnecessary or harmful elements.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

All animal cells are made up of the same basic parts, which work together to ensure the health and well-being of the cell.

(A) Inside the membrane are several organelles, among which mitochondria convert oxygen and other nutrients into energy.
(B) The cell derives its shape from the cytoskeleton, which forms a rigid grid-like pattern of support beneath the cell wall.
(C) The outermost parts of the cell are the cell membrane, and cytoskeleton, which selectively let necessary substances in and maintain its shape respectively.
(D) Tiny hairs called flagella that protrude from the cell membrane can be used by the cell to move through liquid surroundings.
(E) The nucleus controls other parts of the cell and is composed of a bundle of DNA and other materials that communicate with the various parts.
(F) The nuclear lamina lines the inner walls of the nuclear membrane and protects the material inside from being damaged.

Circadian Rhythm

The health and well-being of humans, animals, and even plants are largely dependent on natural biological rhythms that help regulate bodily functions and optimize an organism's ability to carry out vital tasks. Most organisms are subject to what is called a circadian rhythm, a roughly 24-hour cycle that is divided into periods of sleep and wakefulness. The circadian rhythm has a far reaching influence over the daily lives of organisms, regulating physical activity, chemical processes, and behavior. Although circadian rhythms are generated internally, they are heavily influenced by environmental cues, most notably the difference between day and night. However, circumstances do arise in which organisms lack the ability to pick up on such cues, or else the cues are altogether absent. In such cases, circadian rhythms are regulated almost entirely by an "internal clock" that informs an organism's biological processes. For the most part, though, circadian rhythms are uniform and predictable across a vast array of species.

➡ The circadian rhythm is controlled by a part of the brain called the hypothalamus, which acts as a clearing house for internal and external cues, collecting and interpreting them and ultimately determining one's sleep patterns. Sleep is induced naturally by a chemical called melatonin, and melatonin production is directly associated with activity in the hypothalamus. The retina of the eye contains special cells that, when activated by light, send signals to the hypothalamus that tell it whether the surroundings are light or dark. The hypothalamus sends this information on to the pineal gland, also in the brain, which either produces or inhibits the production of melatonin, depending on the information it receives. If the retina detects light, then the pineal gland halts production of melatonin, and as the hormone cycles out of the brain, wakefulness follows. The wavelength of the light detected determines how severely melatonin is inhibited. The opposite is true when night falls; the lack of light stimulates the pineal gland to produce more melatonin in preparation for the organism's coming sleep. Some other preparations include lowering body temperature and blood pressure.

➡ *Humans* and other animals follow this basic model most of the time, but under unusual circumstances, this is not always possible. In the extreme northern and southern parts of the world, where the sun does not set for months at a time, the environmental cues that would generally control the circadian rhythm are not always present. Studies have produced mixed results in regard to how Arctic animals respond to prolonged sunlight. Reindeer will display no consistent rhythms for several months out of the year. This is called a free-running rhythm and is regulated only by the animal's awareness of its needs, like those for food and sleep. When the day-night cycle does resume, the reindeer return to a regular circadian rhythm. In another study, squirrels in Alaska were found to follow a strict circadian rhythm year round, despite constant sunlight or darkness. The reason for this is unknown, except that perhaps the sun's position relative to the horizon is enough of a cue to maintain a cycle.

➡ While some organisms can successfully maintain a free-running rhythm, it can be harmful for humans to do so. Not getting enough sleep at regular intervals can cause hormones in the brain to become unbalanced. If a deficiency of sleep continues for long enough, it may even result in mental illness. By ignoring the circadian rhythm, one's waking and sleeping schedule becomes out of sync with

the biological processes that occur during regular sleep, by which muscles are regenerated, memories are stored, and a number of other important processes are carried out. Missing out on any one of these processes can have serious negative physical effects like muscle loss and even heart failure. Sometimes a person's circadian rhythm can become inconsistent when he or she travels a long distance across many different time zones. [A] This is commonly called "jet lag," since it mostly applies to air travel. [B] While the body is still accustomed to the rhythms it established in the place of departure, it is suddenly faced with new environmental cues. [C] This can result in irregular sleep patterns, fatigue, and mental exhaustion. [D]

1 The word **array** in the passage is closest in meaning to

(A) activity
(B) pattern
(C) range
(D) process

2 The word **inhibits** in the passage is closest in meaning to

(A) balances
(B) reduces
(C) stimulates
(D) enhances

3 The word **it** in the passage refers to

(A) hypothalamus
(B) melatonin
(C) retina
(D) pineal gland

4 According to paragraph 2, the amount of melatonin produced is determined by

(A) the signals sent out by the hypothalamus
(B) the length of time the body has been asleep
(C) the wavelength of the light detected by the eye
(D) the level of hormones in the brain

Paragraph 2 is marked with an arrow [➡].

5 According to paragraph 2, all of the following are mentioned as preparations for sleep EXCEPT

(A) lower body temperature
(B) increase in melatonin
(C) decreased mental alertness
(D) change in blood pressure

Paragraph 2 is marked with an arrow [➡].

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.

(A) In the polar regions, daylight can be scarce for long periods, affecting environmental cues.
(B) Environmental cues are more subtle in extreme northern regions, where sunlight is frequent.
(C) At extreme latitudes, environmental cues that control circadian rhythm are limited due to months-long periods of daylight.
(D) Months of daylight can make it difficult to perceive existing environmental cues at low latitudes.

7 The word **prolonged** in the passage is closest in meaning to

(A) extended
(B) intense
(C) absent
(D) weakened

8 Why does the author mention **Reindeer**?

(A) To show how some animals create their own irregular rhythms
(B) To explain why some animals cannot develop a circadian rhythm
(C) To give an example of an animal that lives in the Arctic regions
(D) To come to a conclusion about different animals' circadian rhythms

9 According to paragraph 3, scientists theorize that the circadian rhythm of Alaskan squirrels could be regulated by

(A) the rising and setting of the sun
(B) basic needs like hunger or exhaustion
(C) the position of the sun relative to the horizon
(D) constant sunlight or darkness for several months

Paragraph 3 is marked with an arrow [➡].

10 The word **deficiency** in the passage is closest in meaning to

(A) change
(B) excess
(C) period
(D) shortage

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

Over time, however, the human body can adapt to the new cues if effort is taken to follow them.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

12 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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. ***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 Text**.

A restorative cycle of sleep and wakefulness known as the circadian rhythm helps animals regulate biological processes.

(A) In the absence of obvious environmental cues like night and day, some animals show abnormal behaviors.

(B) The circadian rhythm is regulated in animals by a complex network of cells, glands, and hormones within the brain.

(C) The cues that help establish the circadian rhythm most often come from the internal clock.

(D) The circadian rhythm is so important to maintaining good health that ignoring it can seriously affect human health.

(E) Some animals successfully adjust their circadian rhythm on a special occasion when the daytime lasts for months.

(F) Humans' circadian rhythm can be interrupted when traveling across several time zones, causing fatigue and disorientation.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. i_____ *n.* getting a communicable disease

2. f_____ *a.* the most basic and important

3. i_____ *a.* not composed of any living things

4. i_____ *a.* harsh, difficult to live

5. o_____ *v.* to make something function at its best or most effective

B Choose the right meaning for the word in bold.

1. Some scientists believe there may be enough water and soil on Mars to **sustain** plant life.

(A) support (B) restore (C) change (D) spend

2. The two brothers look **identical**, but if you look closely you will see that one is taller than the other.

(A) short (B) unusual (C) aggressive (D) the same

3. She **latched on to** the ladder very tightly so that she would not fall and hurt herself.

(A) held to (B) reached up to (C) fell from (D) looked down below

4. My father's old car requires a lot of **maintenance** to keep it safe and efficient.

(A) attention (B) care (C) money (D) skill

C Choose the words in the box to fill in the blank. You may have to change the word forms.

harm	law	question	describe

1. We cannot give a _____ of the criminal because he wore a mask when he robbed the bank.

2. The panda bear may look cute and _____, but it is actually a very strong and dangerous animal.

3. The belief that the Earth rotates around the sun is _____, because it has been proven by astronomers.

4. The judge ruled that the man's behavior was _____, and sentenced him to six months in jail.

D Choose the right word for the blank in each sentence.

1. It would be _____ for your health to eat less junk food and exercise more.

   (A) beneficial (B) inorganic (C) inactive (D) controversial

2. Our English classes will _____ after the teacher returns from his two-week vacation in Spain.

   (A) attach (B) resume (C) cushion (D) construct

3. The rock wall was very _____, so rain water could easily pass through it

   (A) inconsistent (B) predictable (C) protective (D) permeable

4. Many of Stephen Hawking's theories have pushed the _____ of science, and helped us to learn more about our universe.

   (A) interval (B) exhaustion (C) boundary (D) deficiency

Useful Terms

Gene & Evolution

- ☐ inherit
- ☐ heredity
- ☐ characteristic
- ☐ trait
- ☐ genetic
- ☐ gene pool
- ☐ DNA
- ☐ dominant
- ☐ recessive
- ☐ mutation
- ☐ hybrid
- ☐ offspring
- ☐ genetic engineering
- ☐ species
- ☐ adaptation
- ☐ survival of the fittest
- ☐ natural selection
- ☐ mutate
- ☐ differentiation of species
- ☐ environmental pressure

Body

- ☐ organ
- ☐ stomach
- ☐ intestine
- ☐ ligament
- ☐ lung
- ☐ biochemical
- ☐ antibody
- ☐ antigen
- ☐ metabolism
- ☐ digestion
- ☐ carbohydrate
- ☐ protein
- ☐ unsaturated fat
- ☐ saturated fat
- ☐ respiration
- ☐ hormone
- ☐ secrete
- ☐ absorb
- ☐ enzyme
- ☐ gland
- ☐ circulation
- ☐ blood vessel
- ☐ vein
- ☐ artery
- ☐ nerve
- ☐ nervous system
- ☐ urine
- ☐ endocrine system
- ☐ receptor
- ☐ activate
- ☐ deactivate
- ☐ endorphin
- ☐ adrenaline

Cell

- ☐ tissue
- ☐ membrane
- ☐ nucleus
- ☐ mitochondria
- ☐ chromosome
- ☐ organism
- ☐ osmotic pressure
- ☐ microbe
- ☐ microscopic
- ☐ unicellular
- ☐ multicellular
- ☐ cell division
- ☐ parent cell
- ☐ daughter cell
- ☐ binary fission

Reproduction

- ☐ reproductive organ
- ☐ mate
- ☐ breed
- ☐ fertilization
- ☐ sperm
- ☐ egg
- ☐ fertilized egg
- ☐ embryo
- ☐ sexual reproduction
- ☐ asexual reproduction
- ☐ external fertilization
- ☐ internal fertilization

CHAPTER

06

Physical Science & Technology

- Isaac Newton
- Spiral and Elliptical Galaxies
- Nuclear Power
- The Space Race
- Comets

Approaching Themes

Isaac Newton

One of the most influential figures in modern history was Isaac Newton, a British scholar whose work led to breakthroughs in many different sciences, including mathematics, astronomy, biology, and chemistry. Surprisingly, for a man with such a brilliant mind, Newton performed below average in his school years. He was admitted to the prestigious Trinity College, but neglected classes to work on his own private studies. When the school closed because of an outbreak of the plague, Newton finally had the time he needed to develop his many theories in math and science. It is often said that Newton made some of his most important discoveries within the year that followed, which is why it is called his *annus mirabilis*, or "year of miracles." His discoveries were later recorded in his famous book *Philosophiae Naturalis Principia Mathematica*, widely considered the most important work of science in history.

The highlight of Newton's book was his three laws of motion. The first law explained the force of inertia, stating that an object will remain either still or moving at its same speed and direction until acted upon by another force. For example, a satellite moving through space will continue to move at a constant speed and direction unless it encounters an obstacle that alters its speed and direction. The second law offers a way to calculate the force acting on an object by multiplying the object's mass by the rate at which its speed changes. In the third law, Newton states that every time a force acts on an object, that object also exerts an equal force in return. Take, for example, a man pushing a large rock up a hill: the man exerts force on the rock to move it, while the rock exerts an equal amount of force on the man.

➡ These three simple rules laid the groundwork for another of Newton's most famous theories, that of gravitation, which also appears in the *Principia*. Newton theorized that every body with mass attracts other bodies with mass, the attraction being stronger for greater masses and at shorter distances. This attraction is of course the force of gravity, and it is an illustration of his third law of motion, that every force involves an opposite and equal force. A Newton applied this theory to an important problem of his day: why the planets move in circular orbits. B The moon orbits the Earth, he theorized, because it is held there by Earth's gravity. C *However*, the force exerted back onto the Earth by the moon keeps it at a distance. D

- **breakthrough** *n.* important discovery
- **outbreak** *n.* sudden occurrence of something unpleasant
- **motion** *n.* movement
- **inertia** *n.* the force that keeps an object moving until it is stopped by another force
- **constant** *a.* remaining the same
- **obstacle** *n.* something that prevents progress
- **encounter** *v.* to be faced with something
- **exert** *v.* to make an effort
- **groundwork** *n.* preparation, foundation
- **gravitation** *n.* the force that causes two planets to attract each other
- **theorize** *v.* to form a theory; to form a possible explanation about some fact
- **opposite** *a.* contrary to something
- **circular** *a.* shaped like a circle
- **orbit** *n.* the path that a planet, moon or satellite follows

[Vocabulary]

1 The word **neglected** in the passage is closest in meaning to

(A) enjoyed
(B) ignored
(C) preferred
(D) disliked

[Rhetorical Purpose]

2 Why does the author mention a **satellite**?

(A) To show what types of objects are affected by his laws of motion
(B) To illustrate how inertia determines the behavior of objects in motion
(C) To illustrate how the force of inertia differs among objects
(D) To show that his laws of motion are universal in all of nature

[Negative Fact]

3 According to paragraph 3, all of the following are true of gravity EXCEPT:

(A) It is stronger in objects with greater mass.
(B) It explains why smaller objects orbit planets.
(C) It is a force exerted by all objects with mass.
(D) It provides an example of Newton's second law.

Paragraph 3 is marked with an arrow [➡].

[Insertion]

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

Newton combined gravitation with his laws of motion to find the solution.

Where would the sentence best fit?

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

Isaac Newton is one of history's most influential scientists, and his work laid the foundation for the study of basic principles of physics.

(A) Newton studied all manner of sciences besides physics, especially math, and is also famous for the invention of calculus.
(B) Newton was fortunate enough to be given time off from college, giving him enough time to conduct research and publish it in the *Principia*.
(C) Despite his later success as a scientist and teacher, Newton was a below average student in college.
(D) The most famous of Newton's theories are the three laws of motion, which explain how objects move in relation to the forces that act on them.
(E) Newton used the laws of motion to arrive at his theory of gravity, which helped him explain the motion of planets.
(F) Newton's laws of motion are not sophisticated enough to explain the motion of atoms and other microscopic phenomena.

Spiral and Elliptical Galaxies

Galaxies are the most fundamental structures in the universe. It is within galaxies that stars and planets are formed, heavy elements such as carbon and oxygen are synthesized and spread, and, in at least one case, intelligent life has arisen. By Earth standards, all galaxies are enormous, containing hundreds of millions of stars. There is, however, a remarkable amount of variation observed in the galaxies that inhabit our universe, both in terms of size and in shape. Nevertheless, it is possible to place most of these galaxies into one of a few broad categories.

➡ The most numerous galaxies in the universe are thought to be spiral galaxies, by some estimates making up to 77% of all galaxies in the observable universe. Spiral galaxies are so named because their stars are dispersed in a thin, rotating disk with a center section that is somewhat thicker. Extending from this central bulge are two spiral arms composed primarily of interstellar dust and bright, young stars. The flat shape of spiral galaxies is formed by their high rotational speeds and the centrifugal force these create. The stars in a spiral galaxy all orbit on the same plane and with roughly uniform speeds, which makes the structures of these galaxies highly ordered and organized.

Spiral galaxies are thought to evolve naturally, and it is believed that the first galaxies to form in the universe were most likely spiral galaxies. This belief is supported by the fact that many spiral galaxies observed today contain relatively heavy concentrations of star-forming regions, suggesting that these galaxies are still in the earlier stages of their evolution. In addition, spiral galaxies are generally only found in relatively empty regions of space. This is because the proximity of other galaxies nearby would create gravitational interference and disrupt their delicate spirals.

Elliptical galaxies, in contrast to spiral galaxies, are thought to only make up between 10-15% of the known universe. These galaxies have a more disordered structure than spiral galaxies, with their stars orbiting on many different planes and at various velocities. Elliptical galaxies also differ from spiral galaxies in that they contain relatively few star-forming regions and almost no interstellar dust. Finally, elliptical galaxies are generally some of the largest galaxies found in the universe.

➡ All of these differences can be attributed to one fact: elliptical galaxies are formed by the collision of two galaxies. As two galaxies merge in such a collision, gravitational disruptions throw their stars into the chaotic orbits that characterize elliptical galaxies. The merger of two smaller galaxies also explains the exceptional size of elliptical galaxies. It also explains the absence of star-forming regions, as such collisions generally occur relatively late in the course of galactic evolution.

• **estimate** *n.* rough calculation • **disperse** *v.* to scatter • **interstellar** *a.* happening between stars • **centrifugal** *a.* moving away from a center • **rotational** *a.* of a turning movement • **concentration** *n.* a large number of things gathered in a particular place • **proximity** *n.* closeness in distance • **interference** *n.* the force that prevents something from succeeding • **elliptical** *a.* shaped like an oval • **disordered** *a.* not neatly arranged • **velocity** *n.* speed of an object that moves in a particular direction • **attribute** *v.* to think of something as caused by a particular circumstance • **exceptional** *a.* unusual • **absence** *n.* the state of not being present • **collision** *n.* crash

[Reference]

1 The word **these** in the passage refers to

(A) spiral arms
(B) galaxies
(C) young stars
(D) rotational speeds

[Fact]

2 According to paragraph 2, what is one factor that makes spiral galaxies flat?

(A) gravity from central bulge
(B) centrifugal force created by fast rotation
(C) explosions of neighboring stars
(D) collision between different galaxies

Paragraph 2 is marked with an arrow [➡].

[Simplification]

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) Galaxies in which there are large, dense star-forming areas are most likely to be young spiral galaxies under development.
(B) Spiral galaxies in early stages of formation show heavy concentrations of star-forming materials at their center.
(C) Modern observation of spiral galaxies shows dense star-forming regions, suggesting that they are in an early stage of development.
(D) The study of spiral galaxies reveals that they may contain developing stars in a region of younger star forming materials.

[Inference]

4 What can be inferred about elliptical galaxies?

(A) They are made up mostly of old stars.
(B) They are the smallest galaxies in the universe.
(C) They are well-ordered, like spiral galaxies.
(D) They make up a majority of galaxies in the universe.

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the galaxy to which they relate. Two of the answer choices will not be used.

Spiral Galaxies	Elliptical Galaxies
•	•
•	•
•	

Answer Choices

(A) Caused by the collision of two different galaxies
(B) Thought to be the earliest type of galaxies
(C) Comprise the majority of galaxies in the known universe
(D) Contain almost no interstellar dust or star forming materials
(E) Gradually dissipate into space because of uneven orbital patterns
(F) Stars orbit on the same plane at roughly consistent speeds
(G) Exceptionally large in size because there is no black hole

Nuclear Power

Nuclear power is the subject of much controversy around the world. Despite the fact that it is a clean and efficient source of electricity, it comes with some very serious risks. Today, there are over 400 nuclear power plants in operation worldwide, and countries like France get as much as 77 percent of their energy from this source. Few people fully understand the mechanism that drives this energy source. In many ways, it is similar to more traditional sources such as coal-fired power plants. Both nuclear and coal-fired plants rely on pressurized steam to drive electric generators. The controversy surrounding nuclear power stems from how this steam is produced — the process of nuclear fission.

The term nuclear fission refers simply to the splitting of an atom. It occurs commonly in nature, albeit much more slowly than in power plants, and is the reason we call certain elements "radioactive." In the case of power plants, the substance that is used is uranium-235, which is unique among the different types of uranium in that it can undergo induced fission — nuclear fission that is created by people under artificial conditions. An atom of uranium-235 releases a great deal of energy when it absorbs a neutron from outside itself. In less than a second, the neutron creates unstable conditions within the atom that cause a very sudden reaction. When the atom bursts apart, energy is released and heat is created. A In the presence of other uranium-235 atoms, the particles released by the first fission cause fission in surrounding atoms, creating a chain reaction that results in the release of massive amounts of energy.

B The purpose of the fission reactions is simply to create heat. C This is used to heat a store of water to its boiling point so that it rapidly evaporates, letting off steam. D The steam is the real source of the power, since, like the water in a hydroelectric dam, the force of its movement sets in motion a series of electric generators that ultimately produce the plant's energy. After the electricity is produced, the steam goes through a cooling phase and is released into the atmosphere by way of giant concrete towers. The steam released from these cooling towers does not contain harmful radiation, as the water never comes into contact with the radioactive materials in the plant.

Admittedly, nuclear power faces a big problem when it comes to the disposal of the spent uranium. Once the element is no longer useful for production, it must be thrown away or stored somewhere, and though its radioactivity is diminished through use in the plant, it is still a dangerous and deadly substance. Improperly stored uranium can contaminate the ground and the water supply around it, posing a serious threat to public health. Only after tens of thousands of years of natural decay will the uranium reach levels that are safe again. For this reason, radioactive waste is stored in secure facilities under the strict supervision of experts, where it is allowed to cool and decay without threatening the environment. As the number of nuclear power plants grows, and the waste they produce increases, storing nuclear waste becomes a serious problem with nuclear power.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. split	(a) the act of overseeing an activity
2. artificial	(b) to divide something into two or more parts
3. evaporate	(c) to change liquid into vapor
4. supervision	(d) created by human beings

1 The word **it** in the passage refers to

(A) neutron
(B) energy
(C) atom
(D) reaction

2 The word **diminished** in the passage is closest in meaning to

(A) activated
(B) reduced
(C) exploded
(D) changed

3 According to the passage, all of the following are true of nuclear power EXCEPT:

(A) Steam is released into the atmosphere by cooling towers.
(B) Creating nuclear power always produces nuclear waste.
(C) Nuclear fission is used to create steam.
(D) Waste from the process is stored in the ground until it cools.

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

However, this is not the same energy that is used to power homes and businesses.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 process of creating electricity from nuclear materials, while harmless in many aspects, does come with some dangers.

(A) Nuclear power plants induce fission in uranium by introducing a neutron and destabilizing the uranium atom until it breaks apart.
(B) The electric generators in a nuclear power plant are driven by steam, created by the rapid heating of water through nuclear fission.
(C) Although nuclear power is popular throughout much of Europe, it is still seen as controversial in other places, like the United States.
(D) Nuclear waste from power plants can remain a danger to the public for hundreds of years, and so must be protected in special facilities.
(E) A special kind of uranium, uranium-235, is required in nuclear power plants because it is an especially unstable isotope.
(F) A process is used to cool the steam produced by power plants before it is released into the atmosphere.

The Space Race

➡ After World War II, the United States and the Soviet Union entered a period of tense relations known as the Cold War. During this time, the two superpowers competed fiercely to become the one and only superpower on Earth. One of the most publicized areas of competition was space exploration. The idea of a "space race" between the Soviet Union and the United States had been in development even before the Cold War. During World War II, Nazi scientists conducted experiments with rockets, though the goal was not space exploration, but rather the ability to fire missiles over long distances at enemy targets. At the end of the war, many of these rocket scientists went either to the United States or the Soviet Union, and continued to research the use of rockets for the government.

At stake in the space race was not only superior technology, but also, many believed, national pride. This is why it came as a blow to Americans when, in October of 1957, the Soviet Union successfully launched the first satellite into orbit, beating the Americans to space. Further disappointment came for American scientists when their first attempt to launch a rocket failed. The Vanguard rocket exploded before it even had a chance to leave the launch pad. America successfully launched *Explorer 1*, its first satellite, into orbit in January of the next year, but by that time the Soviet Union had already launched a second satellite.

The Americans quickly began work on their next major goal: to send a human being into space. The Mercury project was conceived to accomplish this and more. Not only did the Americans want to put a man in space, but also put him into orbit. The Soviets developed the Vostok project with the very same goals, and the race was on again. Americans felt especially pressured to win this round of the race after being defeated in the previous effort. Unfortunately, this was not to be. The Soviets scored another first in April of 1961 when cosmonaut Yuri Gagarin became the first man both to enter space and to orbit the Earth in his spacecraft *Vostok 1*. A month later, Alan Shepard became the first American to travel into space, but his brief 15-minute flight was overshadowed by the Soviets' superior accomplishment.

Determined to win the space race, President John F. Kennedy challenged NASA to put a man on the moon before the end of the decade. As the technology to go to the moon was being developed, several other firsts took place, most of them on the Soviet side. The Soviets sent the first woman into space in 1963 aboard *Vostok 6*, and sent the first group of people into space in 1965. America, however, was making advances as well. By the time NASA completed its Gemini project, scientists had all the knowledge they needed to help astronauts travel, live, and work in space for the two weeks required to reach the moon and return. This dream finally became a reality in July of 1969 when Buzz Aldrin and Neil Armstrong became the first humans to walk on the moon. This stunning achievement is widely considered to mark the end of the space race.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. exploration	(a) to send something such as spacecraft into the sky
2. launch	(b) Russian astronaut
3. disappointment	(c) the act of travelling in order to discover something
4. cosmonaut	(d) a feeling of frustration

1 According to paragraph 1, what was the initial aim of rocket research?

(A) To transport people into space
(B) To study the Earth from orbit
(C) To transport bombs over long distances
(D) To beat the Soviets in World War II

Paragraph 1 is marked with an arrow [➡].

2 The phrase **the previous effort** in the passage refers to

(A) winning the space race with the Soviets
(B) being the first to put a man in space
(C) development of the Mercury program
(D) launching a satellite that could orbit Earth

3 The word **overshadowed** in the passage is closest in meaning to

(A) celebrated (B) emphasized
(C) undermined (D) ruined

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 Gemini project established all the necessary standards for studying how man could survive a trip to the moon.
(B) The success of the Gemini project gave Americans enough expertise about living, working, and traveling in space to make a trip to the moon possible.
(C) The first moon landing was a result of the Gemini project, and its study of traveling, working, and living in space.
(D) The Gemini project provided Americans with the rocket technology they needed to beat the Soviets to the moon.

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the nation to which they relate. TWO of the answer choices will not be used. ***The question is worth 3 points.***

America	Soviet Union	Both
•	•	•
•	•	

Answer Choices

(A) Attempts to put a satellite into orbit were eventually abandoned
(B) Recruited scientists from Europe to continue their rocket research
(C) Responsible for sending the first woman into space
(D) Efforts to put a man into space resulted in a brief and disappointing flight
(E) Performed experiments by sending various animals into orbit
(F) Vowed to put a man on the moon by the end of the 1960s
(G) Sent the first satellite into orbit

Comets

➡ For thousands of years, human beings have marveled at the sight of comets streaking across the night sky. In ancient cultures, the sudden appearance of a comet was taken as a mysterious omen of bad fortune, inspiring predictions of famine, disease, and flood, among other catastrophes. Nor was this the only fallacious belief attached to comets. The Greek philosopher Aristotle reasoned that, since the heavens were essentially perfect, such a temporary and unpredictable occurrence as a comet must instead come from the Earth. Thus, he believed comets were pieces of the Earth that had somehow been ignited and blown into space. Surprisingly, this view remained unchallenged for nearly 2,000 years after Aristotle's death. Today, astronomers are able to study comets in close detail through the use of advanced telescopes and satellite images, and as a result, have a far more informed understanding of what makes a comet.

The best way to illustrate the basic make-up of a comet is to liken it to a "dirty snowball." The mass of the comet consists of ice intermixed with rock and dust. Many of these small celestial bodies are believed to originate in the Oort Cloud, which is a giant spherical mass of floating ice, debris, and gases that surrounds our solar system, extending to distances thousands of times farther than the orbit of Pluto. Scientists believe that these elements may collide and conjoin within the Oort Cloud. When large objects pass through the cloud, they knock some of these pieces out of their regular orbits and into the inner solar system, where their new orbits make them visible from the Earth. Comets appear to observers as bright white streaks, with a rounded head and a long, shimmering tail. However, this common image represents only a brief phase in the comet's life cycle. Further examination of the comet's various components helps to explain why comets appear as they do.

➡ The nucleus is the most basic, and the only consistent, component of a comet. The nucleus of a comet comprises the core of what appears to be the comet's head, and consists of a densely packed mixture of mostly ice and rock. The nucleus of a comet can measure anywhere from 100 meters to 30 miles in diameter, but most average about 10 miles across. The nuclei of comets are some of the darkest bodies in the heavens; they only reflect about 4% of the sunlight that shines on them. The intense darkness of the nucleus is generally attributed to an accumulation of rock and dust on the surface that covers the ice trapped within. Offsetting this darkness only slightly is the thick shroud of dust and debris that surrounds the nucleus bound by its gravitational pull, but even though this covering reflects more light than the surface of the nucleus, it still does not account for the bright appearance of comets in the sky.

➡ What produces the bright image that is visible to humans, sometimes even with the naked eye, is the other two major components of comets, the coma and the tail. It should be noted that these two phenomena are relatively rare during the entire lifespan of a comet, and only occur under special conditions. The coma is a nebulous cloud of gases and dust particles that forms a giant gaseous ball around the nucleus. This formation is much larger than the nucleus, however, measuring tens of thousands of times its size. A coma cannot form around the comet until it passes into the inner solar system, where it is exposed to the heat of the sun. When this happens, the ice inside the comet turns to

vapor through a process called **sublimation**, and is then ejected from the comet through holes in the surface of the nucleus. This highly reflective water vapor forms a temporary atmosphere around the comet that shines brightly when exposed to the sun's rays. In addition to the sun's heat, the comet is also
40 subject to solar winds and radiation pressure. **A** For this reason, portions of the coma are forced away from the comet, leaving a trail in the sky that is known as the comet's tail. **B** Contrary to popular belief, the direction in which the tail points is not related to the comet's forward momentum. **C** As the comet revolves around the sun, the tail is continually changing directions in relation to its position to the solar winds and other forces. **D**

1 The word **catastrophes** in the passage is closest in meaning to

(A) wonders
(B) events
(C) disasters
(D) forecasts

2 According to paragraph 1, Aristotle theorized that comets were

(A) warnings that bad things were coming
(B) pieces of earth that exploded into space
(C) heavenly bodies far away from Earth
(D) temporary and unpredictable events

Paragraph 1 is marked with an arrow [➡].

3 The author mentions the **Oort cloud** in order to

(A) explain where comets come from
(B) illustrate the abundance of comets
(C) show how comets develop their tails
(D) explain a comet's appearance

4 The phrase **these elements** in the passage refers to

(A) rocks and dust
(B) debris, ice, and gasses
(C) small celestial bodies
(D) large objects and comets

5 The word **they** in the passage refers to

(A) bodies
(B) comets
(C) nuclei
(D) heavens

6 The word **attributed** in the passage is closest in meaning to

(A) credited
(B) compared
(C) considered
(D) concentrated

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 nucleus is surrounded by a cloud of dust and debris that absorbs sunlight and darkens its usually bright appearance.
(B) A cloud of dust may partially account for the comet's brightness, though it is still slightly darker than the nucleus it surrounds.
(C) The thick cloud of dust and debris surrounding the comet reflects more light than the nucleus, but not enough to fully explain its brightness.
(D) Light that is reflected by the nucleus is absorbed by a cloud of dust and debris, which may account for its brightness.

8 According to paragraph 3, cometary nuclei are very dark because

(A) they are composed mostly of rock and ice
(B) they are much farther away than they *appear*
(C) they are coated with a layer of dust and rock
(D) they are surrounded by gases that do not reflect light

Paragraph 3 is marked with an arrow [➡].

9 The word **nebulous** in the passage is closest in meaning to

(A) bright
(B) hazy
(C) solid
(D) clear

10 According to the passage, it can be inferred that **sublimation** is the process by which

(A) a liquid turns into a solid
(B) a solid turns into a gas
(C) a gas turns into a liquid
(D) a liquid turns into a gas

11 According to paragraph 4, which of the following is true of comets?

(A) The majority of comets form in the inner solar system.
(B) The tail indicates the comet's direction of travel.
(C) The coma is many times larger than the nucleus.
(D) The nucleus is only a temporary part of the comet.

Paragraph 4 is marked with an arrow [➡].

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

Instead, the tail always points away from the sun.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

13 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

The appearance of a comet is best understood by considering its three basic components, the nucleus, the coma, and the tail.

(A) The coma is created when the heat of the sun causes the ice within the comet to release highly reflective gasses.

(B) A tail of dust and gases can stretch for 1 astronomical unit, or 150 million kilometers, behind the average comet.

(C) Because the nucleus is several thousand times smaller than the coma around it, it is not directly visible with the naked eye.

(D) Comets are forced out of the solar system when large objects knock them from their orbits at the outer edge of the solar system.

(E) The pressure exerted on a comet by solar winds forces the dust and gases of the comet backward into what appears as a tail.

(F) The only permanent part of a comet that exists throughout its lifespan is the nucleus, a small, dark, and dense collection of ice and rock.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. p_____ *n.* closeness in distance

2. i_____ *n.* the force that prevents something from succeeding

3. b_____ *n.* important discovery

4. c_____ *n.* a large number of things gathered in a particular place

5. e_____ *n.* rough calculation

B Choose the right meaning for the word in bold.

1. I thought those dark clouds were a bad **omen**, so I did not play outside today.

(A) weather (B) guess (C) belief (D) sign

2. The biggest **obstacle** to attending a good university is the SAT test, which is very difficult to prepare for.

(A) challenge (B) chance (C) hope (D) question

3. J.K. Rowling has written books that are loved by millions of readers, and that is why she is such an **exceptional** writer.

(A) prepared (B) outstanding (C) popular (D) productive

4. Scientists were able to **synthesize** the two chemical compounds to create a new, environmentally friendly energy source.

(A) heat (B) analyze (C) monitor (D) combine

C Choose the words in the box to fill in the blank. You may have to change the word forms.

accumulate	explore	disappoint	supervise

1. The _____ of Mars has taught us a lot about the possibility of life on other planets.

2. The teacher expressed _____ with us for being lazy and not finishing our homework.

3. The _____ of dirt and dust in the apartment makes it look very dirty and messy.

4. Student's who perform dangerous scientific experiments without a teacher's _____ will receive a failing grade in the class.

D Choose the right word for the blank in each sentence.

1. _____ grass is better for the environment because it does not require any water or fertilizer.

   (A) Artificial (B) Disordered (C) Overshadowed (D) Centrifugal

2. That table is very heavy, so I have to _____ myself to move it to the other side of the room.

   (A) evaporate (B) diminish (C) exert (D) split

3. Many stars, planets, and other _____ bodies are very far from our planet, making it difficult to study them.

   (A) constant (B) celestial (C) opposite (D) circular

4. The space shuttle _____ was delayed when NASA discovered a dangerous leak in the shuttle's fuel tank.

   (A) inertia (B) gravitation (C) launch (D) cosmonaut

Useful Terms

Physics

- ☐ gravity
- ☐ inertia
- ☐ mass
- ☐ friction
- ☐ velocity
- ☐ centrifugal force
- ☐ centripetal force
- ☐ kinetic energy
- ☐ potential energy
- ☐ mechanical energy
- ☐ action and reaction
- ☐ theory of relativity
- ☐ vacuum
- ☐ visible rays
- ☐ ultraviolet rays
- ☐ infrared rays
- ☐ radiation
- ☐ reflection
- ☐ refraction
- ☐ wavelength
- ☐ fission
- ☐ fusion
- ☐ critical mass
- ☐ volume
- ☐ density
- ☐ diameter
- ☐ radius
- ☐ conductor
- ☐ semiconductor

Astronomy

- ☐ star
- ☐ planet
- ☐ asteroid
- ☐ comet
- ☐ meteorite
- ☐ meteor
- ☐ celestial bodies
- ☐ ecliptic
- ☐ nebular
- ☐ cluster
- ☐ constellation
- ☐ rotate (*n.* rotation)
- ☐ revolve (*n.* revolution)
- ☐ eclipse
- ☐ neutron star
- ☐ sunspot
- ☐ magnetic storm
- ☐ supernova
- ☐ dwarf star
- ☐ weightlessness
- ☐ axis
- ☐ orbit

Energy

- ☐ alternative energy
- ☐ clean energy
- ☐ renewable energy
- ☐ solar energy
- ☐ energy-efficient
- ☐ energy conservation
- ☐ energy consumption
- ☐ natural resource
- ☐ electricity
- ☐ generator
- ☐ nuclear power
- ☐ tidal power
- ☐ hydroelectric power
- ☐ thermal power
- ☐ power plant
- ☐ wind power
- ☐ sustainable
- ☐ uranium enrichment
- ☐ fossil fuel
- ☐ petroleum
- ☐ crude oil
- ☐ oil pipeline
- ☐ oil drilling
- ☐ oil field
- ☐ reserves
- ☐ deplete
- ☐ power supply

CHAPTER

07

History & Anthropology

- The Transcontinental Railroad
- Craft and Mass Production
- Charlemagne and the Holy Roman Empire
- The Ancient City of Petra
- Culture of the Pueblo Peoples

Approaching Themes

The Transcontinental Railroad

Before the middle of the 19th century, major trading centers only existed along America's coastlines, in large port towns where much of the population was concentrated. However, as more settlers moved westward, cities sprang up along the frontier, and new centers of trade began to open in the interior of the United States. Unfortunately, the development of effective overland transportation lagged behind this rapid westward expansion. The construction of canals helped, but they were limited in the amount of goods they could transport, and did not extend past the Mississippi River. In order to solve this problem, a major railroad system into the West was imperative. By 1828, some short rail lines had already been constructed, though they were designed only to connect major cities within the same region, like New York and Boston. Several companies had provided railroads as far as Indiana and Missouri by the middle of the century, but pressure was mounting to construct a railway that would lead all the way from the East Coast to California.

➡ Such a feat would require cooperation between the federal government and private companies. Several projects took shape in the 1840s, when surveyors began to plot different competing routes from Mid-American railroad stations to territories in the West, such as Oregon and California. To resolve these differences and devise a plan for an official railroad, the government conducted its own study, the Pacific Railroad Survey, which compared all of the potential routes. The government decided to provide funding for a railroad that ran from Nebraska to Utah, where it would meet up with a second railway being built from Utah to California. Two companies were commissioned by the government to build the railroads: the Union Pacific Company would build the eastern half, while the Central Pacific Company would build the western section.

➡ Construction began in 1862, but the outbreak of the Civil War slowed progress considerably on the Union Pacific line when workers were called away to serve in the army. However, workers farther west on the Central Pacific were able to continue construction in Utah and California. For this reason, the Central Pacific Railroad advanced far more quickly than the Union Pacific. A compromise was made to extend the Central Pacific farther to the east, to make up for the time lost building the Union Pacific line. The lines finally met one another in 1869, at the newly determined junction in Promontory, Utah. [A] The completion of the transcontinental railroad was perhaps a bit before its time. [B] In the early years, one train a week was all it took to deliver all the supplies needed by settlers in the West. [C] However, as settlements in the West expanded, so did the railroad. By the 1880s, new rail lines ran the entire length of the West Coast, from Washington state in the north to Los Angeles in the south. [D]

• **interior** *n.* the part of the land that is far away from a coast of a country • **overland** *a.* of travel across land • **lag behind** *v.* to progress so slowly that you are behind others • **expansion** *n.* the act of increasing something • **construction** *n.* the act of building something • **canal** *n.* a long channel of water that is built for boats or for irrigation • **mount** *v.* to become stronger or more intense • **feat** *n.* important achievement • **federal government** *n.* central government • **route** *n.* a road or path • **funding** *n.* financial support • **commission** *v.* to assign a task to someone • **outbreak** *n.* sudden occurrence of something unpleasant • **considerably** *ad.* significantly • **compromise** *n.* agreement between two sides • **completion** *n.* the act of finishing some task • **transcontinental** *a.* crossing a continent

[Vocabulary]

1 The word **imperative** in the passage is closest in meaning to

(A) valuable
(B) necessary
(C) impossible
(D) excessive

[Negative Fact]

2 According to the paragraph 2, all of the following are mentioned as major points along the first transcontinental railroad EXCEPT

(A) Nebraska
(B) Utah
(C) California
(D) Washington

Paragraph 2 is marked with an arrow [➡].

[Inference]

3 In paragraph 3, what does the author imply about the West during the Civil War?

(A) It did not play a large role in the conflict.
(B) Most of the fighting happened there.
(C) Citizens were required to fight.
(D) It surrendered early in the war.

Paragraph 3 is marked with an arrow [➡].

[Insertion]

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

Thus, expansion of the rail system could hardly be justified.

Where would the sentence best fit?

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 first transcontinental railroad built in the US took a massive cooperative effort between the government and private companies.

(A) Several surveys were conducted to devise the best route across the country, and the government made the final decision.
(B) The Civil War temporarily interrupted construction on the railway leading from California to Utah.
(C) The government commissioned two companies, Union Pacific and Central Pacific, to build the two major sections of the railroad.
(D) Years passed before the transcontinental railroad proved its worth, however, due to persistently low populations in many western territories.
(E) Early railroads served mainly to connect major cities on the eastern seaboard, such as Boston and New York.
(F) Before the transcontinental railroad was built, goods were transported mainly though canals.

Craft and Mass Production

➡ The manufacturing industry has changed dramatically in the last two centuries, as technology has advanced at a rapid pace and machines have come to dominate factory floors. However, in the 18th century and earlier, the predominant form of production was craft production. Craft production involved the manufacture of a specialized product — whether a rifle, a violin, or a piece of furniture — by a single individual or a small team of workers. The drawbacks of such a process are evident. This mode of production was extremely time-consuming, and the products that were made were accordingly very expensive. In addition, each product was slightly different in size and measurement, and the parts of one item were not designed to fit any others. This meant that if a gun made by a craftsman broke, there were no parts available to replace the broken parts, and the gun had to either be professionally repaired at great cost by a craftsman, or replaced altogether. However, despite its shortcomings, craft production had a few key advantages as well. The products were made by people who were masters of their craft, who put a great deal of attention and care into each item they made. As a result, the items produced were of premium quality.

In the early 19th century, however, craft production fell out of practice when a far more prolific mode of production came into use: mass production. During the Industrial Revolution, machines largely replaced the delicate labor once done by hand, and though individuals still had to be present to operate the machines, they often did little more than pull levers or keep the machines oiled and running. With the loss of master craftsmen, the quality of products obviously decreased, sometimes dramatically, but the number of items that could be produced in a given period of time increased. As a result, mass produced products could be sold more cheaply and to a far broader base of buyers, ultimately bringing in much larger profits. Mass production would not have been possible without the use of replaceable parts, pioneered in the last years of the 18th century by gun manufacturers in Europe and America. This innovation called for parts to be made to standard specifications, so that they could fit any product of the same specific model. The Ford Motor Company further improved upon mass production in the early 20th century with its complicated assembly line production methods. Ford's methods were so effective in increasing production and sales that the company could afford to *pay its workers higher* wages than any other company.

- **manufacture** *v.* to produce goods
- **dramatically** *ad.* greatly
- **dominate** *v.* to become the most important
- **predominant** *a.* most common; largest in number
- **drawback** *n.* disadvantage
- **evident** *a.* easy and clear to understand
- **time-consuming** *a.* taking a lot of time
- **professionally** *ad.* in a way that shows a great degree of skill
- **craftsman** *n.* someone who makes things very skillfully by hand
- **shortcoming** *n.* disadvantage
- **prolific** *a.* highly productive
- **delicate** *a.* skillful
- **lever** *n.* a machine that operates using leverage
- **obviously** *ad.* clearly; in a way that is easily understood
- **ultimately** *ad.* in the end
- **replaceable** *a.* substitutable, exchangeable
- **specification** *n.* detailed explanation of how something should be made
- **assembly line** *n.* a manufacturing system where workers put together parts to make finished goods

[Fact]

1 According to paragraph 1, which of the following was an advantage of craft production?

(A) It required a small team of workers.
(B) Work on the products was took less time.
(C) The products were of better quality.
(D) Products could be sold cheaply.

Paragraph 1 is marked with an arrow [➡].

[Rhetorical Purpose]

2 In paragraph 1, why does the author mention gun making?

(A) To illustrate an impractical aspect of craft production
(B) To show that guns made by craftsmen were of poor quality
(C) To give an example of a product improved by mass production
(D) To explain the challenges faced by the master craftsmen

Paragraph 1 is marked with an arrow [➡].

[Simplification]

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) The Industrial Revolution saw handiwork replaced by machines, with only the most basic functions carried out by workers.
(B) Workers suffered during the Industrial Revolution because machine labor was simple and boring.
(C) The introduction of machine labor during the Industrial Revolution made human workers unnecessary.
(D) Machines performed most of the work in factories during the Industrial Revolution, but people were required to supervise them.

[reference]

4 The phrase **This innovation** in the passage refers to

(A) Mass production
(B) Gun manufacturing
(C) Assembly line production
(D) The use of replaceable parts

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the method of production to which they relate. TWO of the answer choices will not be used.

Craft Production	Mass Production
•	•
•	•
	•

Answer Choices

(A) Each item produced was unique
(B) Greatly reduced the cost of raw materials
(C) Traded quality for speed
(D) Required standard specifications for products
(E) Required long and detailed work
(F) Simplified the workers' role in production
(G) Directly impacted family life

Charlemagne and the Holy Roman Empire

➡ By the fifth century A.D., the Roman Empire, once the largest and most powerful on Earth, had finally collapsed after years of fighting with Germanic tribes from the north of Europe. The remnants of the once mighty Roman Empire lay to the east, in Constantinople, the royal seat of the Byzantine Empire. Meanwhile, in central and western Europe, a new superpower was rising to prominence: the Frankish kingdom, which included several of the independent Germanic tribes that aided in the overthrow of the Western Roman Empire. Within 100 years of the Romans' defeat, the Frankish kingdom expanded to include much of eastern and central Europe. Under their legendary king Charlemagne, the Franks rose to such prominence in the region that a weakened Rome, now little more than a religious center, would appeal to them in an effort to reestablish the former glory of the Roman Empire.

Several factors led to the Franks, under Charlemagne, becoming the protectors of the Roman Empire. This honor was traditionally left to the Byzantines, but infighting among the ruling elites there led to instability, and the Romans lost confidence in their ability to defend the Pope and the Catholic Church. At the same time (around 799 A.D.), Pope Leo III was having troubles within his own country as well. The Roman nobles were intent upon taking his title, for the simple reason that Leo was of peasant birth. They falsely accused him of an array of crimes in the hopes that at least one of them would lead to a conviction and force him from power. The tension led to a vicious attack on the Pope, in which rebels attempted to gouge out his eyes and cut off his tongue. Leo fled to Paderborn, a city within the Frankish kingdom, where he met Charlemagne for the first time.

Having accepted Christianity as the state religion some time back, the Franks gladly took the Pope in. Charlemagne resolved to help him, and called a meeting with his enemies to try and quell the violent opposition. When the talks fell apart, Charlemagne traveled to Rome in person, along with the Pope, to see that the uprising was stopped. He met again with supporters and opponents of the Pope to discuss the situation, but this time, he was able to sway the committee of friends and enemies to cease attacks on the Pope and allow him to officially declare his innocence of all the charges falsely brought against him by the nobles. His enemies were thus exiled, and Leo was pardoned.

While still in Rome, Charlemagne attended Christmas Mass at the Vatican, at the Pope's request. As he knelt down to pray, the Pope placed a crown on his head, officially making him Emperor of the Romans. For the Pope, the act served to thank Charlemagne for his defense and to increase the influence of the Catholic Church across the vast Frankish territory. Charlemagne, meanwhile, seized upon the opportunity to renew the Roman Empire under the rule of the Franks. In name, this did not occur until two centuries later, when a portion of the Frankish lands was renamed the Holy Roman Empire, an institution that would persist for nearly a thousand years.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. overthrow	(a) a state of mistrust and hostility between people or countries
2. infighting	(b) removal of someone from power
3. tension	(c) to take advantage of something
4. cease	(d) to stop doing something
5. seize	(e) conflict between members of the same society

1 The word **remnants** in the passage is closest in meaning to

(A) enemies
(B) rulers
(C) remainders
(D) members

2 According to paragraph 1, who was responsible for the fall of the Roman Empire?

(A) the Byzantine Empire
(B) the Germanic tribes
(C) the Catholic Church
(D) the Frankish kingdom

Paragraph 1 is marked with an arrow [➡].

3 The word **them** in the passage refers to

(A) nobles
(B) accusations
(C) attacks
(D) rebels

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) In a second meeting with Roman nobles, Charlemagne was convinced that the rebels who attacked the Pope were innocent.
(B) Charlemagne traveled to Rome to meet with opponents and supporters of the Pope to argue for his innocence.
(C) Attacks on the Pope led the Roman nobles to agree with Charlemagne and declare Leo Ⅲ innocent of all charges.
(D) The second time Charlemagne met with the Roman nobles, they agreed to acknowledge the Pope's innocence and end their attacks.

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

Charlemagne, King of the Franks, forged an alliance with the Catholic Church that expanded Roman influence in the West.

(A) The seat of the Roman Empire moved to Constantinople in the east after the Western Roman Empire fell to invaders.
(B) Pope Leo Ⅲ faced violent opposition from Roman nobles who sought to ruin his name and strip him of his position.
(C) The Frankish kingdom formed out of an alliance between several German tribes and grew to be a powerful force in Europe.
(D) Charlemagne was able to influence the nobles to stop their rebellion against the Pope, bringing peace to Rome again.
(E) The Byzantine Empire had grown unstable due to fighting between members of the government.
(F) The Pope made Charlemagne and the Frankish kingdom the new protectors of the Roman Empire, a role formerly held by the Byzantines.

The Ancient City of Petra

One of the most amazing relics of the ancient world is Petra, an archaeological site in the country of Jordan. Petra is an ancient city that was literally carved out of the walls of a mountain in a style known as rock-cut architecture. The city was founded in 100 BC by a group of Arab peoples called the Nabataeans, who made it the capital city of their kingdom. In ancient times, Petra was a major center of trade in the Middle East, as it lay at the intersection of several different trade routes. Petra also rose to prominence because of its water supply, which made the desert city habitable. The city sits in a low-lying valley among several large mountains, along the route of several mountain streams. Unfortunately, this also makes it a frequent victim of floods. The Nabataeans, however, constructed dams and special channels that could **divert** the water either away from the city or into special holding tanks, where it was stored to be used in times of drought. Evidence of these devices remains at the site today. The fact that Petra had a consistent store of water made the city even more popular with passing traders, as they could buy some of the city's water when it had become scarce elsewhere during the dry seasons.

The city had the advantage of being a natural fortress, as it was surrounded on all sides by high mountains. The main entrance to the city, called the *siq*, was its main point of defense. The *siq* was a long chasm that cut through the giant sandstone cliffs. It was created by a fault in the mountain which was slowly worn away by water over the years. It was only a few meters wide but stretched for nearly a mile, with towering cliff walls on each side. Visitors had to navigate this long corridor in order to reach the city. The end of the narrow *siq* opened upon the city's most spectacular ruin, called the treasury. The façade of the treasury was heavily influenced by Greek architecture, with stately columns and sculptures decorating the outward facing wall. The city was also home to several ancient tombs, which have since allowed archaeologists to trace the history of **the site** according to the style in which its tombs were built — most reflected the early Nabataean style, while others were influenced by later inhabitants such as the Romans and Muslims.

➡ Despite the defenses and riches of the city, the Nabataeans were unable to defend Petra against Roman attacks, and it fell to the Empire in 106 AD, having been under Nabataean rule for just over 200 years. Under Roman rule, the city continued to prosper for a time, as evidenced by the Roman additions to the city's original architecture. But when major trade routes began to shift in the 5th century, the city saw a decline in commerce, and it slowly fell into ruin. Islamic forces invaded Petra and took control of the city a hundred years later, and what remained of Nabataean culture quickly disappeared. The city remained largely unknown to the modern Western world until Swiss explorer Johann Burckhardt was shown the ruins by local Bedouins on an 1812 expedition, and reported back to his colleagues in Europe. In 1985, the United Nations named it a World Heritage Site, and it was later also named one of the New Seven Wonders of the World.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. inhabitant	(a) a place where two roads cross each other
2. spectacular	(b) buying and selling goods and services
3. intersection	(c) a person or animal living in a particular area
4. commerce	(d) a trip organized for a particular purpose, such as exploring a place
5. expedition	(e) extremely impressive

1 The word **divert** in the passage is closest in meaning to

(A) redirect
(B) capture
(C) disperse
(D) surround

2 The phrase **the site** in the passage refers to

(A) the treasury
(B) the tombs
(C) the *siq*
(D) the city

3 According to paragraph 3, what was the first major cause of Petra's decline in commerce?

(A) the defeat of the Nabataeans
(B) changes to major trade routes
(C) its discovery by Westerners
(D) damage from natural disasters

Paragraph 3 is marked with an arrow [➡].

4 According to the passage, all of the following groups held Petra EXCEPT

(A) Nabataeans
(B) Muslims
(C) Bedouins
(D) Romans

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 ancient city of Petra, a bustling center of trade in ancient times, is now a treasured archaeological site.

(A) Petra lay at the intersection of many different routes used by traders and had enough water resources, which contributed to its rapid growth and wealth.
(B) Tombs built in several different styles have helped archaeologists date parts of the site according to which peoples inhabited the city.
(C) Petra has unique natural surroundings such as *siq* and cultural treasures which attract archeologists and tourists.
(D) Petra, which had been ruled by several different peoples, was rediscovered in the 19th century and is named as a World Heritage site.
(E) Water bodies in Petra provided Nebataeans with necessary water, but were responsible for many floods.
(F) A Swiss explorer discovered Petra with the help of local Bedouins.

Culture of the Pueblo Peoples

➡ In the southwestern region of the United States reside several tribes of Native Americans known as the Pueblo peoples, who derive their name from the fact their ancestors lived in pueblos, or compact and permanent villages that traditionally consisted mostly of houses made from mud-bricks and straw. While they originally descended from a single ancestral group thousands of years ago, the Pueblo peoples gradually fragmented into different tribes, each with a distinct culture. The cultures of these tribes were further altered by the Spanish, who took over the Pueblos' territory in the 17th century and transformed Pueblo life in ways which can still be seen today. For instance, some Pueblo peoples now practice Catholicism or incorporate it into earlier religious beliefs, and most communities have some kind of political system featuring governors and other elected leaders, as introduced by the Spanish. Despite these numerous developments throughout their long history, the Pueblo peoples have maintained many core features of their cultures, in particular their social structure and ceremonial practices. Recurring distinctions in both social structure and ceremonial practices allow researchers to divide modern Pueblo peoples into two basic categories: the Western Pueblo and the Eastern Pueblo.

➡ The Western Pueblo tribes reside in the deserts of northern Arizona and western New Mexico. This group includes some of the most well-known tribes, particularly the Hopi and Zuni tribes. Western Pueblo all feature a similar social organization based around the clan, the central social unit in these societies. These clans are large families that trace their ancestry through the mother's side of the family. Upon marriage, a man will live with his wife's mother, and the couple's children belong to their mother's clan. There are stringent rules about whom people can and cannot marry, as tribe members must marry outside of their particular clans. In this social structure, women own the farming property and have a good deal of social power. All other organizations in a tribe are owned and operated by individual clans.

Besides the organization of communities by clan membership, the other distinctive feature of the Western Pueblos is their set of ceremonial practices. While influenced by the introduction of Christianity, the Western Pueblo have retained most of their traditional religious practices, at the center of which lies the *kachina* cult. A Originally, the *kachina* cult attempted to communicate with spirits that could bestow good fortune upon the tribe, particularly in the form of greater rainfall. B This was important because farming in such arid regions is difficult, since adequate rainfall is rare and unpredictable. C An important part of these ceremonies involves the men dressing up as the spirits they pray to and playing the role of these characters. D This practice is fundamental to the Western Pueblo, seen in the fact that many communities have numerous places of worship, which also serve as centers for all other community activities.

➡ The Eastern Pueblo, who are primarily located in the valley along the Rio Grande River in New Mexico and include tribes that speak the Tewa and Tiwa languages, have different social structures and ceremonial practices from their western counterparts. First, the Eastern Pueblo do not strictly adhere to a clan system, so clans do not play as prominent a social role as they do in Western Pueblo society. Lineage is usually traced along both the mother's and father's families, with members from both groups

living among an extended family. Second, most Eastern Pueblos are divided into two moieties, or central social groups: the Summer People and the Winter People. These terms come from a traditional method of sharing power in Eastern Pueblo societies: the Summer People would rule for the six months of summer and the Winter People would rule for the six months of winter. To offset the political **discord** such an arrangement could potentially cause, the community also has numerous smaller groups that are in charge of hunting, medicine, ceremonial rituals, and other such activities. These secondary groups operate throughout the year and consist of members from both moieties. This unites members of both moieties and limits the power of the ruling moiety, maintaining peace between the two.

Ceremonial practices are also an important part of Eastern Pueblo culture, though there are significant differences from those of the Western Pueblo. Individual Eastern Pueblo communities have far fewer places of worship than the Western Pueblo have. Furthermore, the *kachina* cults are quite weak among the Eastern Pueblo, and in some communities **they** are not present at all. The ceremonies also differ in their focus. Due to their location, these tribes do not feel the need to focus primarily on weather control for assistance with growing crops. Instead, their ceremonies traditionally place more emphasis on activities that are considered more masculine, particularly hunting, at least for part of the year. **The various tribes actually emphasize different concerns, like hunting and farming, to different degrees and at different times, a noticeable distinction from the singular focus of Western Pueblo ceremonial practices.**

1 The word **fragmented** in the passage is closest in meaning to

(A) united
(B) invaded
(C) broke up
(D) traced

2 According to paragraph 1, the Pueblos received their name from

(A) their family structure
(B) their geographical location
(C) their mode of housing
(D) their religious beliefs

Paragraph 1 is marked with an arrow [➡].

3 Why does the author mention the **Spanish**?

(A) To illustrate the far-reaching influence of Pueblos
(B) To discuss how the Pueblo split into many tribes
(C) To show the amazing resilience of Pueblo culture
(D) To help explain changes in Pueblo culture

4 The word **stringent** in the passage is closest in meaning to

(A) lenient
(B) numerous
(C) strict
(D) trivial

5 The word **their** in the passage refers to

(A) children
(B) family
(C) clan
(D) couple

6 According to paragraph 2, the basic social unit of the Western Pueblo is

(A) the village
(B) the family
(C) the clan
(D) the tribe

Paragraph 2 is marked with an arrow [➡].

7 The word **prominent** in the passage is closest in meaning to

(A) frequent
(B) important
(C) credible
(D) famous

8 The word **discord** in the passage is closest in meaning to

(A) devotion
(B) cooperation
(C) influence
(D) conflict

9 According to paragraph 4, in Eastern Pueblo society all of the following duties are performed by specially chosen groups EXCEPT

(A) rituals
(B) farming
(C) medicine
(D) hunting

Paragraph 4 is marked with an arrow [➡].

10 The word **they** in the passage refers to

(A) ceremonies
(B) *kachina* cults
(C) communities
(D) places of worship

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) Unlike the ceremonies of the Western Pueblo, the Eastern Pueblo practice religious ceremonies to invoke the help of spirits.
(B) Religious ceremonies of the Eastern Pueblo have a singular focus, which distinguishes them from the Western Pueblo.
(C) The Eastern Pueblo differ from the Western because they use religious ceremonies to ask the spirits for a variety of favors, depending on the specific need and time.
(D) The religious ceremonies of the Western Pueblo only occur in times of great need, as when food and resources are scarce, which is quite the opposite of the Eastern Pueblo.

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

The activities of the cult are an attempt to mitigate this and bring some level of stability.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

13 **Directions:** Select the appropriate phrases from the answer choices and match them to the group of Pueblo peoples to which they relate. TWO of the answer choices will not be used. ***This question is worth 4 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 Text**.

Answer Choices

(A) Live in a region where rainfall is often sparse and hard to predict

(B) Should marry members from different clan

(C) Divided into two groups that take turns ruling the tribe

(D) Women own farms and have a great deal of social influence

(E) Marriages are only allowed within the same clan

(F) Ancestry is traced through both the mother and the father

(G) Ask the spirits for good fortune through religious ceremonies

(H) Communities contain many places of worship also used for events

(I) Tribal members compete to gain political dominance

Eastern Pueblos

-
-

Western Pueblos

-
-
-
-

Both

-

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. u _____ *ad.* in the end
2. a _____ l _____ *n.* a manufacturing system in a factory where workers put together parts to make finished goods
3. c _____ *n.* a long channel of water that is built for boats or for irrigation
4. c _____ *n.* someone who makes things very skillfully by hand
5. c _____ *v.* to assign a task to someone

B Choose the right meaning for the word in bold.

1. One of the **drawbacks** to globalization is that businesses must lower employee wages in order to attract foreign investment

   (A) guides (B) paths (C) effects (D) disadvantages

2. Because of the war, the UN volunteers must **cease** all aid operations and leave the country immediately.

   (A) stop (B) continue (C) consider (D) disagree

3. We are very lucky to attend the university, and must **seize** the opportunity to become educated and knowledgeable.

   (A) get away with (B) take advantage of (C) catch up with (D) bring about

4. Some ancient peoples are remembered for **spectacular** buildings which have survived almost intact for thousands of years.

   (A) crumbling (B) historic (C) impressive (D) large

C Choose the words in the box to fill in the blank. You may have to change the word forms.

replace	expand	dramatic	emphasize

1. The government will place _____ on improving the quality of education, as that is what voters feel is most important.

2. Global warming has _____ changed the weather patterns in the Arctic, causing the temperatures there to increase.

3. The _____ of his business made him very wealthy, but it also made his life very busy and stressful.

4. This car is very cheap, and the _____ parts make it easy to maintain and repair.

D Choose the right word for the blank in each sentence.

1. I didn't realize how much money I spent, but many small purchases quickly _____ up.

   (A) mounted (B) dominated (C) fragmented (D) manufactured

2. _____ among government officials made it very difficult to pass any new laws that would help the environment.

   (A) Cooperation (B) Intersection (C) Overthrow (D) Infighting

3. North Korea and South Korea were able to reach a _____ in their tense negotiations.

   (A) compromise (B) construction (C) tension (D) commerce

4. The _____ of swine flu made it very inconvenient for people to travel to foreign countries during their vacations.

   (A) inhabitant (B) outbreak (C) counterpart (D) ceremony

Useful Terms

History

- ☐ prehistory
- ☐ Stone Age
- ☐ Bronze Age
- ☐ Iron Age
- ☐ civilization
- ☐ Fertile Crescent
- ☐ irrigation system
- ☐ city-state
- ☐ theocracy
- ☐ priestly governor
- ☐ cuneiform
- ☐ writing system
- ☐ hieroglyphics
- ☐ solar calendar
- ☐ lunar calendar
- ☐ caste system
- ☐ feudalism
- ☐ manor
- ☐ lord
- ☐ vassal
- ☐ fief
- ☐ serf
- ☐ serfdom
- ☐ divine right of kings
- ☐ succeed someone to the throne
- ☐ be on the throne
- ☐ next in line to the throne
- ☐ heir apparent
- ☐ pretender
- ☐ depose
- ☐ medieval
- ☐ Black Death
- ☐ crop rotation
- ☐ three field system
- ☐ Restoration
- ☐ Renaissance
- ☐ Protestant Reformation
- ☐ Industrial Revolution
- ☐ aristocracy
- ☐ royal family
- ☐ clergy
- ☐ colonialism
- ☐ colonize
- ☐ tribute
- ☐ civil rights
- ☐ women's suffrage
- ☐ federal government
- ☐ Confederate
- ☐ Prohibition
- ☐ American Civil War
- ☐ Emancipation Proclamation
- ☐ Union
- ☐ the Confederacy
- ☐ slavery
- ☐ enslave
- ☐ plantation
- ☐ Pilgrim Fathers
- ☐ Puritan
- ☐ Indian reservation
- ☐ settlement
- ☐ frontier

Anthropology

- ☐ shamanism
- ☐ primitive
- ☐ religious ritual
- ☐ caste
- ☐ dowry
- ☐ arranged marriage
- ☐ levirate marriage
- ☐ intermarriage
- ☐ dwelling
- ☐ ethnic
- ☐ folklore
- ☐ kinship
- ☐ lineage
- ☐ monogamy
- ☐ polygamy
- ☐ matrilineal society
- ☐ patrilineal society
- ☐ myth
- ☐ nomad
- ☐ patrimonial
- ☐ supernatural
- ☐ tribe
- ☐ domesticate
- ☐ indigenous
- ☐ aboriginal
- ☐ cultural relativism

CHAPTER

08

Earth Science

- The Effects of El Niño
- Mountain and Continental Glaciers
- Classification of Rocks
- Seismic Waves and the Earth's Interior
- Volcano Monitoring

Approaching Themes

The Effects of El Niño

El Niño is a common phenomenon that occurs in the waters of the Eastern Pacific Ocean, and is characterized mainly by a rise in the surface temperature of the ocean water. The rise in temperature and its effects on the atmosphere above it are associated with floods, droughts, and other disturbances in various parts of the world. El Niño events are still somewhat mysterious in their exact timing, but they seem to occur every two to seven years, and can last up to two years, causing a great deal of harm to island and coastal communities in the eastern and central Pacific region. Areas most severely affected are developing nations along the Pacific coast, most notably in South America.

An El Niño event is preceded by various factors which, when considered together, are referred to as El Niño conditions. Though the areas most severely affected are in the eastern Pacific, the first signs of an El Niño event actually occur on the other side of the world, in the South Pacific. A decrease in air pressure over the South Pacific causes a weakening of the trade winds, a group of winds that transfer warm air westward along the equator, and also drive the warm ocean currents in the region. As the trade winds weaken, more warm water flows to the eastern Pacific, toward the northern part of South America. These warm waters produce more tropical storms than normal, which they carry with them across the ocean. The additional rain causes flooding and erosion, which seriously disrupt agriculture in the region.

➡ The extra warm water has an especially vicious effect on the fishing industry of South America. In an average year, the ocean currents that run north along the coast of South America bring cold water from the Antarctic region. [A] When this cold water reaches the warmer waters off the coast of Peru, it displaces the warm water and causes it to rise to the surface. [B] The increased nutrients brought up from these depths cause a huge increase in the fish population. [C] During an El Niño event, the upwelling, as it is called, is interrupted because more warm water is flowing in from the west. [D] This creates a thicker surface layer of warm water that does not allow important nutrients to rise to the surface, causing fish to migrate elsewhere for food. The decrease in supply results in a massive loss in expected profits. This is of course a disaster for local fishermen, but it can also be severe enough to affect the worldwide market for South American fish.

• **phenomenon** *n.* something that happens • **characterize** *v.* to be typical of someone or something • **associate** *v.* to be related with somebody or something • **drought** *n.* a long period of weather when there is not enough rain • **disturbance** *n.* disruption • **coastal** *a.* of land beside the sea • **notably** *ad.* especially, in particular • **precede** *v.* to happen before some event • **severely** *ad.* badly; to a great degree • **current** *n.* flow of water or air • **tropical** *a.* of or in the hottest part of the Earth • **erosion** *n.* the process of gradual destruction of rock by wind or water • **vicious** *a.* very damaging in its effect • **displace** *v.* to remove something from its usual place • **nutrient** *n.* substance that gives nourishment • **upwelling** *n.* rising of cold nutrient water • **interrupt** *v.* to cause something to stop • **migrate** *v.* to move from one place to another

[Rhetorical Purspose]

1 **Why does the author mention the South Pacific ?**

(A) To illustrate the worldwide consequences of El Niño
(B) To explain early indicators of El Niño conditions
(C) To discuss a region adversely affected by El Niño
(D) To show how El Niño causes tropical storms

[Vocabulary]

2 **The word disrupt in the passage is closest in meaning to**

(A) forbid
(B) maintain
(C) assist
(D) impair

[Negative Fact]

3 **According to paragraph 3, all of the following are results of upwelling EXCEPT**

(A) an increase in nutrients at the water's surface
(B) warmer water pushed upward by cold water
(C) the migration of more fish in search of food
(D) a greater amount of severe thunderstorms

Paragraph 3 is marked with an arrow [➡].

[Insertion]

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

For this reason, the area is one of the most fertile fishing areas on Earth.

Where would the sentence best fit?

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.

El Niño is a specific set of weather conditions that can cause harm to coastal communities in the eastern Pacific.

(A) El Niño events occur when the trade winds weaken and excessive warm air and water flow eastward across the Pacific Ocean.
(B) The length and frequency of El Niño events are still unknown, but they seem to happen about every two to seven years.
(C) The trade winds are a group of winds that usually travel westward, bringing much needed rain to South Asia.
(D) The transfer of heat results in more severe thunderstorms, which can cause damaging floods in regions of South America.
(E) Ocean currents traveling north along the coast of South America bring much needed cold water from the Antarctic Circle.
(F) The warmer water coming from the western Pacific drives away marine life, hurting economies that depend on fishing.

Mountain and Continental Glaciers

Glaciers can be roughly divided into two very different types: mountain glaciers and continental glaciers. The most well-known type of glacier is the mountain variety, also called an alpine glacier. Mountain glaciers form when valleys become filled with ice after years of continuous freezing snow, which condenses into ice and slowly begins its descent down the valley slope. The shape taken by mountain glaciers is largely determined by the topography of the area in which they form, and in general they are longer than they are wide, due to their gradual momentum in one fairly specific direction. The shape generally conforms to the rocky passes that they fill as they flow toward lower elevations. One exception to this is a type of mountain glacier called a piedmont glacier, which forms at the bottom of a mountain or valley. Because it flows outward rather than in a single direction, it can have more of a circular shape than other mountain glaciers. Because mountain glaciers exist in subarctic climates, they are affected by the elements in ways that continental glaciers are not, sometimes even putting them in danger of collapse. For example, rainfall can melt small portions of mountain glaciers, forming icy streams of water that can, over long periods of time, carve elaborate ice caves ever deeper into the glacier.

➡ Continental glaciers are quite different. As their name suggests, they are massive in size and far more expansive. Today, the only continental glaciers in existence are the ice sheets of the Arctic and Antarctic regions. These continental glaciers formed over millions of years, as layer after layer of snow fell to the Earth and became compacted into one thick sheet of ice weighing millions of tons. The bedrock of the continent of Antarctica is almost completely covered in glacier ice, with only a few isolated mountain ranges penetrating the thick ice sheet. In some areas, the ice is so plentiful that it extends beyond the edge of the continent and into the ocean, forming what are known as ice shelves. On the Antarctic mainland, the ice can reach depths of over a mile. The effect of such a thick, heavy layer of ice is that it depresses the actual land mass so that most of it is below sea level. The pressure exerted on the deepest layers of the ice sheet by the denser and heavier upper layers causes some of this deeper ice to melt, creating a slippery layer of ice and water below the ice sheet. Unlike mountain glaciers, continental glaciers do not flow in any consistent manner, but gravity may *cause portions of the continental glacier* to slide along the fine bottom layer of ice down any slopes.

• **glacier** *n.* a large mass of ice • **alpine** *a.* relating to glacial mountains • **condense** *v.* to make something denser by pressing or squeezing it hard • **descent** *n.* the act of going down • **topography** *n.* features of an area of land • **momentum** *n.* force or speed of forward movement • **conform** *v.* to be similar • **elevation** *n.* height above sea level • **piedmont** *n.* area at the foot of mountains • **subarctic** *n.* an region located south of the Arctic • **expansive** *a.* very wide • **compact** *v.* to press something to make it become smaller and more solid • **bedrock** *n.* solid rock below soil • **penetrate** *v.* to enter or pass through something • **extend** *v.* to occupy a wide area within a particular range • **exert** *v.* to apply force on something

[Simplification]

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) Mountain glaciers are formed by valleys and mountains, which give them the long and wide shape that allows them to travel downhill.
(B) The topography of an area determines which direction in which the mountain glacier will flow as it travels with a steady momentum.
(C) The movement of mountain glaciers in one specific direction causes them to become wider than they are long.
(D) Mountain glaciers take the shape of the valley floors and mountain walls through which they travel, becoming long and narrow as they push forward.

[Inference]

2 **What can be inferred about ice caves?**

(A) They will fill with ice when the water in them freezes.
(B) They are elaborate structures formed over long periods.
(C) They can weaken a glacier until parts of it cave in.
(D) They form rivers of glacier water that can run for miles.

[Reference]

3 **The word it in the passage refers to**

(A) layer of ice
(B) mainland
(C) land
(D) water

[Fact]

4 **According to paragraph 2, how are ice shelves created?**

(A) When a glacier collapses due to long-term weathering
(B) When an ice sheet extends beyond the land
(C) When pieces of the glacier break off into the ocean
(D) When an ice sheet becomes too heavy to support

Paragraph 2 is marked with an arrow [➡].

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the type of glacier to which they relate. TWO of the answer choices will not be used.

Continental Glaciers	Mountain Glaciers
•	•
•	•
	•

Answer Choices

(A) Shape determined by the path along which it flows
(B) Created as valleys at high elevation continuously fill with snow
(C) Are exposed to more of nature's elements
(D) Are shrinking at a faster rate due to climate change
(E) Heavy enough to force the land mass on which it sits below sea level
(F) Are home to a greater diversity of wildlife
(G) Flow in an irregular fashion, depending on elevation

Classification of Rocks

Every rock belongs to one of three basic types, depending upon the processes by which the rock is formed. The categories include igneous rocks, sedimentary rocks, and metamorphic rocks. These are the most general classifications, and each of them contains several subtypes that offer a more detailed analysis of the rock's composition and formation. However, any effort to classify and identify a rock must begin with these basic distinctions.

When liquid magma from the Earth's interior cools and hardens, the result is always igneous rock. Over 700 different types of igneous rocks have been identified, most of them formed by processes that take place deep within the Earth and are unobservable to humans. [A] Their exact origin can only be ascertained by studying their physical and chemical characteristics. [B] For instance, magma that is stored inside the Earth differs in composition from that which has somehow escaped by way of a lava flow or a volcanic eruption. [C] Igneous rocks reach the surface over long periods of time, either by tectonic forces or by the gradual weathering of the earth that covers them. [D] For example, when mountains are created, portions of the Earth's outer crust are thrust upward, exposing vast amounts of igneous rock that were formed within the Earth. As mountain ranges weather away and erode, they reveal one particularly common and useful type of igneous rock — granite — which comprises the interior of most mountains. Igneous rocks are perhaps most valuable to humans for the mineral deposits they contain, such as uranium and platinum.

➡ Sedimentary rocks, unlike igneous rocks, are formed exclusively on the Earth's surface when dirt, smaller rocks, organic material, and other debris collect in one place. These deposits of materials become so heavy that they exert an extreme amount of pressure on the lower layers which, over many millions of years, compress and harden into rock. About 75 percent of the Earth's surface is covered in sedimentary rock, which includes such common types as sandstone, chalk, and limestone. Because the formation of sedimentary rock is ongoing, with more material being added all the time, it has the unique appearance of sedimentary layers. The formation of the rock over the millennia can be traced through these different layers, or strata, revealing numerous details about Earth's climate, changes in its composition, and sometimes even life forms from prehistoric times. Among these strata paleontologists find fossils of organisms that have died and been covered by layer after layer of rock.

Metamorphic rocks are igneous or sedimentary rocks that are transformed over time by pressure and temperature into a rock that is different from either of the previous types. Metamorphic rocks are formed by extreme changes in their physical surroundings, which in turn change the mineral composition of the rock. The minerals within the original rock react to the stresses of their physical environment by rearranging themselves into a new, more stable configuration, changing the very fabric of the rock into something totally unique. Metamorphic rocks are most commonly found in areas where major geological events have taken place, such as at fault lines or the site of a volcanic eruption, where seismic or volcanic activity has resulted in extreme conditions. Several metamorphic rocks are familiar in everyday life, one of them being marble, which is created from the metamorphosis of limestone.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. classification	(a) unable to be seen
2. unobservable	(b) only belonging to a particular thing, person or place
3. exclusively	(c) to completely change
4. transform	(d) dividing items into several groups

1 The word **ascertained** in the passage is closest in meaning to

(A) explained
(B) observed
(C) determined
(D) studied

2 According to paragraph 3, sedimentary rocks can reveal all of the following EXCEPT

(A) climate changes throughout history
(B) soil composition since prehistory
(C) the conditions in the Earth's mantle
(D) organisms that are now extinct

Paragraph 3 is marked with an arrow [➡].

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) A rock that is under great pressure at high temperatures changes its surroundings into a new and different type of metamorphic rock.
(B) Changes in pressure and temperature transform a rock's mineral structure to create a different type of rock better suited to withstand the new conditions.
(C) The stress of transforming into a new type of rock is the result of drastic changes to the mineral structure of the rock's surroundings.
(D) The mineral structure of a rock changes to create a completely new type of rock that is stable enough to withstand further metamorphosis.

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

This difference allows geologists to learn the general circumstances of the rock's formation.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

There are three basic categories by which all rocks can be classified, based primarily on the means by which a rock is formed.

(A) Differences in the composition of an igneous rock can tell geologists whether it formed inside the Earth or on the surface.
(B) Debris from a number of different sources can collect into a deposit so dense and heavy that the bottom layers are turned to solid rock.
(C) Both sedimentary and igneous rocks, when exposed to extreme pressure and temperature, can transform into a completely new type of rock.
(D) Igneous rocks make their way to the surface of the Earth by way of either tectonic activity or gradual weathering of the Earth's surface.
(E) Magma that cools and hardens inside the Earth creates the igneous rocks most commonly found in mountains ranges.
(F) Sediments deposited on the ground over millions of years have created well defined layers in the Earth's rocky outer crust.

Seismic Waves and the Earth's Interior

It is a well established fact that the Earth is composed of three internal layers. The crust is a thin layer of solid rock that covers the Earth and extends about a mile inward. Beyond that is the mantle, a large section of liquid magma, and within this magma is the core, a dense solid sphere of mostly iron. But how have scientists come to these conclusions? After all, it is impossible for humans to observe what goes on inside the Earth. Instead, scientists are forced to study these phenomena by indirect means. One way in which scientists can do this is by observing the way that different types of seismic waves behave as they pass through the different layers of Earth's interior.

➡ To understand how this method works, it is important to have an understanding of seismic waves and how they behave under different circumstances. Seismic waves are vibrations created whenever there is shaking on the Earth's surface, and are most commonly the result of volcanoes and earthquakes. Seismic waves can be broken down into two types: surface waves that travel horizontally along the Earth's surface, and body waves that travel vertically into the Earth's interior. Body waves can be divided into primary waves (P-waves) and secondary waves (S-waves), the two types of seismic waves that most facilitate the study of Earth's internal composition. These two waves have one important difference. S-waves travel by displacing the ground around them, and as this displacement cannot occur in liquids, these waves can only travel through solids like rock. P-waves move in a different way, both compressing and separating material as they pass through it, and can pass through both liquids and solids.

➡ These two types of seismic waves can behave in several different ways as they pass through the layers of the Earth, the simplest of these being refraction and reflection. The path of any wave as it travels through the Earth depends on its velocity and the density of the materials through which it passes. When a wave passes from one type of rock to another, denser type, for instance, the direction in which the wave travels also changes. When the wave encounters the thicker rock, part of its energy continues to travel onward, though in a slightly altered direction. This is called refraction. However, some of its energy bounces off of the new layer and travels back in an upward direction through the process of reflection. How much energy is reflected and how much is refracted depends on the type of wave and the density of the new material it encounters at deeper layers. S-waves, which cannot pass through liquid, are always reflected when they reach the mantle at depths of 20 to 30 miles. P-waves can travel through both liquids and solids, and are thus useful in determining what lies beyond the uppermost region of the mantle. By measuring the degree of refraction and reflection in P-waves as they pass through different layers of the Earth, scientists can deduce the density and composition of the materials inside. The fact that P-waves undergo extreme changes in direction and velocity as they approach the center of the Earth allows scientists to infer that the Earth's core is indeed much denser than the surrounding mantle.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. sphere	(a) the way something is made up of different parts
2. circumstance	(b) to experience or meet something
3. composition	(c) a ball-like shape
4. density	(d) a degree to which a space is packed with people or things
5. encounter	(e) a condition that affects an event or behavior

1 According to paragraph 2, what is the major difference between P-waves and S-waves?

(A) P-waves can travel inside the Earth, while S-waves can only move along the surface.
(B) P-waves are caused by natural phenomena, while S-waves are often man-made.
(C) P-waves reflect off the Earth's mantle, but S-waves can penetrate to the core.
(D) P-waves travel through solids and liquids, while S-waves can only pass through solids.

Paragraph 2 is marked with an arrow [➡].

2 The word **it** in the passage refers to

(A) wave
(B) energy
(C) material
(D) layer

3 In paragraph 3, the author explains P-waves and S-waves by

(A) contrasting how the two waves behave in different mediums
(B) explaining that the two waves reflect and refract in the same way
(C) giving examples of how the two waves are used in predicting earthquakes
(D) discussing how the two waves gain speed when they travel through the earth

Paragraph 3 is marked with an arrow [➡].

4 In the passage, what does the author imply about P-waves?

(A) They travel more slowly than S-waves, which makes them easier for scientists to observe.
(B) They are more helpful than S-waves in determining the structure of Earth's interior.
(C) They are most often refracted when they come into contact with denser materials.
(D) They are the most common type of seismic wave found inside the Earth.

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

Scientists have determined the structure of the Earth's interior by studying the effects of seismic waves.

(A) Seismic waves belong to one of two broad categories, surface waves and body waves.
(B) Seismic waves react to changes in the density of the Earth by altering their speed and direction of travel.
(C) P-waves and S-waves behave in different ways; the former pass through both solids and liquids, but the latter pass though solids, but not liquids.
(D) How seismic waves behave at different depths allows scientists to determine the composition of Earth's interior.
(E) The behavior of S-waves provides evidence of a layer of liquid magma many miles inside the Earth.
(F) The Earth is composed of a rocky outer crust, a liquid mantle, and a solid inner core.

Volcano Monitoring

As one of the most destructive occurrences on earth, volcanic eruptions are of great concern to people everywhere. The magma and ash that spew out of a volcano can cause much damage, posing an immediate threat to communities near it and causing extensive environmental and financial damage, too. For all of these reasons, scientists have developed several methods of monitoring volcanoes in order to catch any activity that foreshadows an eruption. The kinds of activity that are monitored are seismic disruptions, deformations in the volcano and landscape, and gaseous emissions from the magma itself. A wide range of techniques and equipment are used in the process.

➡ One of the most reliable and frequently employed methods of monitoring volcanoes and predicting eruptions is through the measurement of local seismic disruptions. This is because impending volcanic eruptions frequently give off minor earthquakes. As magma rises into the volcano, it must squeeze through a constricted chamber or series of chambers while under great pressure. The force will crack some of the rock or force rocks with pre-existing cracks to convulse, setting off tremors with varying frequencies. This seismic activity is relatively weak and occurs roughly ten kilometers beneath the volcano. In order to detect such weak quakes, scientists must set up a network of seismometers around the volcano in order to catch the slightest fluctuations in seismic activity that are usually a prelude to a volcanic eruption. About four to eight seismometers are placed about twenty kilometers from one of the vents, and several more are placed on the volcano itself. All of these have to be close in order to catch the quakes, as a seismometer being placed too far away could not detect subtle shifts in seismic activity. Fortunately, this method has been used so extensively that it is quite advanced, and scientists are experienced in detecting crucial seismic activity quickly, accurately, and in real time.

➡ While seismic monitoring is the most widely used and trusted method of monitoring volcanoes, there are other technologies that allow scientists to observe landscape deformation, which usually accompanies volcanic activity. In addition to causing quakes, the increased magma flow will also make the volcano swell and alter the surrounding landscape, particularly its evenness and elevation, though these changes are too slight to be noticed with the naked eye. Scientists use a variety of tools to observe such changes. One major tool is the satellite. In particular, scientists use the Global Positioning System (GPS) satellites to study a very detailed map of the earth's surface, though the GPS is not primarily used to study volcanoes. Additionally, scientists have Interferometric Synthetic Aperture Radar (InSAR) satellites. These satellites use radar to map out changes in the landscape and the development of deformations very accurately, detecting possible volcanic activity. A Changes on the ground can also be measured directly by people with land surveying equipment. B Scientists use devices such as electronic distance meters (EDM) and tiltmeters to directly observe subtle changes that magma flow causes in the landscape. C One way that scientists use all of these methods in combination is by pinpointing two distinct spots on a volcano with GPS satellites. D They then use EDMs, tiltmeters, and InSAR satellites to measure the exact distance between them. As the volcano fills with magma, it stretches like a balloon and thus increases the distance between the two spots. If surveying tools like tiltmeters and EDMs catch this development,

scientists can be alerted to the possibility of an eruption before it occurs.

➡ In addition to the deformations in the ground caused by volcanic activity, scientists can measure chemical gaseous emissions. Gauging the emission of certain gases like sulfur dioxide and carbon dioxide is helpful. As magma rises to the surface, it will give off greater amounts of these two gases, so increased amounts of them around a volcanic area would be a good indication of increased activity. While it is possible to monitor such activity at a safe distance via satellite, weather can interfere with accurate readings, so the direct sampling of these emissions by people is a more accurate method, though this means having to get near an active vent to retrieve the samples. This is difficult because acidic gases like sulfur dioxide are easily dissolved in bodies of water, skewing precise measurements. Carbon dioxide is less likely to vanish in such a manner, though, so it could be more helpful in predicting volcanic activity.

1 The word **foreshadows** in the passage is closest in meaning to

(A) follows after
(B) may prevent
(C) makes worse
(D) comes before

2 The word **constricted** in the passage is closest in meaning to

(A) hot
(B) tight
(C) wide
(D) hidden

3 The word **these** in the passage refers to

(A) kilometers
(B) vents
(C) quakes
(D) seismometers

4 According to paragraph 2, why must scientists use a network of seismometers around volcanoes?

(A) The earthquakes that occur are not very strong.
(B) They must be ready to replace damaged instruments.
(C) The earthquakes are so strong that many are necessary.
(D) They are not certain where tremors will occur.

Paragraph 2 is marked with an arrow [➡].

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

(A) Before an eruption, the land elevation and evenness around an earthquake become distorted.
(B) Magma flow transforms the land in ways that are hard to detect, as well as causing quakes.
(C) The increased flow of magma causes earthquakes around a volcano that are barely noticeable.
(D) The increased swelling of a volcano about to erupt is due to the earthquakes that shift land elevation.

6 According to paragraph 3, satellites can do all of the following EXCEPT

(A) pinpoint two exact locations on a volcano
(B) monitor the direction of seismic waves
(C) monitor gasses released by the magma
(D) detect deformations of the ground with radar

Paragraph 3 is marked with an arrow [➡].

7 According to paragraph 3, tiltmeters help scientists predict volcanoes by

(A) measuring the change in temperatures
(B) measuring the emission of gases
(C) measuring the evenness of the ground
(D) measuring the fracturing of rocks

Paragraph 3 is marked with an arrow [➡].

8 The word Gauging in the passage is closest in meaning to

(A) Preventing
(B) Causing
(C) Measuring
(D) Discovering

9 The phrase such activity in the passage refers to

(A) the flowing of magma
(B) the emission of gases
(C) the monitoring of gases
(D) deformations in the ground

10 According to paragraph 4, why are gaseous emissions from magma directly sampled?

(A) Because accurate readings of emissions can be hindered by bad weather.
(B) Because it is impossible to read gas emissions using satellites.
(C) Because direct sampling of gases is the safest method.
(D) Because sampling of gases absorbed in the water bodies is required.

11 According to paragraph 4, why is measuring sulfur dioxide emissions to monitor volcanic eruptions tricky?

(A) Sulfur dioxide emissions are tainted by carbon dioxide.
(B) Magma does not always release increased amounts of sulfur dioxide.
(C) Stormy weather can scatter sulfur dioxide gases away from volcanoes.
(D) Sulfur dioxide tends to dissolve in nearby bodies of water.

Paragraph 4 is marked with an arrow [➡].

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

Both of these types of satellites provide scientists with the advantage of measuring such changes from a safe distance away from volcanic activity.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

13 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

Scientists have developed several ways of monitoring different natural phenomena that usually indicate that a volcano is about to erupt.

(A) The gases that magma gives off as it rises to the surface are measured closely or at a distance, though this method presents many challenges.

(B) Scientists constantly look out for the occurrence of small earthquakes and tremors in the area around an active volcano.

(C) Some gases from magma are tricky to measure because they disappear into surrounding lakes and rivers, making readings imprecise.

(D) The use of GPS satellites is very effective in measuring seismic activity, but the financial expense is too great to use them often.

(E) Many different instruments, including satellites and surveying techniques, are used to detect changes in the landscape before an eruption.

(F) The earthquakes that occur due to increased volcanic activity are usually beneath the surface and are very weak.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. c _____ *v.* to make something denser by pressing or squeezing it hard
2. e _____ *v.* to apply force on something
3. i _____ *v.* to cause something to stop
4. m _____ *n.* force or speed of forward movement
5. p _____ *n.* something that happens

B Choose the right meaning for the word in bold.

1. Toxic fertilizer is extremely dangerous, yet it is still **extensively** used on Chinese and Indian farms.

   (A) frequently (B) illegally (C) widely (D) continuously

2. Watching the common caterpillar **transform** into a butterfly is one of nature's greatest wonders.

   (A) change (B) enter (C) die (D) eat

3. The fitness center is available **exclusively** to hotel guests, so outside residents cannot use it.

   (A) shortly (B) only (C) easily (D) greatly

4. The singing of the national anthem will **precede** the President's speech to the nation.

   (A) come before (B) get over (C) be true of (D) be essential to

C Choose the words in the box to fill in the blank. You may have to change the word forms.

classify	coast	emit	observe

1. The price of _____ real estate has continued to decrease because of damage from natural disasters.

2. This _____ of plants and animals provides us with a better understanding of the scientific world.

3. Since _____ parts of the universe cannot be measured, hypotheses about them cannot be used in scientific theory.

4. The increase in carbon _____ is expected to create a number of health problems for residents of large cities.

D Choose the right word for the blank in each sentence.

1. The _____ created water shortages, which led to wild fires in the region.

   (A) drought (B) erosion (C) upwelling (D) quake

2. The new home owners hired a carpenter to make repairs to the _____ of the house.

   (A) elevation (B) sphere (C) interior (D) fluctuation

3. The _____ of the human body includes large amounts of oxygen, hydrogen, and carbon.

   (A) core (B) circumstance (C) composition (D) density

4. The war will kill hundreds of soldiers and _____ thousands of innocent civilians.

   (A) penetrate (B) displace (C) encounter (D) extend

Useful Terms

Geology

- ☐ erosion
- ☐ corrosion
- ☐ weather
- ☐ igneous rock
- ☐ plutonic rock
- ☐ metamorphosis
- ☐ metamorphic rock
- ☐ sediment
- ☐ sedimentary rock
- ☐ limestone
- ☐ granite
- ☐ alluvial
- ☐ crystallize
- ☐ deposit
- ☐ continental drift theory
- ☐ earthquake
- ☐ seismic wave
- ☐ epicenter
- ☐ Richter scale
- ☐ crust
- ☐ mantle
- ☐ magma
- ☐ volcano
- ☐ volcanic eruption
- ☐ crater
- ☐ lava
- ☐ stratified
- ☐ stratum (*pl.* starta)
- ☐ rift
- ☐ chasm
- ☐ upheaval
- ☐ bulge

Atmospheric Science

- ☐ temperature
- ☐ wind chill factor
- ☐ precipitation
- ☐ downfall
- ☐ cold front
- ☐ warm front
- ☐ westerlies
- ☐ trade wind
- ☐ typhoon
- ☐ hurricane
- ☐ cyclone
- ☐ torrential rain
- ☐ thunderstorm
- ☐ inclement
- ☐ continental climate
- ☐ oceanic climate
- ☐ desert climate
- ☐ subtropical climate
- ☐ tropical climate
- ☐ temperate climate
- ☐ monsoon climate
- ☐ highland climate
- ☐ subarctic climate
- ☐ polar climate
- ☐ air current
- ☐ air mass
- ☐ atmospheric pressure
- ☐ icecap
- ☐ glacial epoch
- ☐ glacier
- ☐ aurora

Oceanography

- ☐ tsunami
- ☐ whirlpool
- ☐ current
- ☐ submarine
- ☐ topography
- ☐ ocean floor
- ☐ continental shelf
- ☐ submarine valley
- ☐ strait
- ☐ seamount
- ☐ trench
- ☐ salinity

CHAPTER

09

Art

- The Salons of Paris
- Art Restoration and Conservation
- Renaissance Architecture
- Pottery of the Hopi Indians
- Dada

Approaching Themes

The Salons of Paris

➡ Today, Paris is well known for its contributions to new and daring art movements. However, early attempts at experimental art in the city actually faced strong opposition from the government, which favored art that was of a more classical, academic nature. Until the late 19th century, the art world of Paris revolved around the *Salon de Paris*, a regular exhibition of painting and sculpture sponsored by the French government. If an artist had any hopes of becoming a great success, it was imperative that he or she be accepted to the Paris Salon, as this was the only great form of exposure available at the time.

➡ The Salon of Paris was first opened as a way of exhibiting work from the city's premier art academy, and was not initially open to the public. This changed over the years as the exhibition grew to greater prominence, but even as the exhibition opened to the public and art from outside the school became more frequently accepted, the Salon maintained a reputation for art that reflected only the conventional styles taught in art schools. Beginning in 1725, the Salon was held in the prestigious Louvre Palace, and in 1748 the Salon adopted a system in which prominent teachers from the art academy judged the works and awarded medals to the best ones. The judges were extremely selective in what art was to be included in the exhibition, and their tastes were very conservative in nature. Many rising artists who found themselves being rejected year after year complained to the authorities, who moved to establish the *Salon des Refusés*, or the "Salon of Rejects," in which they allowed some of the art rejected by the Salon to be shown.

However, by the late 19th century this measure was not enough to satisfy artists of new and emerging styles. [A] In response to the conservative Salon, a small group of artists was allowed to organize its own yearly exhibition in 1884, featuring works from all styles, called the *Salon des Indépendants*. [B] The values of the new exhibition were very different from those of the official Salon. [C] First of all, the system of judges was abandoned, and the public was allowed to judge works of art based on their own merits rather than the opinions of academics. [D] In addition, no work of art was rejected, and all submissions found a place on the exhibition grounds. This free-thinking approach gave much-needed exposure to France's rising artists, many of *whom represented* the very future of modern art. For instance, the works of now-legendary painters such as Henri Matisse, Georges Braque, and Vincent Van Gogh made some of their first appearances here.

• **contribution** *n.* something that you do so that something can be successful • **daring** *a.* brave; involving a lot of risk • **experimental** *a.* using new ideas and methods • **sponsor** *v.* to support • **exposure** *n.* public attention • **premier** *a.* best and most important • **prominence** *n.* the state of being famous and important • **reputation** *n.* the opinion that people have about something • **conventional** *a.* of or using method, product, practice, etc., that has been used for a long time • **prestigious** *a.* highly respected • **authority** *n.* an organization that has the power to make decisions about some activities • **feature** *v.* to have something as an important characteristic • **merit** *n.* advantage or good quality of something • **submission** *n.* the act of giving something to an authority to be judged • **legendary** *a.* very famous

[Vocabulary]

1 The word **sponsored** in the passage is closest in meaning to

(A) investigated
(B) operated
(C) supported
(D) eliminated

[Rhetorical Purpose]

2 In paragraph 1, why does the author mention modern Paris's reputation for experimental art?

(A) To express admiration for a few great artists who worked in Paris
(B) To explain why Paris is an important city to artists of all styles
(C) To introduce a surprising contradiction to the city's reputation
(D) To pose a question about the state of experimental art in France

Paragraph 1 is marked with an arrow [➡].

[Fact]

3 According to paragraph 2, what led the authority to establish of the *Salon des Refusés*?

(A) Artists complained that their works were too often rejected.
(B) The government wanted to exploit the rejected artists.
(C) The judges were only accepting of one style of art.
(D) The public demanded that the artists' work be shown.

Paragraph 2 is marked with an arrow [➡].

[Insertion]

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

The people who established this new exhibition were members of the Impressionist movement, whose work was especially disliked by the Salon.

Where would the sentence best fit?

[Summary]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to the salon to which they relate. TWO of the answer choices will not be used.

Salon de Paris	*Salon des Indépendants*
•	•
•	•
•	

Answer Choices

(A) Works were judged by famous art teachers
(B) Only featured works previously rejected
(C) Judgment was left to the public, not academics.
(D) Was at one time closed to the general public
(E) Seen as the only way to gain attention as an artist
(F) Never turned down a serious submission
(G) Accepted only experimental works of art

Art Restoration and Conservation

Great masterpieces of art are destined to live forever as a beloved part of our cultural heritage. However, works of art are inherently fragile. Paint may chip or flake off over the years; canvases may bend or warp. For this reason, experts are continually making efforts to restore and conserve great works of art so that they may survive in perpetuity.

➡ Conservation and restoration have a long history in the art world, but until the 19th century, most of the work had been done by isolated individuals, and involved simply cleaning or touching up pieces of art for themselves or other collectors. The methods used were often only temporarily effective, and sometimes caused long-term damage to the "restored" pieces. For example, it was not uncommon to apply varnish to a painting to serve as a protective coating. However, they unknowingly used inferior materials that, in just a few years' time, would yellow and peel. In addition, early conservators used paints that had no more permanent value than the originals, and sometimes even less. Thus, paintings had to be "restored" quite frequently. With each restoration, the paintings lost more and more of their original integrity and sustained more long-term damage. In these early years, efforts to restore pieces of art proved almost as destructive as simply letting them decay.

During the 19th century, however, renowned scientists like Louis Pasteur and Michael Faraday began to study the effects of the environment on works of art, and their findings served to inform museum curators about the best ways to maintain their precious art collections. In 1888, Friedrich Rathgen became the first chemist to be employed directly by a museum, the Royal Museum of Berlin, thus officially transforming the practice of art conservation into a profession. Shortly after World War I, the British Museum hired chemist Harold Plenderleith to restore paintings that had suffered damage while hidden from enemies in the London Underground. These chemists and others identified and created pigments that would keep their color longer. They also discovered that ultraviolet radiation, such as that from the sun, had a profound effect on the brilliance of the paint. In response to this, museum curators placed their most sensitive paintings in display areas with a minimum of sunlight to keep them from fading.

Today, art conservators are careful not to alter a work of art in any way that is not absolutely necessary to its survival. This is part of a large code of ethics aimed at protecting the integrity of original works of art. Today's conservators practice one of two methods: interventive conservation and preventive conservation. Interventive conservation is similar to the restoration techniques of old, in that the conservator actually interacts with a work of art directly in order to clean it or to remedy some flaw. Even the most advanced interventive techniques can damage a work of art, so ample justification is required before a conservator can undertake such a process. More common is preventive conservation, in which measures are taken to prevent any future damage to a work of art. This involves simply protecting the art from environmental factors that can contribute to decay, so that little or no interventive work will be needed in the future.

- **masterpiece** *n.* great artwork
- **heritage** *n.* something that is passed from generation to generation
- **perpetuity** *n.* all future time
- **unknowingly** *ad.* unintentionally
- **permanent** *a.* lasting forever
- **sustain** *v.* to experience or undergo
- **conservation** *n.* protection from change or damage
- **varnish** *n.* a liquid used for coating something
- **curator** *n.* someone in charge of a museum
- **precious** *a.* valuable
- **profession** *n.* a job that requires a high level of education and training
- **suffer** *v.* to experience a bad situation, such as damage, loss or pain
- **pigment** *n.* coloring material
- **ultraviolet radiation** *n.* a type of ray from the sun that makes your skin darker
- **fade** *v.* to lose the original color of something
- **absolutely** *ad.* in every way, definitely
- **justification** *n.* a good reason for doing something

[Negative Fact]

1 **According to paragraph 2, all of the following were problems in early restoration efforts EXCEPT**

(A) using bad quality paints
(B) applying harmful varnishes
(C) removing paintings from sunlight
(D) restoring paintings often

Paragraph 2 is marked with an arrow [➡].

[Inference]

2 **According to paragraph 2, what can be inferred about early art conservators?**

(A) They had little knowledge necessary for restoring art
(B) They were amateurs who were new to art.
(C) They sought to improve upon the art instead of just restore it.
(D) They used paint that was of high quality.

Paragraph 2 is marked with an arrow [➡].

[Simplification]

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) The effects of the environment on works of art were not fully understood until researched by museum curators in the 19th century.
(B) Museums began to change the way they protected their art collections from environmental damage after hiring chemists to perform research.
(C) Scientists of the 19th century determined that the wrong environment can damage works of art, and they urged museum curators to consider their research.
(D) Research by famous scientists in the 19th century influenced the way museum curators protected their art collections from environmental damage.

[Reference]

4 **The phrase such a process in the passage refers to**

(A) protecting the art from environmental factors
(B) preserving the integrity of the original work
(C) preventive conservation
(D) interventive conservation

[Summary]

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 evolution of art conservation was mostly influenced by past errors, scientific research, and a growing respect for the integrity of original artworks.

(A) For hundreds of years, art conservators used damaging techniques and materials of poor quality to restore works of art.
(B) In the struggle to preserve precious artworks, museums began to recognize chemists as being essential in the process of conservation.
(C) Art conservation is a complex practice that involves several different disciplines, from art history to chemistry.
(D) Museum curators shield paintings from exposure to ultraviolet radiation, which can greatly diminish a work's quality.
(E) Scientific research was instrumental in determining which paints were of the best quality in regard to the endurance of the pigments.
(F) Modern art conservators only use interventive practices when no other solution is available, as they increase the risk of damage.

Renaissance Architecture

➡ The period of European history known as the Renaissance was marked by a renewed interest in learning and the arts. Having just emerged from the Middle Ages, a time during which the Catholic church largely suppressed the pursuit of science and art, artists and thinkers who were disappointed with the failings of their own culture turned to a culture predating their own for inspiration. Ancient Rome became the model for bold new intellectuals who wished to revitalize their weakened culture. One of the earliest and most pronounced examples of Renaissance principles can be found in the architecture of the period. Drawing inspiration from the ruins of ancient Rome, architects reinvented the European skyline, constructing cathedrals and castles that featured a marked departure from the styles of the previous medieval period.

The two dominant styles of medieval architecture produced massive, hulking buildings that were more intimidating than beautiful. The Romanesque style was often fortress-like in design, with its lack of decoration and use of hard lines. The Gothic style, on the other hand, was far more ornamental than the previous style, with statuettes of various saints and demons adorning the exterior, and steep, pointed spires that reached to heights unprecedented in medieval construction. However, even the Gothic style inspired far more dread than it did artistic appreciation. In contrast to both styles, Renaissance architecture was a lively celebration of the art form, in turns both majestic and lighthearted, that gladly disposed of the dreary conventions of the past.

The birthplace of Renaissance architecture was the city of Florence, Italy, in the early 15th century. Here, an architect by the name of Filippo Brunelleschi started a new artistic trend with his work on the city's main cathedral. Though the cathedral itself was built in the Gothic style more common to the Middle Ages, Brunelleschi designed its giant dome based on that of the Pantheon of ancient Rome. He had studied the structure at great length, and admired the style in which it was built for its orderly and symmetrical appearance. These same characteristics showed up in his design for the church of San Lorenzo, a strict geometrical design which featured Roman columns and archways. Throughout his career, Brunelleschi relied on these basic principles in his work as an architect, initiating a new style based on classical guidelines that would quickly become popular throughout Europe.

Perhaps the second most influential architect of the Renaissance was Donato Bramante, whose work is typical of what is called High Renaissance architecture. The High Renaissance period took place during the late 15th and early 16th centuries, and is characterized by an almost universal mastery of classical forms by architects from all over Italy. Often cited as a near-perfect piece of High Renaissance architecture, Bramante's *Tempietto* was built on the supposed place where St. Peter was killed in ancient times, and is thus the most sacred site in Rome. The small, round monument was built in an explicit imitation of ancient Roman temples. It is a round structure, encircled on the outside by slender Doric columns and topped with a perfectly proportioned dome. Bramante later participated in the design and construction of the giant dome atop St. Peter's Basilica at the Vatican, a monumental achievement in Renaissance design for which he is best known today.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. suppress	(a) the act of trying to achieve something
2. pursuit	(b) of the mathematics of shapes made up of points, lines, and angles
3. departure	(c) enjoyable
4. lighthearted	(d) a new way of doing something that is different from old ways
5. geometrical	(e) to hide, conceal, or prevent

1 **According to paragraph 1, what caused Renaissance thinkers to look to ancient Rome for inspiration?**

(A) They recognized Rome as being the world's greatest empire.
(B) They wanted to bring art and learning back to their culture.
(C) They wished to achieve the same status as the ancient Romans.
(D) They felt that the church in Rome was holding back progress.

Paragraph 1 is marked with an arrow [➡].

2 **The word intimidating in the passage is closest in meaning to**

(A) inspiring
(B) attractive
(C) frightening
(D) significant

3 **The author mentions The Romanesque Style and The Gothic Style in order to**

(A) show that the Renaissance style had a major impact on the Romanesque and Gothic Style
(B) argue that Renaissance architecture is the most advanced style
(C) give a clearer picture of how Renaissance architecture is different from previous styles
(D) give detailed information about the Romanesque and Gothic Style

4 **The phrase the structure in the passage refers to**

(A) Florence cathedral
(B) Pantheon
(C) Gothic style
(D) San Lorenzo

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Renaissance period saw the introduction of numerous elements of ancient Roman architecture into European culture that changed the art form forever.

(A) Thanks to the intellectuals of the time, philosophy and the arts enjoyed a renewed vitality during the Renaissance period.
(B) Florence is the site of several early Renaissance buildings, many of them designed by Brunelleschi, who studied Roman ruins at length.
(C) The High Renaissance period is marked by a very explicit return to Roman styles, the best example of which is a monument called the *Tempietto*.
(E) The Renaissance style of architecture was wildly popular in Italy, but its influence did not spread much farther.
(D) The great achievement of the Gothic style was its use of tall, pointed spires that made cathedrals taller than any in history.
(F) In contrast to the dreary architecture of the Middle Ages, Renaissance architecture was often playful in its style.

Pottery of the Hopi Indians

Of all the art forms common to Native American culture, pottery is one of the most beloved, and the pottery of the Hopi Indian tribe of southwestern America is among the most vibrant Native American traditions. The Hopi and their neighboring tribes began making pottery over 2,000 years ago, and the traditional process of making it has changed very little since then.

The potter, almost always a woman in Hopi culture, first must obtain the clay that is needed to make the pot. Clay is traditionally gathered near the home, simply by digging small pits in the ground. Larger mines do exist, and many of them are kept secret from outsiders by members of the tribe, as clay is often seen as an almost sacred material. Traditional prayers are offered up to the spirits when the clay is taken from the earth. The clay must be conditioned for several days before it is ready to be used, and the women do this by grinding the hard substance into a fine powder and soaking it in water until it is soft and pliable.

After this step is completed, the clay can be molded into the shape of the pot. Most often, the pot is carefully molded by hand, using small amounts of water to keep the clay soft and smooth throughout the process. Another popular method, most often used for much larger objects, is to use long coils of clay that can be stacked. A base is made from a flat piece of clay, and the pot is literally built from the ground up by stacking the coils on top of one another. Once molded, the pot is left to dry for a short time before the potter returns to polish it. Polishing involves the use of a small, wet pebble, which is scraped up and down the sides of the pot at a rapid pace. This ensures that there are no imperfections such as air bubbles in the clay, which can ruin the pot when it goes into the firing stage.

Designs for the pot are often in the form of pictures or shapes that are scratched into the clay surface with a special tool. This process is known as scraffito, and it must be done very carefully, because marks that are too shallow may not show up after firing, while marks that are too deep risk breaking the inside surface, which can cause the pot to shatter when heated. Traditional designs often feature the Avanyul, a feathered serpent from Hopi folklore, and several other symbols that have a personal, spiritual significance to the potter, such as wolves or waterfowl. Painting is not uncommon, either, and is traditionally done with a piece of a yucca plant that has been chewed at one end to form a brush.

Finally, the pot is placed in a shallow pit to be fired. [A] The pot is placed on a bed of large broken pottery shards, and covered further with more shards. [B] The whole arrangement is then covered with a mound of dried feces from cows or sheep, and wood is used to set the feces ablaze. [C] The potter recites a traditional prayer for good luck in completing her work of art, as any number of things can go wrong during the firing. [D] A gust of wind, for instance, can blow ashes or feces onto the pot and stick to the clay, ruining the design of the pot and the many days of work that went into shaping it. After several hours of cooking, the pot is hardened and ready for use.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. imperfection	(a) relating to a religion or spirit
2. spiritual	(b) to shape something using one's hands
3. ablaze	(c) to speak a piece of literature
4. mold	(d) burning strongly
5. recite	(e) flaw

1 The word **them** in the passage refers to

(A) small pits
(B) clay mines
(C) tribal members
(D) potters

2 The word **pliable** in the passage is closest in meaning to

(A) flexible
(B) fragile
(C) dense
(D) heavy

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) Since designs cut too deep can damage the pot and designs cut too shallow will likely not show after firing, scraffito must be performed delicately.
(B) Decorating a pot with scraffito must be done carefully so as not to cause the pot to break when it goes into the oven.
(C) Because designs that do not penetrate enough of the clay often disappear when the pot is fired, scraffito must be etched deeply into the surface.
(D) Since scraffito is a risky practice that can accidentally destroy a pot, it is considered by most an unnecessary step in the process.

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

The space between the pieces allows air to pass into the furnace and feed the flames.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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.***

For the Hopi Indians, the long and intensive process for making their traditional pottery is much the same as it has been for hundreds of years.

(A) After the clay is properly conditioned, it is molded by hand, or built up as long strips of clay.
(B) In traditional Hopi society, women are the ones who most often make pottery, though the opportunity extends to males and females alike.
(C) Potters put patterns onto the surface of the pottery by carving or painting pictures.
(D) If a pot is to be painted, it generally features images of animals that have some spiritual significance to the artist.
(E) Tiny imperfections such as air bubbles in the surface of the clay can cause the pot to burst when it is fired in the oven.
(F) In the final stage, the pot is covered in pottery shards and animal feces and set ablaze until it hardens into its usable state.

Dada

➡ The course of Western art forever changed after World War I. The brutality and violence of the war affected an entire generation of young poets, writers, painters, and other artists. They were disappointed that Western ideals like peace and democracy had not prevented such violence. The outrage felt by these artists gave rise to the most subversive art movement the world had ever seen. Its practitioners called it Dada, and it stood for everything that art was not; it was, in a sense, "anti-art." Instead of pleasing the tastes of viewers, Dada artists sought to shock and offend them. Dadaists sought to challenge people's traditional beliefs by challenging the ways in which they viewed art. Dada artists wanted not only to change the art world, but to change the beliefs and attitudes of the people as well. Throughout its short history, Dada spread to several cities around the world, taking on a new and unique form wherever it traveled.

Dada was begun by a small group of artists in Zürich, Switzerland. Switzerland was neutral in the war, and it was a refuge for people from nearby warring countries such as Germany and Austria. Artists moved to Switzerland both to escape the war and to protest it. The movement centered on a local nightclub called the Cabaret Voltaire, where performance art was the main attraction. In one early performance, poet Hugo Ball read three pieces of experimental poetry while bouncing around the stage in a costume made of cardboard cylinders and a pair of cardboard wings. In short, the performance was completely absurd, and audiences left the club both shocked and confused at such disregard for their own pleasure. This, of course, was Ball's intention. Similar performances at the Cabaret included many important artists who would later go on to achieve great fame. One of them was Max Ernst, who, with the help of fellow artists, established a Dada group in Cologne, Germany shortly after the war. A

➡ From Zürich, some members of the original Dada group moved to New York City to join an already thriving community of Dada artists there. B The atmosphere in New York was much different from that of Zürich and Cologne. C New York artists practiced what was perhaps the most playful form of Dada to date. D Whereas cynicism played a major role in European Dada, irony and humor were important to the New York scene. The basic goals, however, remained the same: the creation of anti-art that challenged the beliefs of mainstream society. French artist Marcel Duchamp created one of the best-known art works from this time and place: a sculpture called *Fountain*, which featured an overturned bathroom urinal. Audiences reacted with disgust to the piece, and the work was almost universally reviled by the mainstream art community. However, it did spark a great deal of lively debate, as the artist had hoped it would.

Artists in Paris had been closely following the work of various Dada groups around the world, but a real movement didn't begin in Paris until 1920, when several of the movement's original members moved there. For many years prior to this, the city had held a stronger reputation for its literature than for its art. However, once an array of artists began pouring into the city, Dada succeeded in Paris more than in any other city. Writers such as André Breton took up the cause of the Dadaists and published essays on the Dada philosophy. French painter Jean Crotti held the first exhibition of Dada painting at the Society of

Independent Artists. Composer Erik Satie collaborated with Pablo Picasso and others to create one of the most bizarre and scandalous ballets of the time. Whereas most ballets include graceful dancing and beautiful music, Satie and Picasso's ballet featured Cubist-style sets, an orchestra of noisemaking instruments, and costumes so large and awkward that few of the dancers could move with ease. Despite the wide array of art produced in Paris, the Dada movement began to go out of style by 1922, and by 1924 had all but disappeared. Though Dada may be gone, the lasting influence of Dada can still be found in modern styles of music such as punk rock, and is also alive and well in many modern art films.

1 The word **they** in the passage refers to

(A) artists
(B) beliefs
(C) people
(D) tastes

2 According to paragraph 1, what can be inferred about the effects of World War I on artists?

(A) It resulted in the deaths of many famous artists.
(B) It caused artists to lose faith in their culture.
(C) It restricted artists' freedom of expression.
(D) It became more difficult to earn a living in art.

Paragraph 1 is marked with an arrow [➡].

3 The word **refuge** in the passage is closest in meaning to

(A) route
(B) holiday
(C) shelter
(D) journey

4 The word **disregard** in the passage is closest in meaning to

(A) misunderstanding
(B) intention
(C) belief
(D) disrespect

5 The word **This** in the passage refers to

(A) The absurdity of Ball's performance
(B) The audience's reaction to Ball's performance
(C) The achievement of great fame by performers
(D) The beginning of a new art movement

6 The word **reviled** in the passage is closest in meaning to

(A) despised
(B) admired
(C) rejected
(D) ignored

7 According to paragraph 3, how was the Dada scene in New York City different from other cities?

(A) New York Dada was more lighthearted than other versions.
(B) New York Dada attracted more of the world's attention.
(C) New York Dada artists were more famous than most others.
(D) New York Dada marked the end of the movement.

Paragraph 3 is marked with an arrow [➡].

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

(A) New York featured playful art such as *Fountain*, a controversial work by French artist Marcel Duchamp.
(B) Marcel Duchamp of New York City was known for using found objects in his art, including a toilet that he entitled *Fountain*.
(C) Marcel Duchamp's *Fountain*, a "sculpture" comprised of only an upside-down toilet, was the most significant contribution to the Dada scene in New York.
(D) The only piece of art worthy of note to come from the New York Dada scene was *Fountain*, a beloved sculpture by French artist Marcel Duchamp.

9 The word **collaborated** in the passage is closest in meaning to

(A) competed
(B) communicated
(C) collected
(D) cooperated

10 According to the passage, what is NOT true of Dada?

(A) It affected a wide scope of art ranging from literature and fine art to ballet.
(B) It opposed mainstream belief systems and traditional forms of art.
(C) Dada artists did not respect the tastes of audiences.
(D) Dada first emerged in France.

11 All of the following are mentioned in the passage as Dadaist art work EXCEPT

(A) sculpture
(B) fashion
(C) painting
(D) poetry

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

These artists were less burdened by the violence in Europe, and the result was this relatively carefree attitude.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

13 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

Dada was a worldwide artistic movement that attempted to shake traditional notions of art and society.

(A) World War I inspired artists from Paris, Zürich, and even New York to show pride in their countries by making art that was more patriotic.

(B) Performance art was important to Dadaists in Zürich, who shocked audiences with nonsensical performances.

(C) While European Dada features seriousness and cynicism, American Dada has unique characteristics such as irony and humor.

(D) Dada reached its climax in Paris, where artists collaborated to put on a bizarre Dada ballet.

(E) Switzerland was neutral during the war, making Zürich the ideal city for an artistic movement to begin in.

(F) Some Dada artists left Zürich early on to join other groups, like the one in New York City.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. e _____ *a.* using new ideas and methods
2. c _____ *a.* of method, product, practice etc has been used for a long time
3. h _____ *n.* something that is passed from generation to generation
4. c _____ *n.* protection from change or damage
5. p _____ *a.* lasting forever

B Choose the right meaning for the word in bold.

1. The **brutality** of the violence in this movie made it very difficult for me to watch alone.
   (A) description (B) censorship (C) outbreak (D) cruelty

2. If a restaurant is able to create a warm and happy **atmosphere**, diners are sure to return.
   (A) mood (B) party (C) event (D) service

3. His new book is much more **lighthearted** than his last one, which was dark and violent.
   (A) enjoyable (B) serious (C) artistic (D) complex

4. The king plans to **suppress** the revolution by ordering his army to attack the rebels.
   (A) organize (B) predict (C) avoid (D) prevent

C Choose the words in the box to fill in the blank. You may have to change the word forms.

perfect	scandal	depart	pursue

1. The author had many _____ affairs with women, and this ruined his reputation as an artist.

2. The hungry fox, in _____ of the rabbit, ran quickly through the forest.

3. The artist's new painting style was a big _____ from his previous technique.

4. The value of a diamond decreases if it is found to have a defect or _____.

D Choose the right word for the blank in each sentence.

1. The prisoner attempted a _____ escape from the prison, but was captured and killed by the police.

   (A) daring (B) sacred (C) ablaze (D) precious

2. Training for the Olympics is very expensive, and so, many large corporations _____ athletes by giving them money.

   (A) disappoint (B) spark (C) recite (D) sponsor

3. I must work very hard if I want to attend a _____ university like Harvard.

   (A) geometrical (B) fragile (C) prestigious (D) spiritual

4. People once believed that the Earth was flat, but this argument was found to have no _____.

   (A) merit (B) disregard (C) exposure (D) mainstream

Useful Terms

Fine Art

- ☐ watercolor painting
- ☐ oil painting
- ☐ mural painting
- ☐ figure painting
- ☐ still-life painting
- ☐ landscape painting
- ☐ portrait
- ☐ hue
- ☐ pigment
- ☐ brushstroke
- ☐ appreciation
- ☐ connoisseur
- ☐ antique
- ☐ reproduction
- ☐ aesthetic
- ☐ composition
- ☐ rendering
- ☐ symbolize
- ☐ sculpture
- ☐ sculptor
- ☐ carve
- ☐ woodprint
- ☐ emboss
- ☐ plaster cast
- ☐ symmetry

Film

- ☐ preview
- ☐ running time
- ☐ rating
- ☐ restricted
- ☐ horror film
- ☐ independent film
- ☐ documentary film
- ☐ monochrome film
- ☐ adaptation
- ☐ casting
- ☐ special effects
- ☐ visual effects
- ☐ close-up
- ☐ double-exposure shot
- ☐ shot
- ☐ scenery
- ☐ score
- ☐ subtitle
- ☐ sound track
- ☐ motion picture
- ☐ criticism
- ☐ silent film
- ☐ sound film

Literature

- ☐ genre
- ☐ epic
- ☐ lyric
- ☐ ode
- ☐ elegy
- ☐ sonnet
- ☐ verse
- ☐ prose
- ☐ chronicle
- ☐ fiction
- ☐ folklore
- ☐ fairy tale
- ☐ fable
- ☐ allegory
- ☐ satire
- ☐ parody
- ☐ setting
- ☐ rhetoric
- ☐ metaphor
- ☐ allusion
- ☐ irony
- ☐ paradox
- ☐ ellipsis
- ☐ alliteration
- ☐ rhyme
- ☐ style
- ☐ synopsis
- ☐ pseudonym
- ☐ masterpiece

CHAPTER

10

Zoology, Botany & Entomology

- Kudzu
- Precocial and Altricial Species
- Honeybee Communication
- Spores and Seeds
- Carnivorous Plants

Approaching Themes

Kudzu

The American Southeast is famous for its beautiful rural areas that are home to a wide array of plants, including several species of trees and flowering plants. One particular plant that has become dominant in this region within the past century is kudzu. Kudzu is a distinctive plant, immediately recognizable by its hairy vines, big leaves, and purple flowers blooming from long stems. Kudzu is not native to the United States, though; its origins can actually be traced to East Asia, particularly China and Japan, where its starchy roots were often eaten and its stems were used to produce fiber for ropes. However, since its introduction into the Southeast, it has spread out over most of the area and become a threat that must be constantly and closely watched.

Kudzu first became popular among people in the United States during the 1880s. The pleasant appearance of the plant, as well as its rapid growth, made it an attractive provider of shade in the warm, sunny climate of the Southeast. Fifty years later, beginning in the 1930s, farmers found other uses for kudzu. Due to its high protein content, it served as a convenient food source for livestock, and its deep roots helped anchor soil in order to prevent erosion. It became so popular that people would grow millions of seeds at a time and planted kudzu almost anywhere that they could, particularly in Alabama, Georgia, North Carolina, Virginia, and other such southeastern states.

➡ However, such avid promotion of kudzu proved to have harmful consequences. Kudzu's quick rate of growth — up to a foot a day — soon became a major problem. It grew over open fields, up the trunks of trees, along sides of highways, and anywhere else, quickly overtaking land, vegetation, and infrastructure. By the 1950s, kudzu was hated by most farmers as an invasive plant species that could not be contained, and the U.S. government subsequently removed its status as an acceptable cover crop. Studies have shown that kudzu has cost agricultural and lumber industries several millions of dollars each year. The primary threat it poses is by blocking out sunlight other plants need, thus interfering with crop and timber production.

Fortunately, there are a few ways to counteract kudzu's spread. The most effective way of removing, or at least controlling, an infestation is the removal of the plant's root crown. These are knobs of plant tissue at the top of the root. By closely cutting this knob away from the root system, people can slow down a plant's growth. The leftover root system, which runs very deep, is then normally treated with herbicide. While this helps control the spread, it cannot stop it. Another proposed method would include using natural agents like bacteria or animals to destroy the plant, but currently this is not feasible, and kudzu remains a prevalent pest.

• **distinctive** *a.* different from others • **starchy** *a.* containing carbohydrate substance • **anchor** *v.* to fix something in place • **promotion** *n.* the act of encouraging something • **trunk** *n.* the main stem of a tree • **overtake** *v.* to develop more quickly than someone or something else • **infrastructure** *n.* the basic systems such as roads, railways and banks that are necessary for a country to work properly • **subsequently** *ad.* after an event • **lumber** *n.* timber; pieces of wood for building • **counteract** *v.* to limit or prevent a bad effect of something • **infestation** *n.* the state of being large in number and becoming harmful • **knob** *n.* a rounded part sticking out from a surface • **leftover** *n.* something that is not used • **herbicide** *n.* chemical substance for killing plants • **prevalent** *a.* occurring commonly and widely

[Simplification]

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) Originally from East Asia, Kudzu was used there as food and for making tools.
(B) Originally from China, Kudzu is often used in Japan to produce various fibers.
(C) Kudzu was used in the United States to produce starchy foods and fibers for tools.
(D) Kudzu did not originally come from America but rather from East Asian countries.

[Negative Fact]

2 **According to the passage, kudzu was initially popular in America for all of the following reasons EXCEPT:**

(A) It helped preserve soil.
(B) It did not mature quickly.
(C) It was a pretty decoration.
(D) It was useful in feeding cattle.

[Vocabulary]

3 **The word avid is closest in meaning to**

(A) cautious
(B) eager
(C) brief
(D) rare

[Rhetorical Purpose]

4 **In paragraph 3, why does the author mention the US government's move and studies on kudzu?**

(A) To explain the desirable environment necessary for kudzu to grow
(B) To compare the popularity of kudzu in the US with that in other countries
(C) To explain how kudzu has become widespread throughout the US
(D) To give evidence that damage caused by kudzu is very serious

Paragraph 3 is marked with an arrow [➡].

[Summary]

5 **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.

While it was a popular plant in America during the early 20th century, kudzu is now considered an invasive species and requires constant effort to manage.

(A) Kudzu has a lovely appearance, with large leaves, purple flower blooms, and long vines.
(B) At first, Americans used kudzu for a variety of agricultural and decorative purposes.
(C) Kudzu has a shallow root system that makes it easy to dig up and kill, preventing infestations.
(D) Kudzu is usually killed by removing the plant's upper part and poisoning the roots.
(E) After its introduction, kudzu quickly grew out over a large area, harming other plants.
(F) Kudzu was first introduced from Asia to America in the 19th century.

Precocial and Altricial Species

Most animals, when they are born, require a great deal of care from one or more of their parents before they are fit enough to survive on their own. Others, however, are ready from a very early point in development to leave the nest and fend for themselves. These two broad groups of animals can be characterized as being either precocial or altricial. Precocial refers to animals that require little care after birth, while altricial refers to those that rely on their parents for a longer period. The characteristics of each group can vary widely depending on the type of animal in question, and it can sometimes be difficult to distinguish one from the other.

➡ Precocial animals have a much longer gestation period than altricial animals. For this reason, they are more fully developed when they are finally born. Animals can present precocial habits across a broad spectrum, and nowhere in nature is this better exemplified than in birds. A The young of most precocial bird species are born with well developed skeletons, feathers, and an excellent sense of sight. B Some species of birds have young that are ready to leave the nest within 24 hours of hatching, and may be called superprecocial because of this amazing ability. C Less precocial chicks still require some care; for instance, some are born without the ability to regulate their body temperature, and must rely on the mother to do this for a short period of time until they are able to handle it themselves. D There are also some mammals, such as deer and goats, which are also precocial to a degree, though they number far fewer than birds.

The opposite group of animals, those said to be altricial, require a great deal more care before they become independent. This group comprises most mammal species. The altricial young are often born without some basic survival traits, such as a coat of fur or eyes that are fully open. For this reason, they must be allowed some time to develop before they can be expected to survive without direct care from the mother. Humans are included among altricial species, and require one of the longest periods of care of any species. Other mammals, such as giraffes, display much shorter periods. It is believed by many scientists that this is due to their large size as adults. The young can gestate for a longer period within a larger adult, one result of which is that the young mammal is larger and more developed when it leaves the womb. In comparison to humans, a giraffe has a gestation period of 15 months, whereas the gestation period for humans is only nine.

• **fend for oneself** *v.* to take care of oneself • **distinguish** *v.* to recognize a difference between two things • **spectrum** *n.* range of situations going from one extreme to the other extreme • **exemplify** *v.* to be an example of something • **hatch** *v.* to come out of the egg • **regulate** *v.* to control something • **gestate** *v.* to carry offspring in the womb

[Fact]

1 **According to paragraph 2, what makes an animal superprecocial?**

(A) It may have a well developed skeleton at birth.
(B) It is born with the traits it needs for survival.
(C) It can leave the mother almost immediately.
(D) It may require some training before it leaves.

Paragraph 2 is marked with an arrow [➡].

[Reference]

2 **The phrase This group in the passage refers to**

(A) mammals
(B) humans
(C) altricial species
(D) precocial species

[Inference]

3 **In the passage, what can be inferred about the distinction between altricial and precocial habits?**

(A) It is not always clear because habits vary greatly.
(B) It is prominent between animals of the same species.
(C) Precocial species are relatively large in their size, while altricial species are mostly small.
(D) It rests with scientists to decide which label applies.

[Insertion]

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

Another such species can actually dig its way out of the nest after hatching and leave immediately.

Where would the sentence best fit?

[Table]

5 **Directions:** Select the appropriate phrases from the answer choices and match them to either altricial or precocial species. TWO of the answer choices will not be used.

Altricial	Precocial
•	•
•	•
	•

Answer Choices

(A) Includes most mammals
(B) May leave mothers within hours of birth
(C) Can vary within a species
(D) Has well-developed skeleton at birth
(E) Associated only with egg-laying species
(F) Born with well developed eyes
(G) Period of care is relatively long

Honeybee Communication

Honeybees are very social creatures, as they live together in large hives that are divided into a highly structured hierarchy. Honeybees function as a collective unit: they depend on each other to build, defend, and sustain hives. Thus, they have various methods of communicating with each other, including releasing various scents and "dancing." Extensive research has shown that the purpose of this dance is twofold: to inform other members of the colonies of the location of nectar that bees use to make honey, their primary staple, and to recruit other bees to retrieve this nectar. In spite of numerous theories about the particular significance of the modes of communication used, researchers generally agree that there are essentially three. They are the dance itself, sounds emitted during the dance, and the distribution of odors from the food source.

➡ The most immediate mode of communication that honeybees use is the dance. These movements have been noticed by observers since the ancient days of Aristotle, but their exact purpose wasn't discovered until after the mid-twentieth century. An audience of honeybees from a hive must watch the dance closely and catch every detail in order to understand the message correctly. The dancer imparts crucial information through various movements. Some of these movements include the rotation of the bee's tail a certain number of times and positioning its body at specific angles, in one or two possible dances. The round dance is used for food sources that are nearby, and the more complicated "waggle" dance indicates the location of food sources that are further away. This particular dance indicates the exact direction in which a food source is located and how far away it is.

➡ In addition to the dance itself, different sounds are made by the dancer and detected through the antennae of honeybees. Ultimately, both the visual movements and the sound are necessary to relay the information properly. Moreover, the specific sounds must be made correctly to create a successful dance. Experiments with bees that had artificially clipped wings or mutated, shorter wings showed that they produced a higher vibration when dancing, and as a result they could not recruit members from the colony to seek out the food source. By comparing the dances of various other species of bees and the conditions in which these dances are performed, researchers now believe they are an adaptation to dancing in locations with little light. A The sounds supposedly help the audience bees follow the dancer's movements in these environments, but this is still speculative. B

The use of odor is another important mode of communication, though its usefulness in finding food is highly debated among researchers. C Some have suggested that picking up these odors, not dancing, is the primary method bees use to find available food sources, but most believe that it plays a secondary role. D The scent of certain flowers, nectar, and other properties of the food source rubs off on the scout as it searches for food. As the scout dances, the audience will pick up on this scent. This action is supposed to help them detect the exact location of the food source, as they can trace the smell to the spot.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. hierarchy	(a) collected together
2. collective	(b) a group of animals or insects of the same kind that live together
3. rotation	(c) based on guessing
4. colony	(d) a social organization in animals
5. speculative	(e) a turning movement

1 The word **imparts** in the passage is closest in meaning to

(A) gives
(B) distorts
(C) withholds
(D) receives

2 According to paragraph 2, the waggle dance tells the audience

(A) only that food is nearby
(B) the distance and direction of food
(C) that the food is very high quality
(D) the exact location of the food

Paragraph 2 is marked with an arrow [➡].

3 According to paragraph 3, why were bees with shorter wings unable to transmit effective messages about the location of food?

(A) They were not able to get enough of the food's scent on their wings.
(B) They put more effort into flight, so they misjudged the distance to food.
(C) They produced the incorrect sounds when they danced.
(D) They could not turn their bodies quickly enough dancing.

Paragraph 3 is marked with an arrow [➡].

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

Another theory is that certain sounds inform the audience that the food source is of a particularly desirable quality.

Where would the sentence best fit?

5 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 process of providing information about food sources to a hive, honeybees must utilize a number of modes of communication to recruit other bees to find and gather the food.

(A) Aristotle was the first person to realize that the dance of honeybees was done in an attempt to collect nectar for the hive.
(B) The honeybee must provide other bees with the smell of the nectar so that the others can find the exact food source.
(C) Honeybees with antennae that are shorter than the average size cannot detect the sounds needed in order to understand the waggle dance.
(D) The sounds that honeybees make with their wings play a significant role in helping audience members decipher the message of the dance.
(E) The use of mutated bees has been crucial in determining the exact movements that honeybees make in their various dances.
(F) Honeybees use two different dances as the primary method of telling other members of their hives where food sources are located.

Spores and Seeds

There are several ways to categorize the many types of plants on Earth, but when it comes to reproduction, plants can generally be divided into two basic categories: those which reproduce by means of seeds, and those which reproduce through the use of spores. Though they serve the same basic functions, the differences between these two reproductive units and the methods of reproduction they represent are many.

➡ The more familiar of the two categories is the seed-bearing plant. Seeds are basically small, enclosed units that contain an embryo of the parent plant. The embryo, an undeveloped version of the parent plant, is the most important component, as it will eventually grow into a new plant. All seeds feature certain protective structures to ensure the health of the embryo. For instance, it is usually protected by an outer covering known as a seed coat, a layer of material that helps both to retain moisture in the seed and to keep it from becoming damaged by environmental factors. Seeds also contain a source of food for the embryo to feed on as it develops. This food is usually a combination of oils, starches, and proteins, and occupies the space between the embryo and the seed coat.

Seeds are considered the end stage in the process of reproduction in seed plants, having been preceded by other familiar processes such as pollination and flowering. All that remains is for the seeds to be spread, which may be accomplished with the help of wind, water, or even animals. Seed plants are the most advanced form of plant in evolutionary terms. For this reason, they often dominate their respective ecological niches, like forests and grasslands. Those few plants that still reproduce entirely asexually — without a partner — represent the most basic form. Between them lies an intermediate stage in the evolution of plants, the spore plant.

➡ Spores are much simpler in their make-up than seeds, and are a common reproductive unit of bacteria and fungi in addition to plants. One of the key differences between seeds and spores is that spores do not have the same support mechanisms, such as stored food resources or defensive coverings. So, spores from plants are less able to survive in unfavorable conditions for long periods of time before growing into a full *plant. As a rule, spores* are released in large numbers as a way of giving more of them a better chance of growing to maturity.

Despite their many shortcomings, spores do have some advantages over seeds. Spores are extremely light compared to seeds, and can thus be dispersed more easily and over greater distances by even light breezes. The most common type of spore plant is the fern, which releases spores from the underside of its leaves. Some species of fern may be said to bridge the evolutionary gap between spore-producing plants and seed-producing plants. The presence of ferns dates back over 300 million years, and over the course of their long evolution, some have evolved into seed-bearing plants, perhaps some of the first.

Word POP-UP

Match the words or phrases on the left with the definitions on the right.

1. reproduction	(a) to achieve or complete some task successfully
2. accomplish	(b) used to protect something from damage
3. ecological	(c) to spread something into different places
4. defensive	(d) relating to the way organisms and the environment interact
5. disperse	(e) the act of giving birth to offspring

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

(A) Important moisture is retained in the seed by the embryo, which lies inside the protective covering of the seed coat.
(B) An outer covering called a seed coat provides the embryo with moisture and a food source as it develops.
(C) The embryo is protected from damage by moisture within the seed, which the seed coat keeps from drying out.
(D) The seed coat protects the embryo from drying out and from becoming damaged by outside forces.

2 **In paragraph 2, what is true of seed plants?**

(A) Seeds provide nutrients for the embryo.
(B) They are considered to be less advanced than spore plants.
(C) They are often pushed out of their habitats by other forms of plants.
(D) They only exist in certain ecological niches.

Paragraph 2 is marked with an arrow [➡].

3 **The phrase this reason in the passage refers to**

(A) the spreading of seeds by way of wind, water, and animals
(B) the idea that seed plants are the most advanced type of plants
(C) the presence of a food source for the embryo within the seed
(D) the assertion that seeds are the final stage in reproduction

4 **According to paragraph 4, spores are vulnerable because**

(A) they cannot spread over a very large area
(B) they are attractive to predators on the ground
(C) they lack a food source and a means of protection
(D) they are not fully developed when released

Paragraph 4 is marked with an arrow [➡].

5 **Directions:** Select the appropriate phrases from the answer choices and match them to either seed plants or spore plants. TWO of the answer choices will not be used. ***This question is worth 3 points.***

Seed Plants	Spore Plants
•	•
•	•
	•

Answer Choices

(A) Are vulnerable to predators
(B) Contain a protective outer covering
(C) Released in very large numbers
(D) Are restricted to green plants only
(E) The most advanced form of plant
(F) Less likely to survive in a hostile environment
(G) Can be spread over great distances due to weight

Carnivorous Plants

➡ All plants rely on nutrients taken from the soil in order to survive. However, in areas where the soil does not contain enough vital nutrients, some plants have adapted to supplement their diets from another source: living organisms. Though they are few in number, carnivorous plants are nonetheless fascinating beings that "eat" anything from one-celled organisms to insects in order to survive. They are commonly found in marshlands. Carnivorous plants feature one of several types of "traps" to ensnare prey, which they consume to make up for nutrients that may be missing from the soil. While there are over 400 species of carnivorous plants in the world today, some are more prevalent than others.

➡ The most well known of these plants are the snap traps, which includes the Venus flytrap. Snap traps are easily identified by their leaves, which are separated into two lobes that have the ability to fold together. These carnivorous plants capture prey through mechanisms that are not unlike the common household mousetrap. Inside the lobes, the surface is covered with tiny hairs that are sensitive to movement. When the plant's prey brushes against the hairs, it triggers a closing mechanism that rapidly brings the two lobes together, trapping the prey securely inside. The response of the traps is phenomenal in regard to speed: the time between triggering the hairs and snapping shut is less than a second. As the prey struggles inside the trap, it only triggers more hairs, causing the leaves to tighten their grip. The plant then secretes liquid chemicals from special glands into the trap to dissolve the prey and absorb all of its nutrients. Besides the Venus flytrap, only one other type of snap trap exists today, referred to as the waterwheel plant. The two share a common ancestor and differ only in a few ways. For instance, the waterwheel is an aquatic plant, while the flytrap is exclusively terrestrial. In addition, the flytrap feeds primarily on arthropods like spiders, while the waterwheel lives off of simple invertebrates, like certain types of plankton.

➡ *Pitfall* traps are among the most strangely beautiful types of carnivorous plants, though they may also be the most primitive. They function much more simply than snap traps, though the wide variety of pitfall traps (also known as pitcher plants) means that some are more complex than others. The simplest type of this carnivorous plant is best exemplified by the sun pitcher plant. It consists of tall leaves that are rolled into a tubular shape. The mouth of the leaf, and the opening of the trap, are wider than the rest of the body. The sun pitcher plant simply waits for unsuspecting prey to slip down the sides of the tube, where digestive enzymes wait in a small pool to drown and devour it. More complex forms of pitfall traps use basically the same mechanism for killing and eating their prey, but the actual trap can be far more elaborate. The cobra plant features a large, vacant bulb at its tip with small transparent dots that let sunshine in. When insects (mostly ants) crawl into the bulb, they try endlessly to leave through these "false exits," but eventually they tire themselves out and fall down the tube into the digestive chamber, where they are dissolved by the plant's digestive enzymes.

➡ A third type of carnivorous plant uses flypaper traps to capture its prey. [A] These plants are extremely numerous and vary greatly in appearance from species to species. [B] Their leaves contain glands that release a sticky type of mucus which can be used to trap insects that unknowingly land on

them . [C] One type of flypaper trap is the butterwort plant. [D] The butterwort has broad, bright green leaves that are grouped closely together. Flying insects are attracted to the butterwort because the thin layer of mucus on its leaves has the semblance of dew, making the plant look like it is covered in water droplets. When the insect lands, the leaves release more of this sticky substance, which further traps the insect. Another type of flypaper trap is the cape sundew, which has an appearance quite unlike its distant cousin the butterwort. The leaves of the cape sundew are long and thin, like tentacles. Tiny hairs run up and down the length of the tentacles, each containing a fat drop of mucus. As with the butterwort, insects are attracted to the cape sundew expecting to find water, but instead become trapped in the mucus. The tendrils then curl up, enclosing the insect in a tight coil that aids in digestion.

1 The word **ensnare** in the passage is closest in meaning to

(A) monitor
(B) catch
(C) escape
(D) enter

2 According to paragraph 1, carnivorous plants get nutrients from living organisms because

(A) they had to develop protective against harmful insects
(B) they cannot get necessary nutrients from the soil they live in
(C) they need to protect themselves from harmful nitrogen or phosphorus from the soil
(D) marshlands are the place where organisms with high protein are abundant

Paragraph 1 is marked with an arrow [➡].

3 Why does the author mention a **mousetrap**?

(A) To elaborate on the weaknesses of the flytrap
(B) To better illustrate how the flytrap functions
(C) To emphasize the strength of the flytrap's leaves
(D) To contrast the flytrap with other snap traps

4 According to paragraph 2, what is NOT true of snap traps?

(A) They catch its prey by closing their lobes.
(B) They consume their prey by dissolving it with chemicals.
(C) They are all terrestrial plants.
(D) Their tiny hairs sense the existence of prey.

Paragraph 2 is marked with an arrow [➡].

5 According to paragraph 2, what can be inferred about the snap trap?

(A) Once it catches its prey, there is little chance that the prey can escape.
(B) It mostly feed on insects that are very large.
(C) There are various species of snap traps which differs in hunting mechanism.
(D) Snap traps are on the verge of extinction due to the decrease in their habitat.

Paragraph 2 is marked with an arrow [➡].

6 The word **devour** in the passage is closest in meaning to

(A) ensnare
(B) utilize
(C) expel
(D) consume

7 The word **elaborate** in the passage is closest in meaning to

(A) primitive
(B) accurate
(C) decorated
(D) complex

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) The cobra plant captures its prey by luring them into a brightly colored bulb which produces digestive chemicals.
(B) The bulb of the cobra plant tires insects by fooling them with false exits, at which point they fall into the digestive chamber.
(C) Insects become trapped inside the bulb of the cobra plant because bright colors attract them to the plant's "stomach."
(D) When ants crawl into the cobra plant's bulb, it quickly closes the exit and traps them in its *digestive* chamber.

9 According to paragraph 3, what is true of the pitfall trap?

(A) The basic mechanism for catching and killing its prey is similar with that of the snap trap.
(B) The trap is filled with digestive substances.
(C) It encloses its trap so that the prey cannot escape.
(D) It is the most advanced form among all carnivorous plants.

Paragraph 3 is marked with an arrow [➡].

10 The word **them** in the passage refers to

(A) insects
(B) leaves
(C) hairs
(D) species

11 The word **semblance** in the passage is closest in meaning to

(A) importance
(B) composition
(C) appearance
(D) appeal

12 According to paragraph 4, flypaper traps attract insects looking for

(A) food
(B) shelter
(C) water
(D) mates

Paragraph 4 is marked with an arrow [➡].

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

However, all of them share the same basic trapping mechanism.

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 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 Text**.

There are many species of carnivorous plants, all of which have their own unique methods for catching prey.

(A) The waterwheel plant and the Venus flytrap are the only two existing species of flytrap plants.

(B) The most primitive carnivorous plants are designed to let insects trap themselves.

(C) Some carnivorous plants use sticky mucus to attract flying insects which then get stuck on the leaves.

(D) Carnivorous plants are most commonly found in areas that do not provide all the essential nutrients for plant life.

(E) Some carnivorous plants aggressively capture their prey using reflexes triggered by sensitive hairs.

(F) A few carnivorous plants cannot thrive in terrestrial environments, and are thus only found in water.

Vocabulary Review

A Fill in the blank with a word that corresponds with the given definition.

1. i _____ *n.* the basic systems that are necessary for a country to work properly
2. h _____ *n.* chemical substance for killing plants
3. s _____ *ad.* after an event in the past
4. g _____ *v.* to carry out offspring in the womb
5. p _____ *a.* occurring commonly and widely

B Choose the right meaning for the word in bold.

1. Some species have a **phenomenal** ability to survive even under extreme conditions of heat, cold, and lack of water.

   (A) remarkable (B) natural (C) physical (D) intellectual

2. Much literature about this species is **speculative**, because we know little about its anatomy and way of life.

   (A) complete (B) abundant (C) well-documented (D) based on guessing

3. As soon as the fish releases its eggs, they **disperse** through the water and settle to the bottom.

   (A) spread (B) swim (C) blend (D) release

4. The sea plants **anchor** themselves to the bottom with strong roots that kept the plants from washing away.

   (A) fix (B) remove (C) repair (D) float

C Choose the words in the box to fill in the blank. You may have to change the word forms.

erode	example	reproduce	defend

1. Some chemicals released into the environment may interfere with the _____ systems of animals and thus endanger their survival.

2. Part of the turtle's _____ system is a strong shell that covers its body and protects it from attack.

3. By changing color to match its background, the chameleon _____ the ability of animals to adapt to their surroundings.

4. The park planted grasses near the beach to stabilize the sand and to reduce _____ by wind.

D Choose the right word for the blank in each sentence.

1. The _____ in a society of primates may change as young males challenge older males for supremacy.

   (A) hierarchy (B) promotion (C) infestation (D) colony

2. Colors in the wings of butterflies range across the whole _____, from red and orange to blue and violet.

   (A) appearance (B) rotation (C) digestion (D) spectrum

3. _____ plants must survive in an environment very different from that of plants that live in water.

   (A) Collective (B) Terrestrial (C) Ecological (D) Prevalent

4. To _____ the dryness of desert air, the cactus has a tough, waxy skin that keeps water from evaporating.

   (A) accomplish (B) counteract (C) impart (D) overtake

Useful Terms

Zoology

- ☐ symbiosis
- ☐ mutualism
- ☐ commensalism
- ☐ parasitism
- ☐ parasite
- ☐ host
- ☐ natural enemy
- ☐ predator
- ☐ prey
- ☐ omnivore
- ☐ carnivore
- ☐ herbivore
- ☐ nocturnal
- ☐ migratory bird
- ☐ cold-blooded
- ☐ warm-blooded
- ☐ thermoregulation
- ☐ territorial
- ☐ territory
- ☐ courtship
- ☐ hatch
- ☐ habitat
- ☐ hibernate

Botany

- ☐ photosynthesis
- ☐ chlorophyll
- ☐ conjugation
- ☐ pollination
- ☐ pollen
- ☐ floral
- ☐ bloom
- ☐ petal
- ☐ carpel
- ☐ carpellate
- ☐ corolla
- ☐ nectar
- ☐ stalk
- ☐ filament
- ☐ anther
- ☐ gametophyte
- ☐ pore
- ☐ stigma
- ☐ ovary
- ☐ ovule
- ☐ embryo sac

Taxonomy

- ☐ species
- ☐ genus
- ☐ family
- ☐ order
- ☐ class
- ☐ phylum
- ☐ kingdom
- ☐ vertebrate
- ☐ invertebrate
- ☐ sponge
- ☐ mollusk
- ☐ arthropod
- ☐ coelenterate
- ☐ fish
- ☐ amphibian
- ☐ reptile
- ☐ bird
- ☐ mammal
- ☐ primate
- ☐ rodent

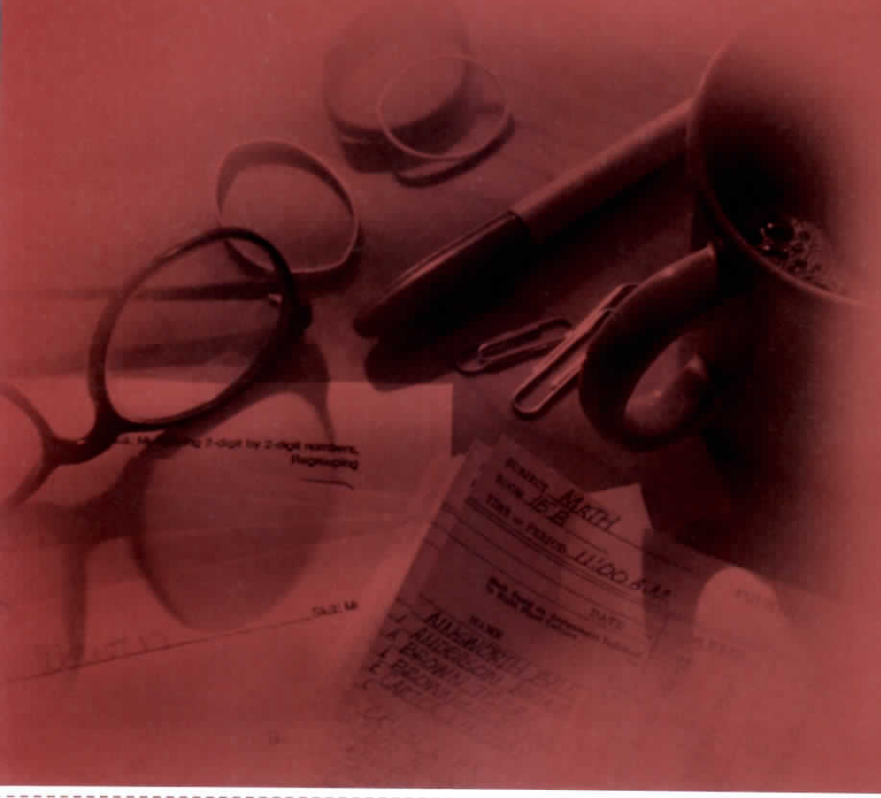
Entomology

- ☐ larva
- ☐ caterpillar
- ☐ chrysalis
- ☐ pupa
- ☐ pupate
- ☐ colony
- ☐ metamorphosis
- ☐ sensor
- ☐ compound eye
- ☐ antenna
- ☐ mandible
- ☐ proboscis
- ☐ camouflage
- ☐ coloration
- ☐ warning color

Memo

PART C

Actual Test



Actual Test 1 (Passages 1~3)

Actual Test 2 (Passages 1~3)

When it is obvious that the goals cannot be reached, don't adjust the goals.
Adjust the action steps. (Confucius)

Actual Test 1

TOEFL READING

VOLUME HELP OK NEXT

Reading Section Directions

This section measures your ability to understand academic passages in English.
The Reading section is divided into 2 separately timed parts.

Most questions are worth 1 point, but the last question in each set is worth more than 1 point.
The directions indicate how many points you may receive.

Some passages include a word or phrase that is underlined in blue. Click on the word or phrase to see a definition or an explanation.

Within each part, you can go to the next question by clicking **Next**. You may skip questions and go back to them later. If you want to return to previous questions, click on **Back**. You can click on **Review** at any time, and the review screen will show you which questions you have answered and which you have not answered. From this review screen, you may go directly to any question you have already seen in the Reading section.

Click on **Continue** to go on.

Passage 1

VOLUME HELP OK NEXT

Brazilian Independence

In the early 19th century, many European colonies in Latin America struggled to become independent nations. Among these was Brazil, today one of the largest nations on Earth and the leading powerhouse of South America. In just three years, from 1822 to 1825, Brazil officially declared its independence from Portugal and gained international recognition as a **sovereign** nation, all with relatively little fighting. Three main factors determined the course of Brazil's struggle for independence: the Napoleonic Wars, Brazil's capable leaders, and assistance from Britain.

➡ The first important factor was the social and political upheaval brought about by the Napoleonic Wars. As Emperor Napoleon I of France conquered Portugal in 1807 and Spain in 1808, he forced the Portuguese royal family to flee in order to avoid imprisonment, a fate also suffered by Spain's King Ferdinand VIII. These developments had two very important effects on the movement for Brazilian independence. **First, the removal of Spain's central government created a power vacuum in Latin America, essentially paving the way for numerous independence movements in Spain's colonies there.** Brazilians, many of whom were also hungry for independence, took special notice of these events and began to rally for their own sovereignty. Second, when Portugal's rulers fled their own land, they settled themselves in their Brazilian colonies. The establishment of Portugal's rulers in a colony, an unprecedented occurrence in history, elevated Brazil from a mere colonial possession to something that was almost a genuine nation. During his brief tenure in Brazil, Dom João VI of Portugal established a strong central government; founded government banks, libraries, and schools; opened up its ports; and ultimately developed Brazil into a kingdom equal to Portugal itself. These reforms transformed a territory that was used for providing raw materials and goods to Portugal into a more unified country with some sense of national identity. Naturally, *many residents* of Brazil wished to expand on **this**, and began to agitate for independence from Portugal.

The second major factor in Brazil's gaining and keeping independence was the leadership of intelligent and ambitious political and military leaders. The most prominent leader was the regent Dom Pedro I, appointed by his father Dom João in 1821. It was under Pedro's reign that Brazil officially gained independence. As a shrewd politician, Dom Pedro recognized the strong sentiment for nationhood among Brazilians and decided to harness it rather than oppose it. He successfully united the colony in opposition to Portugal's parliament, which wanted to keep Brazil **subservient** to Portugal. Dom Pedro was also a skilled orator. In one famous speech, he dramatically denounced Portugal by tearing its military insignia from his uniform, swearing to make Brazil a free nation (in an ironic twist, he would later return to Portugal to rule as its king). Another important figure in Brazil's independence movement was **Lord Thomas Cochrane**. Cochrane, a dismissed British admiral who served Brazil as a mercenary, was instrumental in defending **the country** from external and internal threats. He won numerous naval skirmishes against Portuguese ships and subdued revolts on the coast before violence could spread. Furthermore, he did all of this with a very small mercenary fleet, which was essentially Brazil's navy at the time.

➡ Despite these military successes, a larger war with Portugal might have been inevitable, had it not been for the third factor: Britain's assistance to Brazil. After defeating Napoleon in 1815 and

dismantling the French empire, in addition to Spain and Portugal losing their colonial possessions, Britain essentially became the most powerful empire on Earth. Not surprisingly, Britain encouraged the independence of former European colonies, even supporting measures such as the American Monroe Doctrine, which promised to confront directly any European conquests in the Western Hemisphere. [A] Furthermore, Britain had developed close political and economic ties with Brazil when it acted as the seat of Portuguese power. [B] With great interest in Brazil's independence, Britain negotiated a treaty between Brazil and Portugal. [C]

In order to make their independence final, however, Brazil had to make some concessions to both Britain and Portugal. [D] These included awarding some trading and political privileges to Britain and agreeing to abolish slavery, an immensely unpopular decision with Brazil's plantation owners, who relied on slave labor and successfully defied this requirement for several decades. In regard to Portugal, Brazil had to pay a large financial sum to compensate for the loss of the colony, and it had to relinquish its claims to other Portuguese colonies, particularly those in Africa. Despite the schism that separated the two countries, Brazil's government under Dom Pedro I would remain involved in Portuguese affairs for some time after its independence, another unpopular policy that would lead to much discord in Brazil's formative years as a sovereign nation.

1 The word **sovereign** in the passage is closest in meaning to

(A) industrialized
(B) colonial
(C) united
(D) independent

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.

(A) The Spanish government failed to keep a tight grip on its independent colonies in Latin America.
(B) The colonies in the New World reacted violently to the removal of the Spanish government.
(C) The weakening of the Spanish government strengthened several independence movements in Spanish colonies.
(D) Revolts in the Spanish colonies followed the defeat of several European colonial powers.

3 The word **this** in the passage refers to

(A) providing raw materials
(B) national identity
(C) independence
(D) important reforms

4 According to paragraph 2, what events created a "power vacuum" in Brazil?

(A) War among European colonial powers
(B) The rise of the British Empire
(C) Brazilian independence movements
(D) The failure of Brazil's government

Paragraph 2 is marked with an arrow [➡].

5 According to paragraph 2, Dom João VI made all of the following improvements to Brazil EXCEPT

(A) creating a strong central government
(B) opening Brazil's ports for trade
(C) gaining independence for Brazil
(D) expanding government institutions

Paragraph 2 is marked with an arrow [➡].

6 The word **subservient** in the passage is closest in meaning to

(A) compliant
(B) similar
(C) united
(D) opposed

7 The phrase **the country** in the passage refers to

(A) Spain
(B) Portugal
(C) Brazil
(D) America

8 According to the passage, **Lord Thomas Cochrane** achieved all of the following EXCEPT

(A) winning naval battles against the Portuguese
(B) suppressing revolts on the coast of Brazil
(C) leading Brazil's earliest form of a Navy
(D) dismissing the previous admiral of the Navy

9 Why does the author mention the **Monroe Doctrine**?

(A) To explain the bitter rivalry between Spain and Portugal
(B) To illustrate how America helped in Brazilian independence
(C) To show the extent to which Great Britain supported Brazil's independence
(D) To give an example of how weak the Portuguese government had become

10 The word **concessions** in the passage is closest in meaning to

(A) apologies
(B) payments
(C) arguments
(D) allowances

11 The word **schism** in the passage is closest in meaning to

(A) defeat
(B) peace
(C) division
(D) success

12 According to paragraph 4, what can be inferred about Britain's support for independence movements?

(A) They were against establishing colonies in the New World.
(B) They wished to use the movements for their own gain.
(C) They were strongly allied with the Portuguese government.
(D) They wanted Brazil to become the world's most powerful nation.

Paragraph 4 is marked with an arrow [➡].

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

Thus, in 1825, Brazil officially became an independent nation.

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 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 Text**.

Over the course of a few short years, Brazil was able to win its independence from Portugal due to three major factors.

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Answer Choices

(A) Brazil gained independence and recognition as a sovereign nation with very little fighting.

(B) Brazil was basically left to govern itself when war in Europe weakened many colonial powers.

(C) Dom João VI of Portugal instituted important reforms to increase Brazil's independence as a colony.

(D) Brazil developed an effective Navy made up of mercenaries to fight off the Portuguese by sea.

(E) Dom Pedro I took up the cause of Brazilian independence and strongly resisted Portuguese rule.

(F) Britain lent its assistance to negotiating Brazil's independence from Portugal.

Passage 2

VOLUME HELP OK NEXT

Marsupials in Australia

➡ Unique among mammals is the subclass known as *metatheria*, more commonly called marsupials. This group of mammals consists of animals such as the kangaroo and the opossum. Marsupials differ from other mammals in one essential way: unlike other mammals, their young do not fully develop inside the womb. Instead, they are born without being fully developed, and complete their development outside of the mother's body. They are able to do this partly because of a protective pouch that most adult marsupials possess. After being born, the tiny marsupials instinctively crawl into this pouch, where they safely feed and rest until fully grown. There are over 250 species of marsupials worldwide, but the vast majority of them inhabit the island continent of Australia, as well as surrounding islands such as New Zealand and New Guinea. The reasons for this uneven distribution are varied and complex.

➡ Common marsupials like kangaroos and koala bears are readily associated with Australia, and factor prominently into Australian culture. It might seem perfectly logical that such a unique type of mammal would develop on an island, in total seclusion from other species, but surprisingly, marsupials did not originate in the South Pacific region. In fact, their journey to their final home in this region was a long and complicated one spanning many millions of years. The first known marsupials actually appeared in the Americas about 99 million years ago. Although the first fossil evidence was discovered in North America, it is more likely that South America was their place of origin, as a small number of marsupial species still inhabit this region. How marsupials reached Australia in such large numbers is still a contentious topic among scientists. To begin to answer this question, one must consider the geography of the planet as it looked millions of years ago, when marsupials were making their way to Australia.

➡ At this time, the Earth was divided into two major supercontinents: Laurasia in the northern *hemisphere* and Gondwana in the southern. A Laurasia included what would later become North America and much of Asia. B Gondwana, on the other hand, was composed of what would become South America, Antarctica, India, and Africa. C Marsupials and other mammals evolved together on the same supercontinent, Gondwana. D Then, about 65 million years ago, as these supercontinents were slowly breaking apart, a giant piece of Antarctica separated from the mass to become the island of Australia.

Scientists believe that, by the time this happened, several species of marsupials had already migrated to Australia by way of land connections that led them from their birthplace in the Americas, across Antarctica, and finally to the land mass that would become Australia. As the continent of Australia drifted northward from the supercontinent of Gondwana, these prehistoric marsupials became isolated, and evolved into a vast array of different species. Today, about 200 different species of marsupials remain on the continent, greatly outnumbering native species of placental mammals. Why marsupials survived in such great numbers in Australia and not elsewhere is another topic of debate. Some scientists believe it was because Australia, due to its gradual movement toward ever warmer climates, was spared some of the consequences of the severe climate change that occurred over the next several million years in most other parts of the world. Therefore, its wildlife had a better chance of surviving the threat of extinction.

➡ Despite the long separation of marsupials from most other mammals, the two groups still share a

number of striking similarities. This is a prime example of **convergent evolution**, when two different species in comparable geographical locations adapt to their environments in similar ways. For example, the flying squirrel found in the West can be compared to the flying opossum of Australia. In each instance, the animal is one that is especially vulnerable to predators on the ground, and thus has a short lifespan in the wild because it is routinely preyed upon by snakes and other predators. In order to avoid common predators on the ground, both animals developed a way to take advantage of their woodland environment to increase their safety. Each developed a webbing of skin between their front and hind limbs that allows them to glide through the air from tree to tree, decreasing the amount of time they spend on the ground. Though they are separated by thousands of miles, the similar living conditions caused the two animals to evolve the same defense mechanism.

15 The word **instinctively** in the passage is closest in meaning to

(A) regularly
(B) effortlessly
(C) naturally
(D) rapidly

16 According to paragraph 1, what can be inferred about marsupials?

(A) Their pouch is essential to the survival of their offspring.
(B) They can give birth to many offspring at a time.
(C) There are some species of marsupials that do not have the pouch.
(D) They live only in Australia.

Paragraph 1 is marked with an arrow [➡].

17 The word **seclusion** in the passage is closest in meaning to

(A) cooperation
(B) isolation
(C) observation
(D) opposition

18 The word **contentious** in the passage is closest in meaning to

(A) constant
(B) irrelevant
(C) arguable
(D) common

19 The phrase **this region** in the passage refers to

(A) the South Pacific region
(B) Australia
(C) island
(D) the Americas

20 According to paragraph 2, the first fossils of prehistoric marsupials were discovered in

(A) Africa
(B) Antarctica
(C) North America
(D) South America

Paragraph 2 is marked with an arrow [➡].

21 According to paragraph 3, which of the following is NOT true of Gondwana?

(A) South America and Antarctica were a part of Gondwana.
(B) Gondwana was part of a larger land mass, Laurasia.
(C) Modern-day Australia used to be a part of Gondwana.
(D) Marsupials lived on Gondwana long before it split apart.

Paragraph 3 is marked with an arrow [➡].

22 Why does the author discuss supercontinents in paragraph 3?

(A) To show that the prehistoric world was a far different place
(B) To illustrate the broad range of prehistoric marsupials in Australia
(C) To explain how marsupials and other mammals evolved together
(D) To explain how marsupials migrated to and became isolated in Australia

Paragraph 3 is marked with an arrow [➡].

23 The word **drifted** in the passage is closest in meaning to

(A) merged
(B) moved
(C) sank
(D) rose

24 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) Scientists debate whether marsupials survived because Australia was more isolated than other regions or because it had a more favorable location.
(B) Some scientists believe that marsupials thrived in Australia more than in other regions because they were spared some of the hardship of severe climate change.
(C) Marsupials survived in great numbers in Australia rather than elsewhere because severe climate change drove competing mammals into extinction.
(D) Marsupials came to greatly outnumber other mammals in Australia because the island drifted away from Antarctica to areas with a colder climate.

25 According to the passage, **convergent evolution** occurs when

(A) species evolve in a way that is most appropriate to their environment
(B) species that live in isolation from other animals evolve similar sets of traits
(C) species that evolve alongside each other develop differently from other animals
(D) species in different places with similar environments evolve the same traits

26 According to paragraph 5, what is one factor that guided the evolution of both flying squirrels and flying opossums?

(A) They were too easily preyed upon on the ground.
(B) Their main source of food was only in trees.
(C) They were forced to adapt to climate change.
(D) Their woodland habitat was disappearing.

Paragraph 5 is marked with an arrow [➡].

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

These two giant land masses were combinations of the seven continents we know today.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

28 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

Scientists still debate the origins of the marsupials' strong presence in Australia, but their isolation seems related to separation of the supercontinent.

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Answer Choices

(A) Marsupials arrived in Australia by way of land connections between South America, Antarctica, and Australia as they evolved on Gondwana, one of the two supercontinents.
(B) For several millions of years, marsupials lived on the supercontinent, Gondwana, with other species.
(C) After Gondwana divided into several land masses, Australia drifted toward warm areas, which enabled marsupials to survive up until today.
(D) No marsupials were living in Laurasia, which is why marsupials are not found in North America, a part of Laurasia.
(E) A few species of marsupials still live in South America, which once shared a supercontinent with Australia.
(F) Though separate, some species of marsupials evolved to resemble mammals from other continents because they were exposed to similar environmental pressures and forced to evolve in a similar way.

Passage 3

VOLUME HELP OK NEXT

Colonial American Farming

By the mid-seventeenth century, English colonial possessions in North America stretched from New England in the north to the Carolinas in the south. The early colonial American society was an agricultural one, with the vast majority of colonists making their living off their land in one form or another. However, considering the breadth of the geographic areas held by the colonists, it should not be surprising that the practice of agriculture took different forms in various colonies, and that these different agricultural practices led to the formation of distinct modes of living. This is particularly true when the southern colonies are compared to those of the north.

In the New England colonies, which can roughly be defined as stretching from what is now New York to Maine, agriculture was marginal at best, and farmers' lives involved tough and constant labor. The land was heavily wooded and rocky, so colonists first had to clear areas for planting, literally creating the fields they intended to farm. Most of this work had to be done by hand, as horses and oxen were perpetually in short supply. Even when the laborious task of preparing the fields for planting was completed, New England farmers could only expect a meager harvest. New England soils were poor, and the cold weather meant the growing season was brief. In short, farming in New England was a very humble occupation.

➡ Because of the harsh conditions that prevailed, the most that Northern farmers could hope for was mere subsistence. Given the marginal nature of agriculture in the New England area, there was little sense in acquiring more land than was necessary to support one's family, and farms tended to be small, family plots. The difficulties of New England farming also encouraged a high degree of cooperation amongst neighboring farmers, and it was common for New Englanders to trade with one another for necessary supplies, loan each other expensive or hard-to-find equipment (such as plows and oxen), and to pool their labor when large structures, such as barns, needed to be built. The result was a close-knit, egalitarian society in which the basic social unit was the small town or village.

Farmers in the Southern colonies, especially those in Virginia and the Carolinas, faced a very different situation. In these areas, agriculture was easier and potentially far more profitable. The soils were rich and fertile, and the climate was much more conducive to farming. Furthermore, the difference in climate and soil composition made it possible to grow different kinds of crops than those grown in New England. Whereas New England farmers simply farmed to live, growing primarily the staples such as corn and wheat which they needed to survive, farmers in the southern colonies focused primarily on cash crops such as tobacco, and later, cotton.

The difference was an immensely important one. In growing crops for sale rather than for their own personal use, southern farmers had every incentive to acquire vast tracts of land, since more land for more crops would result in greater profits. The commercial nature of southern farming meant that significant gaps in wealth quickly arose, with a small minority of successful farmers acquiring ever more land and growing ever richer. A plantation system arose in which a small southern aristocracy of wealthy farmers owned much of the best land, while poorer farmers had to make do with small plots in less fertile

areas. A

➡ Moreover, the existence of large plantations meant that the southern population was more dispersed, and southern politics centered around counties covering large areas rather than the small towns and villages of New England. B A further consequence of the focus on cash crops and the rise of the plantation system was that southern plantation owners were perpetually short of labor. C Whereas New England farmers were able to tend to their relatively small fields using only the labor of their family members (and occasionally relying on the help of their neighbors), this was entirely impractical on a southern plantation that might easily cover several hundred acres. D It was for this reason that southern colonies made much greater use of slave labor than farmers did in New England.

29 The phrase **this work** in the passage refers to

(A) harvesting the crops
(B) working the fields
(C) removing trees and rocks
(D) driving horses and oxen

30 The word **meager** in the passage is closest in meaning to

(A) joyless
(B) painful
(C) small
(D) uplifting

31 According to the passage, all of the following made for poor farming conditions in New England EXCEPT:

(A) The land was not suitable for farming.
(B) The cold weather made the growing season short.
(C) They had limited access to tools such as plows and oxen.
(D) They only grew the crops they could sell.

32 The word **marginal** in the passage is closest in meaning to

(A) important
(B) harsh
(C) rich
(D) unproductive

33 The word **their** in the passage refers to

(A) colonists
(B) supplies
(C) villages
(D) oxen

34 According to paragraph 3, what was the basic social unit in New England society?

(A) family
(B) villages
(C) colonies
(D) neighbors

Paragraph 3 is marked with an arrow [➡].

35 The word **conducive** in the passage is closest in meaning to

(A) necessary
(B) beneficial
(C) accustomed
(D) compliant

36 The word **primarily** in the passage is closest in meaning to

(A) together
(B) slowly
(C) seriously
(D) mainly

37 The word **incentive** in the passage is closest in meaning to

(A) asset
(B) mean
(C) reason
(D) difficulty

38 According to paragraph 6, what effect did the plantation system have on government?

(A) It was localized to small villages and towns.
(B) It was run by those with the most land and money.
(C) It was not often enforced in the rural areas.
(D) It was broad and encompassed large counties.

Paragraph 6 is marked with an arrow [➡].

39 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) Southern farmers and New England farmers relied heavily on the work of others to keep their fields tended.
(B) Southern plantations were too large to be worked only by one's family and neighbors, as was the case in New England.
(C) Plantation owners tried to keep their plots small so that they were more practical to maintain.
(D) Because they lacked nearby neighbors, plantation owners often could not tend to their own fields.

40 According to the passage, what can be inferred about Northern and Southern farmers?

(A) Despite their best efforts, Southern farmers could not succeed in growing staple crops.
(B) Unlike Southern farmers, Northern farmers were unlikely to become rich from farming.
(C) Northern and Southern farmers both had many natural obstacles to overcome.
(D) Northern farmers used slave labor, while Southern farmers had the help of family.

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

Southern society was thus more hierarchical than its New England counterpart.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

42 **Directions:** Select the appropriate phrases from the answer choices and match them to the colonial farming practice to which they relate. TWO of the answer choices 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. To review the passage, click **View Text**.

Answer Choices

(A) Farmed mostly for survival

(B) Created a relatively equal society

(C) Relied on saleable crops like cotton

(D) Farming was only for the wealthy

(E) More land meant greater profits

(F) Banned the use of slaves

(G) Family and neighbors often helped

New England

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The Southern Colonies

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You have seen all of the questions in this part of the Reading section.
You have time left to review.
As long as there is time remaining, you can check your work.

Click on **Return** to go back to the previous question.

Click on **Review** to see the review screen for this section.

Click on **Continue** to go on.

Once you leave this part of the Reading section, you WILL NOT be able to return to it.

Actual Test 2

TOEFL READING

VOLUME HELP OK NEXT

Reading Section Directions

This section measures your ability to understand academic passages in English.
The Reading section is divided into 2 separately timed parts.

Most questions are worth 1 point, but the last question in each set is worth more than 1 point.
The directions indicate how many points you may receive.

Some passages include a word or phrase that is underlined in blue. Click on the word or phrase to see a definition or an explanation.

Within each part, you can go to the next question by clicking **Next**. You may skip questions and go back to them later. If you want to return to previous questions, click on **Back**. You can click on **Review** at any time, and the review screen will show you which questions you have answered and which you have not answered. From this review screen, you may go directly to any question you have already seen in the Reading section.

Click on **Continue** to go on.

Passage 1

VOLUME HELP OK NEXT

Aurora

➡ Few natural phenomena on Earth have inspired as much fascination and mystery as the aurora. Appearing in the extreme northern and southern latitudes, auroras manifest themselves as colorful displays of light in the night sky. The terms *aurora borealis* and *aurora australis* are used to refer to those auroras occurring either close to the North Pole or to the South Pole, respectively. They are incredible spectacles, with bands of bright red, blue, and green stretching across vast portions of the sky. While auroras have appeared as far south as Spain in the Northern Hemisphere and as far north as Argentina in the Southern Hemisphere, they are at their most brilliant near the poles, where the Earth's magnetic field is quite strong. This is because the phenomenon is dependent upon the interaction of subatomic particles in the upper atmosphere, where magnetic activity is at its highest. Exactly where, how, and when auroras occur is a complex matter that requires the cooperation of several natural phenomena.

➡ To understand auroras, it is necessary to first understand the structure of the Earth's outermost atmosphere. The outer reaches of the Earth's atmosphere are called the magnetosphere, a region where the Earth's magnetic field and those of nearby celestial bodies combine with solar winds to create an invisible "shell" around the Earth that is highly magnetized. The magnetosphere is important to auroras because of its ions, positively charged atoms or molecules that have lost one or more of their electrons. In addition, the magnetosphere is full of free-floating electrons that are released when photons from the sun clash with atmospheric gases. As a result of this process, much of the magnetosphere is filled with a substance known as plasma. Plasma is a state of matter quite distinct from the three we know best on Earth — solids, liquids, and gases — and can only exist under special conditions. It has the basic properties of a gas, with the exception that electrons and positive ions may exist independently, without forming attachments to other atoms or molecules. The particles in this plasma are part of a mixture of those that travel upward from the lower levels of the atmosphere and those that are transported to the magnetosphere by way of solar winds. The ability of positive and negative charges to exist independently makes plasma very conductive to electricity.

➡ When electrically charged solar winds reach the magnetosphere, the ions contained therein become entangled in the Earth's magnetic field, which circulates between the poles. As the ions travel along this path, they collide with particles of oxygen and nitrogen in the upper atmosphere. The collisions cause the particles to emit electromagnetic energy in the form of visible light. The resulting light is what appears as an aurora. Auroras can vary in color depending on the type and variety of gases involved in the process. Most auroras involve ions from oxygen molecules, which produce both green and red lights. Nitrogen ions produce a deep blue color, while neon is responsible for flares of bright orange. Auroras also come in a variety of shapes. A The most common and stable shape of an aurora is that of an arc, which can persist for hours at a time with little or no change. B Parts of these arcs may be quite well defined, and appear as vertical bands connected to one another. C While the entire formation extends from east to west, the vertical bands are aligned roughly north-to-south in accordance with the lines of the magnetic field. D

Auroras occur with great frequency near the Earth's magnetic poles, as the magnetic field is the densest in **these areas**, and thus more prone to the kind of atomic collisions that produce auroras. Certain conditions can cause auroras to appear with greater frequency in subarctic latitudes. This is more common in the northern hemisphere than the southern. **Geomagnetic storms** — disturbances in the Earth's magnetosphere caused by solar flares — can occur with more frequency during the equinoxes twice a year. This is because solar winds travel much faster from the sun's poles than from its equator, and in the months of March and September, the Earth's position is such that it receives the greatest amount of these more intense winds. The geomagnetic storms that result can be the cause of a greater frequency of auroras that extend farther south than is usual for aurora borealis. Over the years, several auroras associated with geomagnetic storms have been documented over cities as far south as Calgary in southern Canada.

1 The world **manifest** in the passage is closest in meaning to

(A) define
(B) exhibit
(C) control
(D) prepare

2 According to paragraph 1, which of the following is true of auroras?

(A) They only occur at extreme northern latitudes.
(B) They are brightest near the Earth's poles.
(C) They appear outside of Earth's magnetic field.
(D) They affect particles in the lower atmosphere.

Paragraph 1 is marked with an arrow [➡].

3 The word **distinct** in the passage is closest in meaning to

(A) distant
(B) derived
(C) desolate
(D) different

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

(A) The influence of magnetic fields from other planets creates a magnetized "shell" around the Earth called the magnetosphere.
(B) The magnetosphere, a highly magnetized region of the outer atmosphere, is composed of solar winds and magnetic fields.
(C) Earth's magnetic field, the magnetism of other bodies, and solar winds all influence the magnetosphere, a highly magnetized region in the outer atmosphere.
(D) Solar winds enter the magnetosphere at the edge of the atmosphere, and the reaction between the two is responsible for the Earth's magnetic field.

5 According to paragraph 2, plasma is a special state of matter because

(A) it cannot be studied by scientists in laboratories
(B) it is the only state of matter than can exist in space
(C) it contains charged particles that remain unattached
(D) it does not have the ability to change into other states

Paragraph 2 is marked with an arrow [➡].

6 The phrase **the resulting light** in the passage refers to

(A) light emitted by the Earth's magnetic field
(B) light produced by the creation of auroras
(C) light coming from the arrival of solar winds
(D) light created when ions and molecules collide

7 The word **persist** in the passage is closest in meaning to

(A) continue (B) evaporate
(C) transform (D) fascinate

8 The word **aligned** in the passage is closest in meaning to

(A) floated (B) widened
(C) disappeared (D) arranged

9 According to paragraph 3, all of the following gasses are mentioned as contributing to auroras EXCEPT

(A) Neon (B) Hydrogen
(C) Oxygen (D) Nitrogen

Paragraph 3 is marked with an arrow [➡].

10 According to paragraph 3, what is true about the color of auroras?

(A) The color of auroras changes when the density of magnetic field changes.
(B) Each aurora maintains a single color throughout the duration of its existence.
(C) The color of auroras depends on the mixture of gas types.
(D) The most colorful auroras appear in areas with the most atmospheric gas.

Paragraph 3 is marked with an arrow [➡].

11 The phrase **these areas** in the passage refers to

(A) the magnetic fields
(B) the Arctic latitudes
(C) the Earth's poles
(D) the two hemispheres

12 Why does the author mention **Geomagnetic storms**?

(A) To illustrate the many special conditions under which auroras may form
(B) To give an example of how a solar phenomenon can affect the magnetic field
(C) To show that when conditions are right auroras can appear almost anywhere
(D) To explain how this occurrence can increase the appearance of auroras

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

The orientation of these bands is determined by the magnetic field.

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 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 Text**.

Auroras are formed by the interaction of different phenomena in the Earth's outer atmosphere.

(A) Auroras that take the shape of arcs across the night sky are the most stable and common type of aurora.

(B) Increased activity in the magnetosphere can create auroras near the equator.

(C) Electrically charged solar winds enter the Earth's magnetosphere and create disturbances among the free-floating ions there.

(D) Auroras occurring in the northern hemisphere are known as *aurora borealis*, while those appearing in the southern hemisphere are called *aurora australis*.

(E) The color of an aurora is determined by the gasses involved in its formation, while its shape is directly influenced by the magnetic field.

(F) While auroras most frequently occur at the poles, where the magnetic field is densest, in specific parts of the year, activity of aurora increases in the subarctic region.

Passage 2

VOLUME HELP OK NEXT

Ice Age Extinction Event

The end of the last Ice Age brought many dramatic changes to planet Earth. Among them was the sudden mass extinction of countless animal species throughout the world. Some well-known examples include the woolly mammoth, the saber-tooth tiger, and the giant sloth. Because of their enormous size, these animals are referred to as megafauna. Though a few species of megafauna survive today (like the elephant or the rhinoceros), most of them were wiped out during this Ice Age extinction event. The reasons for such a wide-ranging extinction of megafauna are still unclear to scientists. Two major theories have been proposed to explain it, though each theory has its limitations.

➡ One theory states that early humans had an active role in the extinction of megafauna through hunting. As the climate warmed and the ice sheets retreated, humans began migrating to new areas of the world, such as the Americas and the northern regions of Europe and Asia, which were previously uninhabited. Animals in these new lands were not adapted to living with humans, who were already proficient predators. Unaware of the threat humans posed, they did not know to flee them. They were also not equipped with the defenses they needed to avoid or fight off human attacks, and as a result these animals were hunted to extinction. Evidence supporting this theory comes from the fact that mass extinctions of megafauna occurred far more often in lands where human migrations took place, as opposed to those places where animals and humans evolved alongside one another. Very few surviving ancestors of megafauna remain in the Western hemisphere, for example, whereas certain megafauna still exist in great numbers in Africa and South Asia, two regions where humans evolved alongside large mammals.

While the arrival of humans does coincide with the beginning of the extinction event, this does not constitute definitive proof for some scientists. These scientists claim that there is no evidence that any species of megafauna was regularly hunted by humans. The major exception to this is of course the woolly mammoth, the skeletons of which frequently display evidence of wounds inflicted by man-made weapons. Fossils from other megafauna have yet to yield such evidence, however, casting doubt on the idea that humans hunted megafauna into extinction. A further cause for skepticism is that some heavily hunted animals thrived during this period and even survive today. One example is the bison, an animal that is much hunted and whose ancestors have roamed the earth for tens of thousands of years. If the bison could be so heavily hunted and still survive this extinction event, some scientists reason that most megafauna should have survived human interference as well.

➡ Besides the hunting theory, there is another prominent theory set forth to explain the Ice Age extinction event, this one concerned primarily with climate. The major catalyst in this theory is temperature. After all, it was a sharp rise in temperature that melted the frozen earth and brought about the end of the Ice Age. Higher temperatures introduced several complications into the prehistoric climate. Land that was once covered by forests became prairies and grasslands. This ecological change could have had any number of negative effects on megafauna. For one, it would have robbed some species of the shelter and safety provided by the forest. In the forest, giant mammals could obscure themselves from

smaller but faster predators. Roaming the open grasslands, however, made them far more vulnerable to predators. The biggest impact of this change would have been the change in food supply. [A] Higher temperatures led to irregular rainfall. [B] As a result, only those plants well adapted to the new weather patterns survived. [C] Different plants meant that many herbivores couldn't get the same vital nutrients, and many suffered because of this. [D]

➡ However, this theory has a few problems of its own. One observation is that large herbivores had survived previous periods of climate change. Extinction events of this severity had not occurred during other periods of similar change. Other scientists argue that the transformation from woodlands to grasslands would have provided more food for giant herbivores, and should actually have aided in their survival. Some evidence even shows that grazing animals had a lower rate of extinction than animals with mixed diets. While no one theory may hold up on its own, many scientists can agree that some combination of these two theories can probably explain the Ice Age extinction event.

15 The world **proficient** in the passage is closest in meaning to

(A) ineffective
(B) skillful
(C) ferocious
(D) unafraid

16 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) A few species of megafauna survived in the Western Hemisphere, but did not fare as well in areas with an early human presence.
(B) More megafauna exist in areas where they evolved alongside humans than in areas to which humans later migrated.
(C) The migration of megafauna to the Western Hemisphere made them more vulnerable to extinction through human hunting.
(D) Having hunted megafauna to near extinction in Africa and Asia, early humans evolved alongside megafauna in the West.

17 According to paragraph 2, what prompted humans to inhabit new parts of the world?

(A) The worsening of climate conditions
(B) A growth in the population of megafauna
(C) A food shortage in their previous habitats
(D) The melting of ice due to milder temperatures

Paragraph 2 is marked with an arrow [➡].

18 According to paragraph 2, what can be inferred about megafauna that survived human attacks?

(A) They were so violent that humans had to avoid them.
(B) They evolved in a way that they could defend themselves from human attacks.
(C) Their population was so large that human attacks had little effect on their survival.
(D) Humans didn't feel it was necessary to hunt them because they were useless to humans.

Paragraph 2 is marked with an arrow [➡].

19 The word **this** in the passage refers to

(A) the fact that most megafauna did not survive to the present
(B) the theory that megafauna were hunted into extinction
(C) the lack of direct evidence that megafauna were hunted by man
(D) the idea that megafauna were not accustomed to humans

20 The word **thrived** in the passage is closest in meaning to

(A) struggled
(B) changed
(C) succeeded
(D) declined

21 Why does the author mention the **bison**?

(A) To give an example of one species that was hunted to near extinction
(B) To argue against the theory that hunting caused the extinction event
(C) To contradict the assertion that early humans hunted megafauna
(D) To support the theory that man caused the extinction of megafauna

22 The word **complications** in the passage is closest in meaning to

(A) plans
(B) problems
(C) species
(D) enemies

23 The word **obscure** in the passage is closest in meaning to

(A) control
(B) discern
(C) prevent
(D) conceal

24 According to paragraph 4, scientists who support the climate theory believe all of the following to be consequences of higher temperatures EXCEPT

(A) the disappearance of woodlands
(B) the difference in patterns of rainfall
(C) the appearance of new megafauna
(D) the change in the native plant life

Paragraph 4 is marked with an arrow [➡].

25 The word **transformation** in the passage is closest in meaning to

(A) increase
(B) change
(C) destruction
(D) variety

26 According to paragraph 5, some scientists believe that the increase in grasslands

(A) impeded humans' ability to adapt to new environments
(B) could have provided more food for megafauna
(C) is not relevant to the extinction of large herbivores
(D) may have increased the hunting of megafauna

Paragraph 5 is marked with an arrow [➡].

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

This further changed the kinds of plants that were available to megafauna.

Where would the sentence best fit? Click on a square [■] to add the sentence to the passage.

28 **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting 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 Text**.

There are two major theories that explain why megafauna became extinct as the last Ice Age ended.

(A) The reason why megafauna were wiped out remains a mystery to scientists even today.

(B) One theory suggests that excessive hunting of megafauna by early humans gave rise to their extinction.

(C) The Americas and northern Europe were not inhabited by humans before the Ice Age ended.

(D) Some scientists argue that ecological changes caused by rising temperatures were responsible for the extinction of megafauna.

(E) The two theories both have flaws, as there is a lack of evidence to support these theories, with some evidence even contradicting these theories.

(F) The bison is one example that shows megafauna can survive despite hunting by humans.

Passage 3

VOLUME HELP OK NEXT

Oil Shale and Oil Sands

Crude oil has become a fixture in modern lifestyles all over the world. Without it, there would be no fuel for cars, no asphalt for our roads or buildings, and no raw material from which to make the plastics and other oil derivatives that are essential to modern life. The world consumes over 80 million barrels of oil each day, and the number continues to grow. Unfortunately, oil is a limited resource, and as demand for this valuable resource rapidly increases, many experts claim that the world supply has already passed its peak and is on the decline. For this reason, petroleum companies are exploring new sources of crude oil, namely shale oil and oil sands.

➡ Shale oil is produced from a substance known as oil shale, which is a type of rock that contains all the basic elements of petroleum. Oil shale consists mainly of kerogen, the decayed organic matter found in sedimentary rocks that precedes the formation of crude oil. This substance can be extracted from the rock in which it is trapped and refined into a useable form of petroleum. Oil shale was used in prehistoric times as a source of fire, as the chemicals in it make it readily flammable. Even today, some countries still use unrefined oil shale as fuel for power plants. The most notable of these is Estonia, where domestic oil shale is a cheaper option than crude oil. The largest deposits of oil shale in the world can be found in the western United States, in an area known as the Green River basin. Along with giant deposits in Russia and Brazil, these reserves make up over 85% of the world's supply of oil shale.

➡ In most parts of the world, however, oil shale is mined for the purpose of being processed into crude oil. Many people believe that shale oil may one day help to meet the world's growing demand for petroleum, and perhaps extend the world's supply of crude oil for a while. However, it has yet to overcome a few important drawbacks. Oil shale mining can be very destructive to the environment, as it involves clearing land of trees and digging up large amounts of earth to uncover the oil shale. Another obstacle is in processing the raw materials. The most common method of processing oil shale is by heating it in a vacuum, causing it to release kerogen in the form of a vapor, which can then be trapped and distilled, creating a kind of synthetic crude oil. All this additional processing takes time and comes at a cost. At present, the process of mining and refining oil shale is very expensive, more so than that of producing traditional crude oil. As refining technology becomes more advanced, it will be cheaper to produce oil from these rocks, hopefully making shale oil as widely used as traditional oil.

Another nontraditional source of petroleum is oil sands. Oil sands occur when crude oil bubbles to the surface of the earth and mixes with water, dirt, and various bacteria which, over time, work to break the oil down to a very thick, tar-like substance. Its thickness is so great that it cannot flow unless strongly heated. However, its heavy, sticky nature makes it handy for paving roads as a component of asphalt. Today, the largest supplies of oil sands can be found in Canada and Venezuela. Presently, oil sand reserves account for two-thirds of the world's entire supply of petroleum.

➡ Today, the only nation with a large-scale, commercially exploited oil sands industry is Canada. Oil sands account for nearly half of Canada's total oil production; production is so great, in fact, that Canada has become the number one supplier of oil to the United States, surpassing even the Middle

Eastern oil-producing nations. [A] Because oil sands are too thick to flow like regular crude oil, they do not pool into the kind of pressurized wells from which traditional oil is often pumped. [B] However, wells can be artificially created by injecting hot steam into large reserves of oil sands, **simultaneously** heating and diluting them so that they flow more like crude oil. [C] Only then can the oil sands be extracted; and as with shale oil, this mining process can be quite expensive and use a great deal of energy. [D] Experts continue to look for cheaper and more efficient methods of mining and processing oil sands, as **their** abundance could have a major impact on the world's supply of oil in the near future.

29 The world **derivatives** in the passage is closest in meaning to

(A) substitutes
(B) byproducts
(C) reserves
(D) varieties

30 The phrase **This substance** in the passage refers to

(A) Shale oil
(B) Kerogen
(C) Petroleum
(D) Crude oil

31 According to paragraph 2, which of the following is NOT true of shale oil?

(A) It is created from organic matter.
(B) It can be used as a source of fire without refining it.
(C) It is not in practical use yet.
(D) The United States, Russia and Brazil have large deposits of it.

Paragraph 2 is marked with an arrow [➡].

32 The word **demand** in the passage is closest in meaning to

(A) price
(B) amount
(C) efficiency
(D) need

33 The word **synthetic** in the passage is closest in meaning to

(A) primitive
(B) useful
(C) artificial
(D) impractical

34 In paragraph 3, the author mentions the oil shale mining process in order to

(A) compare its mining process with that of crude oil
(B) argue that oil shale is a cheaper option than crude oil
(C) refute the argument that oil shale can be an alternative fuel source
(D) show a problematic aspect of oil shale development that needs to be resolved

Paragraph 3 is marked with an arrow [➡].

35 According to paragraph 3, what can be inferred about processing shale oil?

(A) It comes from ancient practices.
(B) It is harmful to the environment.
(C) It is a very limited practice.
(D) It is too costly to be practical.

Paragraph 3 is marked with an arrow [➡].

36 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) When crude oil bubbles to the surface, it is transformed by bacteria and water into a thick substance called oil sands.
(B) Oil sands are a tar-like substance created by the long-term exposure of surface oil deposits to water, dirt, and bacteria.
(C) Crude oil is the substance that is produced when oil sands bubble to the surface after years of mixing with water and dirt.
(D) Water, dirt, and bacteria mix with crude oil to create a tarry substance called oil sands that then bubbles to the surface.

37 The word **exploited** in the passage refers to

(A) developed
(B) obtained
(C) filtered
(D) stored

38 The word **simultaneously** in the passage is closest in meaning to

(A) as a result
(B) at the same time
(C) respectively
(D) in a timely manner

39 The word **their** in the passage refers to

(A) oil sands
(B) pipelines
(C) methods
(D) experts

40 According to paragraph 5, why are shale oil and oil sands important?

(A) They provide cheaper energy for homes.
(B) They can be made into cleaner fuels for cars.
(C) They could make up for decreasing oil supplies.
(D) They have the potential to be depleted soon.

Paragraph 5 is marked with an arrow [➡].

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

Adding to the expense is the cost of shipping oil sands, as they are too thick to flow through traditional pipelines.

Where would the sentence best fit? *Click on* a square [■] to add the sentence to the passage.

42 **Directions:** Select the appropriate phrases from the answer choices and match them to either shale oil or oil sands. TWO of the answer choices will not be used. ***This question is worth 4 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 Text**.

Answer Choices

(A) Expensive mining process

(B) Accounts for about 2/3 of the world's oil supply

(C) Used for fire by prehistoric peoples

(D) Large deposits can be found in Venezuela

(E) Is a renewable resource, unlike petroleum

(F) Requires environmentally harmful mining techniques

(G) Traditionally used as a component of asphalt

(H) Has the potential to be a cleaner fuel than crude oil

(I) Must be heavily processed because it is too thick and sticky

Oil Shale

-
-

Oil Sands

-
-
-
-

Both

-

You have seen all of the questions in this part of the Reading section.
You have time left to review.
As long as there is time remaining, you can check your work.

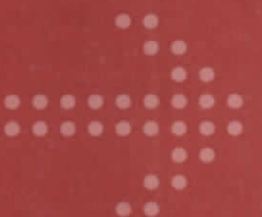
Click on **Return** to go back to the previous question.

Click on **Review** to see the review screen for this section.

Click on **Continue** to go on.

Once you leave this part of the Reading section, you WILL NOT be able to return to it.

Orientation



I. TOEFL *i*BT/ Next Generation TOEFL

II. 점수 환산 기준

I. TOEFL *i*BT/Next Generation TOEFL

2005년 9월을 기점으로 1998년 미국에서부터 시행된 TOEFL CBT은 인터넷을 기반으로 하는 TOEFL *i*BT 체제로 바뀌었다. 일부에서는 새롭게 시행되는 토플에 한국인들이 특히 강한 문법이 없어지고 한국인들이 상대적으로 약한 Speaking이 추가되어 이제 토플로 고득점을 획득하기는 어려울 것이라 생각하는 경우가 있는 것 같다. 하지만 새로운 토플을 면밀히 분석하여 그에 맞는 공부 방법으로 철저히 대비한다면 *i*BT에서도 고득점을 얻는 것이 충분히 가능하다.

1 TOEFL이란?

TOEFL (Test of English as a Foreign Language)은 영어가 모국어가 아닌 사람(EFL학습자 또는 nonnative speakers of English)이 미국, 캐나다 등 영어 사용권 국가의 대학이나 대학원에 입학할 경우 치러야 하는 영어 사용 능력 검정시험이다. TOEFL시험은 미국 New Jersey주의 Princeton에 본부를 둔 ETS (Educational Testing Service)의 주관으로 전세계적으로 시행되고 있으며 5,000여 대학이나 교육기관에서 공인시험으로 인정하고 있다.

*** What is ETS?**

ETS는 Educational Testing Service의 약자다. ETS는 1947년에 설립된 미국 북동부의 New Jersey에 위치한 국가공인 시험 전문 비영리기관(Nonprofit Institution)이다. ETS는 TOEFL 등 영어에 대한 시험뿐만 아니라 미국의 고등학교, 대학교, 대학원 입학에 관련된 영어, 수학, 논리, 전공에 대한 시험을 주관한다. ETS에서 주관하는 대표적인 시험으로는 SAT(미국 대학 입학 능력 평가), GRE(미국 대학원 입학 능력 평가), GMAT(미국 경영대학원 입학 능력 평가), LSAT(미국 법대 입학 능력 평가) 등이 있다. 합격 또는 불합격에 대한 판정은 하지 않으며 단지 해당 시험 분야에 대한 능력만을 평가한다.

2 TOEFL *i*BT란?

2006년부터 전세계적으로 새롭게 시행되고 있는 인터넷 기반의 새로운 토플 시험을 Next Generation TOEFL(차세대 토플) 또는 TOEFL *i*BT (Internet-based Test)라고 한다.

* TOEFL *i*BT는 2005-2006년에 걸쳐 순차적으로 전세계적으로 시행되었다.
  - ✓ 2005년 9월 – 미국에서 시행
  - ✓ 2005년 10월 – 캐나다, 독일, 프랑스, 이탈리아 등 4개국에서 시행
  - ✓ 2006년 – 한국을 포함, 전세계적으로 시행(한국에서는 2006년 9월 시행)
* TOEFL *i*BT는 인터넷을 기반으로 ETS에서 지정한 날짜(주로 금요일과 토요일)에 연중 30-40회 정도 시행이 되며, 시험장소가 대폭 확대되어 가까운 곳에서 편리하게 시험을 볼 수 있다.
* TOEFL *i*BT의 시험 등록은 인터넷, 메일, 전화 등 다양한 매체를 통해 가능하며, 비용은 $140~$170이다.

3 TOEFL iBT의 주요 변화

❑ 문법(Structure)이 없어지고 Speaking이 추가

새로운 토플에서는 기존의 structure 평가영역이 사라지고 실제 의사소통 기능을 갖는 통합형 평가 방식 위주의 speaking이 보강되었다.

* 이는 문법이나 영어구조에 대한 학습은 중요하지 않고 speaking이 더 중요하다는 의미는 아니다. 우리와 같이 제한된 시간에만 영어에 노출되어 있는 EFL환경에서는 문법과 어휘 등 언어구조에 대한 학습이 필수적이라는 인식에는 이견이 없다. 따라서 새로운 토플체제하에서도 문법학습은 여전히 중요하다고 할 수 있다.

❑ 통합형 문제(Integrated Tasks)의 도입

영어를 사용하는 실제 환경의 구현을 위해 [읽고+듣고+쓰기]와 같은 실제 의사소통 기능을 갖는 통합형 평가 방식(Integrated-Skills Approach)의 문제가 출제된다. 새롭게 도입된 통합형 문제 유형은 다음과 같다.

Read / Listen / Speak
Listen / Speak
Read / Listen / Write

❑ Core Academic Skills Assessment 강화

기존의 영어시험이 제시된 영어문장의 이해도를 주로 평가하는 것이라면 새로운 토플은 note taking, paraphrasing, synthesizing, summarizing 등과 같은 영어로 수업을 진행하는데 필요한 실질적인 능력(Core Academic Skills)을 요구하고 있다.

❑ Reading과 Listening의 난이도는 현재의 CBT와 같은 수준

외형상 새로운 토플에 많은 변화가 있기는 하지만 Reading과 Listening은 대부분 기존에 익숙한 CBT 문제 유형을 그대로 사용하고 있다. 또한 새로운 토플에 등장하는 문장의 구조나 어휘범위, 토픽 범위, Writing Topics 등이 기존의 CBT와 동일한 수준이다.

TOEFL *i*BT의 각 영역별 개요

	Reading (독해)	Listening (청취)	Speaking (말하기)	Writing (작문)
구 성	• 총 지문 수: 3-5개 • 총 문제 수: 36-70개 • 각 지문 당 문제 수: 12-14개 • 각 지문 당 단락 수: 4-8개 • 각 지문 당 어휘 수: 약700단어	• Conversation: 2-3개 • Lecture: 4-6개 (Interactive Lecture 2-3개; Academic Lecture 2-3개) • Conversation은 2-3분 정도 (400-500단어의 길이), Lecture는 4-5분 정도 (600-800단어의 길이) • 2-3개의 Conversation (각 5문제씩)과 4-6개의 Lecture (각 6문제씩)에서 총 34-51문제 출제	• Independent Speaking (개별 말하기): 2문제 • Integrated Speaking (통합형 말하기시험): 4문제 (읽고 듣고 말하기 2문제; 듣고 말하기 2문제) • Integrated Speaking의 독해 지문은 75-100단어 수준으로 45초의 읽기시간이 주어진다. • Integrated Speaking의 듣기 지문은 150-280단어 수준으로 1-2분 정도의 길이다. • 총 6문제 출제	• Integrated Writing (통합형 작문): 1문제(20분 동안 150-225단어 정도 작성) - Integrated Writing의 독해 지문은 230-300단어 수준으로 3분의 읽기시간이 주어진다. - Integrated Writing의 듣기지문은 230-300단어 수준으로 2분 정도의 길이다. • Independent Writing (개별 작문): 1문제(30분 동안 최소한 300단어 이상 작성) • 총 2문제 출제
시 간	총 60-100분 (각 지문당 20분씩)	대략 60-90분 정도(듣는 시간을 제외하고 실제 문제를 푸는데 걸리는 시간은 20-30분)	대략 20분	대략 50분 (Integrated Writing: 20분; Independent Writing: 30분)
문 제 유 형	(1) Vocabulary Questions (2) Reference Questions (3) Sentence Simplification Questions (4) Factual Information Questions (5) Negative Fact Questions (6) Inference Questions (7) Rhetorical Purpose Questions (8) Insert Text Questions (9) Prose Summary Questions (10) Classifying, Categorizing, and Organizing Information Questions	(1) Main Idea Questions (2) Supporting Detail Questions (3) Organization Questions (4) Organization-Rhetorical Connection Questions (5) Content-Identifying Relationship Questions (6) Content-Linking Questions (7) Stance / Attitude Questions (8) Function-Purpose Questions	(1) Independent Speaking Personal Preference (2) Independent Speaking Paired Choice (3) Reading / Listening / Speaking Campus Situation Topic (4) Reading / Listening / Speaking Academic Course Topic (5) Listening / Speaking Campus Situation Topic (6) Listening / Speaking Academic Course Topic	(1) Reading / Listening / Writing Academic Course Topic (2) Independent Writing based on Experience & Knowledge
특 징	• Glossary (어휘사전) 제공: 단어를 클릭하면 해당 단어의 설명이 나타난다. • Review (복습) 기능: 체크한 답과 그렇지 않은 답의 상태를 알 수 있어 그냥 지나간 문제를 확인할 수 있다. • 각 지문의 제목이 제시된다. • 문제는 보통 지문의 순서대로 주어지며, 문제가 왼쪽에, 지문이 오른쪽에 제시된다.	• Note Taking (받아적기) 가능: 듣는 동안에 요점을 종이에 쓸 수 있다. • 강의의 핵심 구문을 모니터 상에 제시한다. • 들은 내용을 그대로 다시 들려주고 푸는 Replay Item을 도입했다.	• Note Taking을 이용해 효율적으로 Speaking Task의 답변을 준비할 수 있다. • Independent Speaking은 일상 생활의 경험에 관한 질문 등 매우 익숙한 토픽에 대한 질문이다. • Integrated Speaking은 읽고 들은 내용을 바탕으로 Speaking Task가 주어진다. • 각 문제당 15-30초 정도의 답변 준비 시간이 주어지고 실제 답변 시간은 45초 또는 60초다.	• Note Taking을 이용해 효율적으로 Writing Task의 답변을 준비할 수 있다. • Independent Writing의 주제는 기존의 CBT TOEFL의 185 Writing Topics와 거의 동일하다. • Integrated Writing은 읽고 들은 내용을 바탕으로 Writing Task가 주어진다.

TOEFL *i*BT의 점수체계

❑ Next Generation TOEFL Scores

Four skill scores

Reading: 0 – 30
Listening: 0 – 30
Speaking: 0 – 30
Writing: 0 – 30
Total score: 0 – 120

* 각 영역별(Reading, Listening, Speaking, and Writing)로 0-30의 scale로 할당되며 total 120 scale이 만점이다. 또한 성적 통지표에는 4개의 영역 점수(four skill scores)와 더불어 total score난이 별도로 표기된다.
* Score Report는 테스트 후 15일 이후에 온라인에서 확인하거나 우편으로 받아볼 수 있다.

❑ 각 영역별 배점체계

	Reading(독해)	Listening(청취)	Speaking(말하기)	Writing(작문)
구 성	• 보통 문제당 1점의 원점수가 주어진다. • Prose Summary Questions나 Classifying, Categorizing, and Organizing Information Questions 문제 유형은 부분 점수가 부여되는 Partial-Credit Item으로 0-4점 사이의 원점수가 부여된다. • 모든 원점수를 합하여 30점 만점으로 환산한다.	• 보통 문제당 1점의 원점수가 주어진다. • 일부 Supporting Detail Questions 문제의 경우 2점의 원점수가 주어질 수 있다. 이 경우, 해당 문제에 점수기준이 명시되어 있다. • 모든 원점수를 합하여 30점 만점으로 환산한다.	• Scoring Rubrics를 바탕으로 각 문제당 0-4점 사이의 원점수가 주어진다. • 6명의 human raters에 의해 채점된다. • 모든 원점수를 합하여 30점 만점으로 환산한다.	• Scoring Rubrics를 바탕으로 각 문제당 0-5점 사이의 원점수가 주어진다. • 2명의 human raters에 의해 채점된다. • 모든 원점수를 합하여 30점 만점으로 환산한다.
문제 수	36-70	34-51	6	2
환산점수	0-30	0-30	0-30	0-30

* 한국인의 토플 평균 점수는 200-210점(CBT기준)으로 추산된다. 이는 링구아 토플시리즈의 *i*-TOEFL단계에 해당하는 수준으로 약 5,000-6,000단어 정도의 어휘력을 갖는 것으로 추정하며, 이를 링구아 토플 중급학습자로 분류한다.
* 보통 미국 대학에서 요구하는 토플 점수는 213점(CBT기준)으로 TOEFL *i*BT 80점에 해당하는 점수이다.

II. 점수 환산 기준

TOEFL Total Score Comparison

Internet-based Total	Computer-based Total	Paper-based Total
120	300	677
120	297	673
119	293	670
118	290	667
117	287	660-663
116	283	657
114-115	280	650-653
113	277	647
111-112	273	640-643
110	270	637
109	267	630-633
106-108	263	623-627
105	260	617-620
103-104	257	613
101-102	253	607-610
100	250	600-603
98-99	247	597
96-97	243	590-593
94-95	240	587
92-93	237	580-583
90-91	233	577
88-89	230	570-573
86-87	227	567
84-85	223	563
83	220	557-560
81-82	217	553
79-80	213	550
77-78	210	547
76	207	540-543
74-75	203	537
72-73	200	533
71	197	527-530
69-70	193	523
68	190	520
66-67	187	517
65	183	513
64	180	507-510
62-63	177	503
61	173	500
59-60	170	497
58	167	493
57	163	487-490
56	160	483
54-55	157	480
53	153	477
52	150	470-473
51	147	467
49-50	143	463
48	140	460
47	137	457
45-46	133	450-453
44	130	447
43	127	443
41-42	123	437-440
40	120	433
39	117	430
38	113	423-427
36-37	110	420
35	107	417
34	103	410-413
33	100	407
32	97	400-403
30-31	93	397
29	90	390-393
28	87	387
26-27	83	380-383
25	80	377
24	77	370-373
23	73	363-367
22	70	357-360
21	67	353
19-20	63	347-350
18	60	340-343
17	57	333-337
16	53	330
15	50	323-327
14	47	317-320
13	43	313
12	40	310
11	37	310
9	33	310
8	30	310
7	27	310
6	23	310
5	20	310
4	17	310
3	13	310
2	10	310
1	7	310
0	3	310
0	0	310

Range Comparison

Internet-based Total	Computer-based Total	Paper-based Total
111-120	273-300	640-677
96-110	243-270	590-637
79-95	213-240	550-587
65-78	183-210	513-547
53-64	153-180	477-510
41-52	123-150	437-473
30-40	93-120	397-433
19-29	63-90	347-393
9-18	33-60	310-343
0-8	0-30	310

TOEFL Score Comparison for Reading

Internet-based Reading	Computer-based Reading	Paper-based Total
30	30	67
29	29	66
28	28	64-65
28	27	63
27	26	61-62
26	25	59-60
24	24	58
23	23	57
21	22	56
20	21	54-55
19	20	53
17	19	52
16	18	51
15	17	50
14	16	48-49
13	15	47
12	14	46
11	13	44-45
10	12	43
9	11	41-42
8	10	40
7	9	38-39
6	8	36-37
5	7	34-35
4	6	32-33
3	5	31
1	4	31
0	3	31
0	2	31
0	1	31
0	0	31

Range Comparison for Reading

Internet-based Reading	Computer-based Reading	Paper-based Reading
28-30	28-30	64-67
26-28	25-27	59-63
21-24	22-24	56-58
17-20	19-21	52-55
14-16	16-18	48-51
11-13	13-15	44-47
8-10	10-12	40-43
5-7	7-9	34-39
1-4	4-6	31-33
0	0-3	31

Memo