DarakwonTOEFL

How to Master Skills for the TOEFL® iBT Reading

Intermediate

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DARAKWON

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Introduction

A. Information on the TOEFL® iBT

1. The Format of the TOEFL® iBT

Section	Number of Questions	Timing	Score
Reading	• **3~5 Passages** – approximately 700 words each – 12~14 questions per passage	60~100 min.	30 points
Listening	• **2~3 Conversations** – 12~25 exchanges each (3 min.) – 5 questions per conversation • **4~6 Lectures** – 500~800 words each (3~5 min.) – 6 questions per lecture	60~90 min.	30 points
BREAK		10 min.	
Speaking	• **2 Independent Tasks** (preparation: 15 sec. / response: 45 sec.) ❶ 1 personal experience ❷ 1 personal choice/opinion • **2 Integrated Tasks:** Read-Listen-Speak (preparation: 30 sec. / response: 60 sec.) ❶ 1 campus situation topic – reading: 75~100 words (45 sec.) – conversation: 150~180 words (60~80 sec.) ❷ 1 academic course topic – reading: 75~100 words (45 sec.) – lecture: 150~220 words (60~90 sec.) • **2 Integrated Tasks:** Listen-Speak (preparation: 20 sec. / response: 60 sec.) ❶ 1 campus situation topic – conversation: 180~220 words (60~90 sec.) ❷ 1 academic course topic – lecture: 230~280 words (90~120 sec.)	20 min.	30 points
Writing	• **1 Integrated Task:** Read-Listen-Write (20 min.) – reading: 230~300 words (3 min.) – lecture: 230~300 words (2 min.) – a summary of 150~225 words • **1 Independent Task** (30 min.) – a minimum 300-word essay	50 min.	30 points

2. What Is New about the TOEFL® iBT?

(1) The TOEFL® iBT is delivered through the Internet in secure test centers around the world at the same time.

(2) It tests all four language skills and is taken in the order of Reading, Listening, Speaking, and Writing, with a 10-minute break in the middle.

(3) The test is 4.0~4.5 hours long, and all of the four test sections will be completed in one day.

(4) Note-taking is allowed throughout the entire test, including the Reading section. At the end of the test, all notes are collected and destroyed at the test center.

(5) Compared with the computer-based test (CBT) and paper-based test (PBT), the TOEFL® iBT has no Structure section. Grammar is tested indirectly on questions and tasks in each section.

(6) In the Listening section, one lecture may be spoken with a British or Australian accent.

(7) There are integrated tasks requiring test takers to combine more than one language skill in the Speaking and Writing sections.

(8) In the Speaking section, test takers wear headphones and speak into a microphone when they respond. The responses are recorded and transmitted to ETS's Online Scoring Network.

(9) In the Writing section, test takers must type their responses. Handwriting is not possible.

(10) Test scores will be reported online. Test takers can see their scores online 15 business days after the test and also receive a copy of their score report by mail.

B. Information on the Reading Section

The Reading section of the TOEFL® iBT measures test takers' ability to understand university-level academic texts. This section has 3~5 passages, and the length of each passage is about 700 words. Some passages may have underlined words or phrases in blue. Test takers can click on them to see a definition or explanation. Test takers have to answer 12~14 questions per passage. 60~100 minutes are given to complete this section, including the time spent reading the passages and answering the questions.

1. Types of Reading Passages

(1) Exposition – Material that provides an explanation of a topic

(2) Argumentation – Material that presents a point of view about a topic and provides evidence to support it

(3) Historical narrative – An account of a past event or of a person's life, narrated or written by someone else

Basic Comprehension Questions

(1) Vocabulary (3~5 questions per set)
- _ This type of question asks you to identify the meanings of words and phrases in the reading passage.

(2) Reference (0~2 questions per set)
- _ This type of question asks you to identify the referential relationship between the words in the passage.

(3) Factual Information (3~6 questions per set)
- _ This type of question asks you to identify specific information that is explicitly stated in the passage.

(4) Negative Factual Information (0~2 questions per set)
- _ This type of question asks you to check what information is NOT mentioned in the passage.

(5) Sentence Simplification (0~1 question per set)
- _ This type of question asks you to choose the sentence that best paraphrases the essential information in the highlighted sentence.
- _ This is a new type of question introduced in the TOEFL® iBT.

Inference Questions

(6) Inference Questions (0~2 questions per set)
- _ This type of question asks you to identify an idea that is not explicitly stated in the passage.

(7) Rhetorical Purpose Questions (0~2 questions per set)
- _ This type of question asks you why the author uses particular words, phrases, or sentences.

(8) Insert Text Questions (0~1 question per set)
- _ This type of question provides an example sentence and asks you to decide where the best place for that sentence would be in the passage.

Reading to Learn Questions

(9) Prose Summary (1 question per set)
- _ This type of question asks you to complete a summary chart with major ideas from the passage.
- _ This question is worth up to 2 points, and partial credit is given.
- _ This type of question does not occur with a Fill in a Table question in a same passage.
- _ This is a new type of question introduced in the TOEFL® iBT.

(10) Fill in a Table (1 question per set)

_ This type of question asks you to identify and organize the major ideas of the passage into table categories.

_ This question is worth up to 3 points for tables with 5 correct answers and 4 points for tables with 7 correct answers. Partial credit is given.

_ This type of question does not occur with a Prose Summary question in one passage.

_ This is a new type of question introduced in the TOEFL® iBT.

2. Question Formats

There are three question formats in the Reading section:

(1) Four-choice questions with a single answer in traditional multiple-choice format

(2) Four-choice questions with a single answer that ask test takers to insert a sentence where it fits best in a passage

(3) "Reading to learn" questions with more than four choices and more than one answer

How to Use This Book

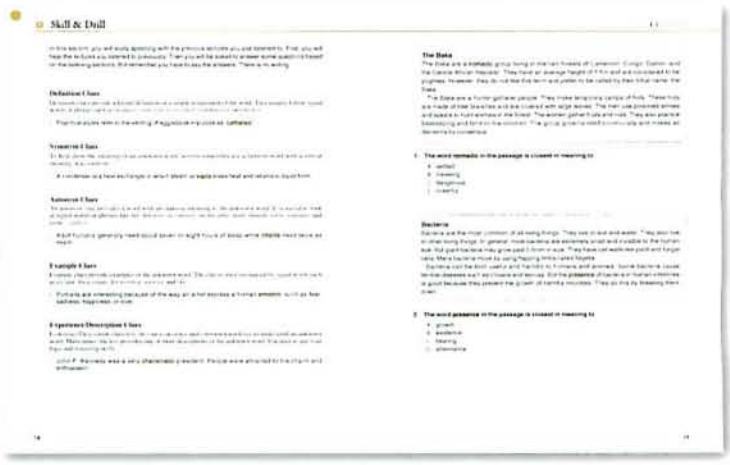
How to Master Skills for the TOEFL® iBT Reading Intermediate is designed to be used either as a textbook for a TOEFL® iBT reading preparation course or as a tool for individual learners who are preparing for the TOEFL® test on their own. With a total of 10 units, this book is organized to prepare you for the test with a comprehensive understanding of the test and thorough analysis of every question type. Each unit consists of 6 parts and provides a step-by-step program that provides question-solving strategies and the development of test-taking abilities. At the back of the book is a practice test of the Reading section of the TOEFL® iBT.

❶ Overview

This part is designed to prepare you for the type of question the unit covers. You will be given a full description of the question type and its application in the passage. You also will be given some useful tips as well as an illustrated introduction and sample.

❷ Skill & Drill

The purpose of this section is to ensure that you understand the new types of questions that were described in the overview. You will be given a chance to confirm your understanding in brief texts before starting on the practice exercises. You will read some simple passages and answer the questions of a particular type. This part will help you learn how to deal with each type of question on the Reading section of the TOEFL® iBT.

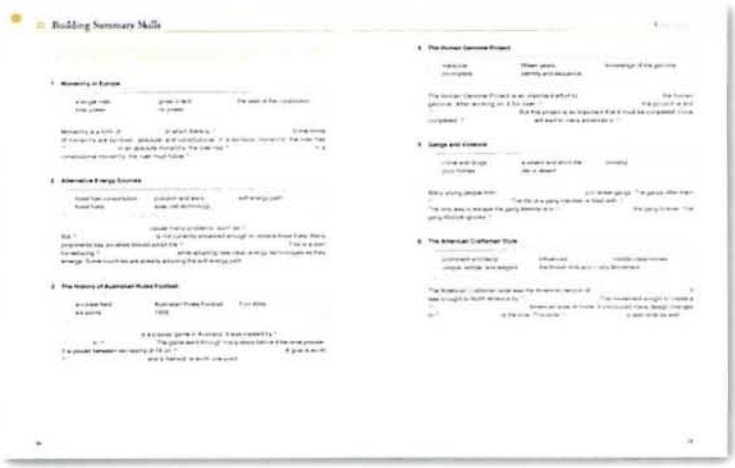


3 Practice with Long Passages

This section is the second of the practice exercises in each unit. Six long passages are provided, and a time limit is also given for reading each passage. You first read the passage within a time limit and then solve the question or questions of the type that is mainly dealt with in the unit. Important words are also listed to help increase your understanding. Besides, a graphic organizer is provided to help you grasp the overall organization of each passage and understand important points.

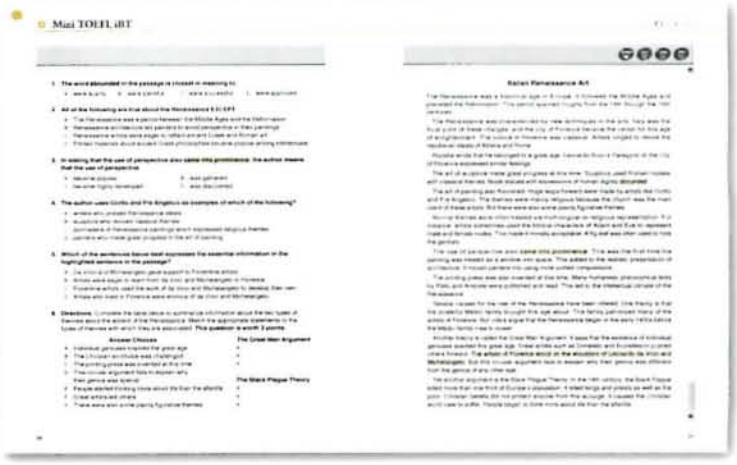
4 Building Summary Skills

The purpose of this part is for you to understand the previous long passages thoroughly by completing the summaries of them. This will also help you enhance your ability of paraphrasing skills that are strongly recommended to those who are preparing for the TOEFL® iBT test.



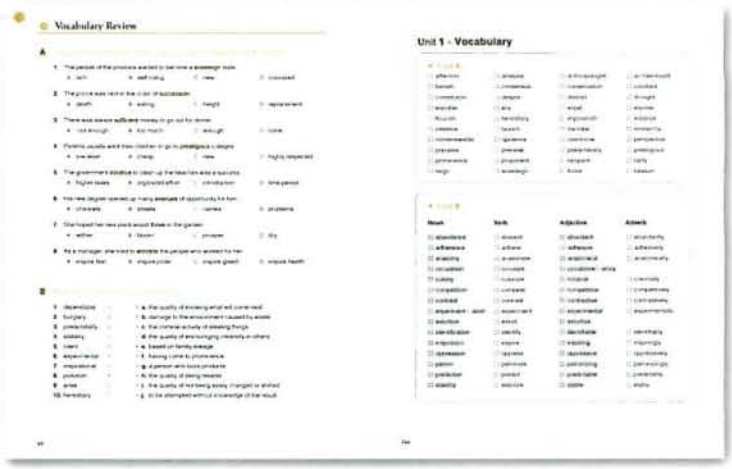
5 Mini TOEFL iBT

This part gives you a chance to experience an actual TOEFL® iBT test in a shortened form. You will be given two passages with 6 questions each. The topics are similar to those on the actual TOEFL® test, as are the questions.



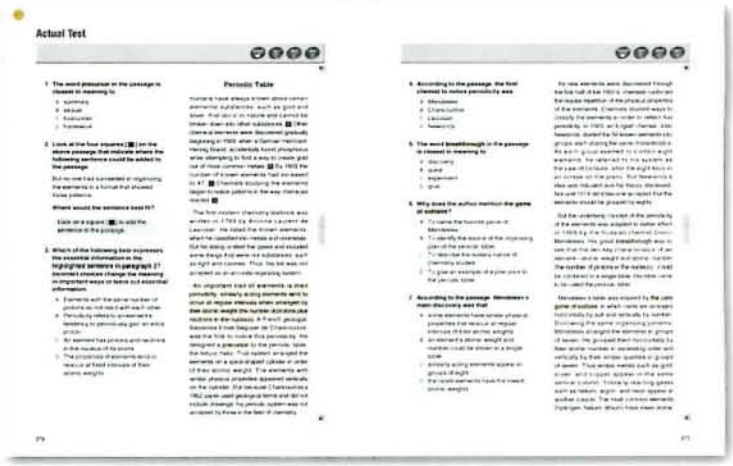
6 Vocabulary Review

This part offers you a chance to review some of the words you need to remember after finishing each unit. Vocabulary words for each unit are also provided at the back of the book to help you prepare for each unit.



7 Actual Test

This part offers a full practice test that is modeled on the Reading section of the TOEFL® iBT. This will familiarize you with the actual test format of the TOEFL® iBT.



PART 1 Basic Comprehension

In this part, the reading comprehension questions include: vocabulary, reference, factual information, negative factual information, and sentence simplification. The learning objectives of these reading comprehension questions are to identify individual words, referential relations between the words in the passage, factual information, and essential sentences.

- Unit 1 **Vocabulary**
  Biography / Sociology / Literature / Biology
- Unit 2 **Reference**
  Animals / Weather / Environment / Science
- Unit 3 **Factual Information**
  Journalism / Health Science / Government / Culture
- Unit 4 **Negative Factual Information**
  Biology / Psychology / Weather / Technology
- Unit 5 **Sentence Simplification**
  Law / Biology / Health Science / Economics

Unit 1

Vocabulary

Unit 1

Vocabulary

Overview

■ Introduction

Vocabulary questions ask you to identify the meanings of words and phrases in the passage, and you then choose a synonym from the answer choices. A word might have more than one meaning, but you should understand its contextual meaning and choose the answer choice closest in meaning to the word as it is used in the passage. There is no particular list of test words, so you need to increase your vocabulary as much as possible. Each passage has three to five vocabulary questions.

■ Question Types

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

2. The phrase _____ in the passage is closest in meaning to

3. In stating that _____, the author means that

4. Based on the information in paragraph X, which of the following best explains the term _____?

■ Useful Tips

- Keep in mind that the question is asking for the meaning as the word is used in the passage.
- Make the most of contextual clues, such as definition, synonym, antonym, example, and experience clues.
- Confirm that the word or phrase you have chosen still makes sense in the passage.

Sample iBT Question

The word depict in the passage is closest in meaning to

(A) describe
(B) ignore
(C) admire
(D) criticize

Mongol Empire

Genghis Kahn was a political ruler. He was also a military leader. He united the Mongol tribes and founded the largest empire in world history. Some historians depict Kahn as a bloodthirsty despot. But to modern-day Mongolians he is an icon. He is their hero.

The Mongol Empire stretched over much of Asia, Africa, Europe, and the Middle East. One distinct feature of the Mongol Empire was strict adherence to a legal code. These laws were called the Yassa Code. They established the empire as a meritocracy. In this form of government, a person advances based on ability, rather than wealth or family connections. Many modern countries still use a similar code.

Correct Answer *Depict* means to describe someone or something using words or pictures. So the correct answer is (A).

The best way to deal with Vocabulary questions on the TOEFL® iBT is to know as much vocabulary as possible. But when you come across an unknown word while reading, it helps to use contextual clues to guess the meaning of the word.

Definition Clues

Definition clues provide a formal definition or a simple restatement of the word. They usually follow signal words or phrases such as *or, means, refers to, is, is called, is defined as,* or *which is.*

- Psychoanalysts *refer to* the venting of aggressive impulses as "catharsis."

Synonym Clues

To help show the meaning of an unknown word, writers sometimes use a familiar word with a similar meaning or a synonym.

- A condenser is a heat exchanger in which steam *or* vapor loses heat and returns to liquid form.

Antonym Clues

An antonym clue provides a word with an opposite meaning to the unknown word. It is useful to look at signal words or phrases like *but, however, in contrast, on the other hand, though, while, whereas,* and *some...; others...*

- Adult humans generally need about seven or eight hours of sleep *while* infants need twice as much.

Example Clues

Example clues provide examples of the unknown word. The clue is often introduced by signal words such as *include, for example, for instance, such as,* and *like.*

- Portraits are interesting because of the way an artist expresses a human emotion, *such as* fear, sadness, happiness, or love.

Experience/Description Clues

Experience/Description clues rely on your experience and common knowledge to understand an unknown word. Many times, the text provides one or more descriptions of the unknown word. You need to use your logic and reasoning skills.

- John F. Kennedy was a very charismatic president. People were attracted to his charm and enthusiasm.

The Baka

The Baka are a nomadic group living in the rain forests of Cameroon, Congo, Gabon, and the Central African Republic. They have an average height of 1.5m and are considered to be pygmies. However, they do not like this term and prefer to be called by their tribal name, the Baka.

The Baka are a hunter-gatherer people. They make temporary camps of huts. These huts are made of tree branches and are covered with large leaves. The men use poisoned arrows and spears to hunt animals in the forest. The women gather fruits and nuts. They also practice beekeeping and tend to the children. The group governs itself communally and makes all decisions by consensus.

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

(A) settled
(B) traveling
(C) dangerous
(D) cheerful

Bacteria

Bacteria are the most common of all living things. They live in soil and water. They also live in other living things. In general, most bacteria are extremely small and invisible to the human eye. But giant bacteria may grow past 0.5mm in size. They have cell walls like plant and fungal cells. Many bacteria move by using flapping limbs called flagella.

Bacteria can be both useful and harmful to humans and animals. Some bacteria cause terrible diseases such as cholera and leprosy. But the presence of bacteria in human intestines is good because they prevent the growth of harmful microbes. They do this by breaking them down.

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

(A) growth
(B) existence
(C) bearing
(D) attendance

Drought

A drought is an abnormally long spell of dry weather. It is a time when there is not enough water to support farming, urban, or environmental needs. It usually refers to an extended period of below-normal rainfall. But it can be caused by anything that reduces the amount of water circulation.

Humans cannot control the weather. So the causes that lead to drought cannot be stopped. The most common causes are lack of water and hot temperatures. Many scientists believe many recent droughts happened because of global warming. They claim that if we can reduce the damage done to the ozone layer, there will be fewer droughts.

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

(A) charm
(B) zone
(C) signal
(D) period

Metaphor

A metaphor is a part of language that is a direct comparison between two unrelated things. The metaphor describes a first subject as being equal to the second subject in some way. There are many types of metaphors, such as mixed, active, and dead. A mixed metaphor combines two commonly used metaphors, to create a nonsensical image. An example of this is, "He stepped up to the plate and grabbed the bull by the horns." An active metaphor is not part of daily language, such as, "You are my sun." A dead metaphor is used to describe a metaphorical cliché, such as "to break the ice."

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

(A) indirect expression
(B) novel expression
(C) overused expression
(D) old-fashioned expression

Queen Elizabeth I

Queen Elizabeth I ruled England and Ireland. She sat on the throne from 1558 to 1603. She was also considered the Queen of France, but she had no power there. She was the fifth and final monarch of the Tudor Dynasty. Elizabeth was called the Virgin Queen because she never married.

The time of Elizabeth's reign is called the Elizabethan Era. Many great accomplishments took place under her reign. Shakespeare wrote his plays. Sir Francis Drake circled the globe. The English colonized North America. Shortly after her death, the American colony of Virginia was established. It was named in honor of the Virgin Queen.

5. In stating that Sir Francis Drake circled the globe, the author means that he

(A) drew a map
(B) measured a model globe
(C) traveled around the world
(D) ran in a circle

The Paramecium

The paramecium is an organism which is also known as a slipper because it has the shape of a slipper. Paramecia represent a group of single-celled organisms called the ciliate group. This is because their bodies are covered with cilia, which are thin tail-like limbs. Their constant motion allows the paramecium to move. The cell has a deep oral groove. This is a kind of mouth that is also filled with cilia. The mouth is used to expel water. Paramecia are commonly found in freshwater areas, especially in scum. They are attracted by acidic conditions.

6. The word expel in the passage is closest in meaning to

(A) push out
(B) pull in
(C) take in
(D) throw away

Practice with Long Passages

A Read the following passage, and answer the questions.

Monarchy in Europe

Time Limit: 3 min.

A monarchy is a form of government where a single ruler is the head of state. It is one of the oldest forms of government in the world. Monarchs are usually kings or queens. But they can also be a chief, an emperor, or called by another name. In some countries, such as Japan, the monarch is merely symbolic. They are figureheads with no real power. In other countries, the monarch wields considerable power. There are currently 29 sovereign monarchies around the world.

Hereditary monarchy is the most common style of succession. This form is used by most of the world's monarchies. In this case, all of the kings and queens come from the same family. A family that rules for a span of time is called a dynasty. The crown is passed down from one member to another member of the family. The hereditary system has the advantages of stability, continuity, and predictability. Family affection and loyalty are also stabilizing factors.

Over the centuries, most European countries were ruled by monarchs. The United Kingdom, Denmark, and Norway still have constitutional monarchies. In a constitutional monarchy a king or queen reigns but must obey the constitutional laws of the nation. This form of government severely limits the monarch's power.

In the 17th century, England became a constitutional monarchy. King Charles I signed an agreement. He had to go through the English Parliament to exact new taxes and laws or to start wars. Immediately after signing the agreement, the king ignored it. He tried to rule with absolute power. He was beheaded for treason. The new era of constitutional monarchy had begun.

The Russian Empire was an absolute monarchy in Europe. The first ruler was Peter I. He was a member of the Romanov family. He became tsar in 1682. "Tsar" is the Russian word for "emperor." The Romanov family ruled this empire until the February Revolution of 1917. In this year, the Russian people revolted. The reigning tsar, Nicholas II was forced to give up his throne. By 1918, Nicholas II and his family were shot before a firing squad.

General Comprehension

1. According to the passage, hereditary monarchy is

(A) a form of absolute monarchy
(B) a figurehead position
(C) the most common style of succession
(D) also called a tsar

2. According to paragraph 4, all of the following are true about King Charles I EXCEPT:

(A) He signed an agreement that limited his power.
(B) He tried to rule with absolute power.
(C) He was loved by the people he ruled over.
(D) He was beheaded for treason.

- **sovereign (a)** self-ruling
- **hereditary (a)** based on family lineage
- **stability (n)** steadiness; firmness
- **affection (n)** love; fondness; attachment
- **reign (v)** to rule; to govern
- **treason (n)** betrayal; treachery

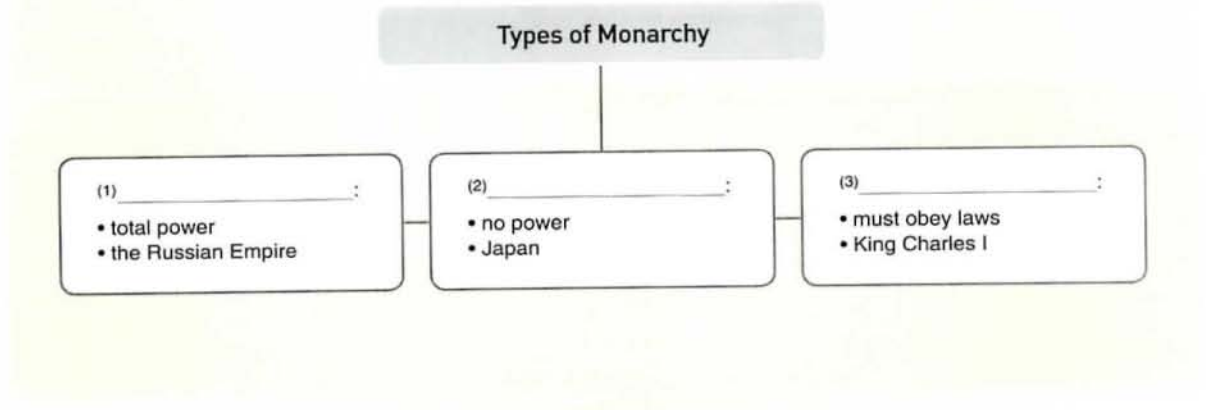
On the TOEFL Test

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

(A) normal
(B) extensive
(C) thoughtful
(D) slight

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

(A) approve of
(B) demand
(C) raise
(D) correct



B Read the following passage, and answer the questions.

Alternative Energy Sources

Time Limit: 2 min. 40 sec.

Fossil fuels are the cause of many problems. They create terrible pollution which leads to global warming. Many wars are fought to control oil and gas fields. Fossil fuels are also nonrenewable resources. They will be exhausted some day. Societies around the world suffer when fuel shortages occur.

Can solar power completely replace fossil fuels? Solar power is clean, safe, and inexpensive. But the idea of replacing fossil fuels with solar power alone is totally unrealistic. Current solar cell technology is not advanced enough. Solar cells are not dependable. They are useless in cloudy and rainy weather as well as at night. Also, they take up too much space. Then they fail to produce sufficient amounts of power.

The soft energy path is a good alternative to fossil fuel reliance. The soft energy path is an energy conservation plan. It is an alternative to the hard energy path. Hard energy is defined as harmful and nonrenewable. Fossil fuels and nuclear power are included. On the other hand, soft energy is defined as renewable and environmentally safe energy. Solar and wind power are soft energy. Biofuel and geothermal energy are also included.

There are many proponents of the soft energy path. They believe the solution lies in new energy production methods. The first step is to practice careful conservation in our use of hard energy technologies. Then, many new soft energy sources will be phased into use as soft energy technology improves.

Some critics claim this will damage all energy production. They feel fossil fuels are important. They want to control as much oil production as possible. They think fossil fuel consumption is good for industry.

Countries such as Canada and Sweden are taking the soft energy path. Canada is currently lessening its reliance on gasoline. In the next few years, all gasoline will contain a percentage of biofuel. Sweden has committed to decrease its reliance on oil by 40%. It says it can do this before the year 2020.

nonrenewable (a)
that cannot be replaced after use

dependable (a)
reliable; trustworthy

conservation (n)
the protection of the natural environment

proponent (n)
a supporter; an advocate

consumption (n)
the act of using energy, food, or materials

General Comprehension

1. According to the passage, which of the following is true about the soft energy path?

(A) It is an energy conservation plan.
(B) It is harmful and nonrenewable fuel.
(C) It is useless in cloudy and rainy weather.
(D) It is biofuel and geothermal energy.

2. According to paragraph 6, all of the following are true EXCEPT:

(A) The soft energy path has been adopted by Canada and Sweden.
(B) Canada is trying to use less gasoline every year.
(C) All gasoline in Canada will contain some biofuel in a few years.
(D) Sweden will cut down on the consumption of oil by 90% in the future.

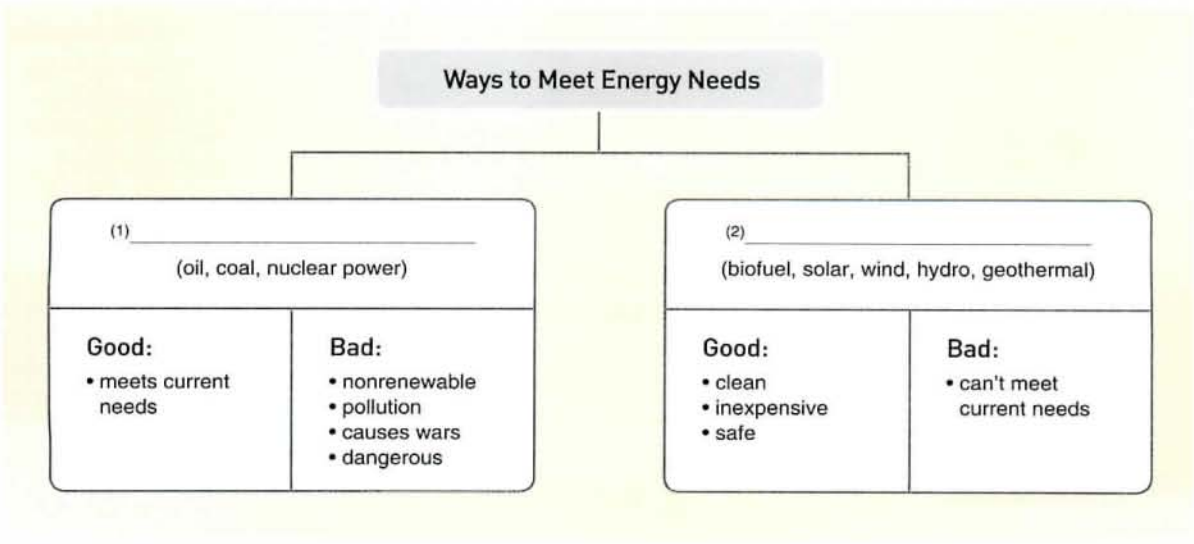
On the TOEFL Test

3. **The word exhausted in the passage is closest in meaning to**

   (A) wasted
   (B) used up
   (C) worn out
   (D) burned

4. **In stating that many soft energy sources will be phased into use, the author means that they will**

   (A) be an alternative to the hard energy path
   (B) be used gradually
   (C) be adopted by Sweden and Canada
   (D) damage all energy production



C Read the following passage, and answer the questions.

The History of Australian Rules Football

Time Limit: 2 min. 40 sec.

Australian Rules Football is called by many nicknames. Lovers of the game just call it "football" or "footy." When contrasted with other forms of football, it is called "Aussie Rules" or "AFL." AFL stands for Australian Football League, which is the most prestigious league in Australia.

Australian Rules Football was created by Tom Wills in 1858. He wanted to create a sport that would keep cricket players fit through the winter. He began by writing a letter that explained his purpose to a sports magazine. It also called for the creation of a football club. In 1858, Wills and others played an experimental match that was the first game of Australian football. But few details about this match have survived.

On August 7, 1858, two important events for the game occurred. The Melbourne Football Club was founded. It was one of the world's first football clubs in any code. Also, a famous match between Melbourne Grammar School and Scotch College was played. It was umpired by Tom Wills. A second day of play took place on August 21, and then there was a third and final day on September 4. The two schools have competed every year since.

The game is played between two teams of 18 players on an oval that can also be used for cricket. These playing fields can be up to 185m long. This is almost four times the size of fields used in other forms of football.

A point called "a behind" is scored when the ball goes across the line and between a goal post and a behind post. A behind point is also scored if the ball is touched by any body part of either team's member as it passes between the goal posts. A goal is worth six points, and a behind is worth one point.

General Comprehension

1. According to paragraph 1, all of the following are nicknames for Australian Rules Football EXCEPT:

(A) soccer
(B) footy
(C) Aussie Rules
(D) AFL

2. According to the passage, Tom Wills created Australian Rules Football because

(A) he liked contributing to sports magazines
(B) he wanted to umpire a game between Melbourne Grammar and Scotch College
(C) he wanted cricket players to keep healthy during the winter
(D) he wanted to join the most prestigious league in Australia

- **contrast (v)** to show differences between two things
- **prestigious (a)** to be thought of highly
- **experimental (a)** to be attempted without knowledge of the result
- **umpire (v)** to watch a game and make sure that rules are not broken
- **survive (v)** to continue existence
- **compete (v)** to play against one another in a game
- **oval (n)** an egg-shaped field

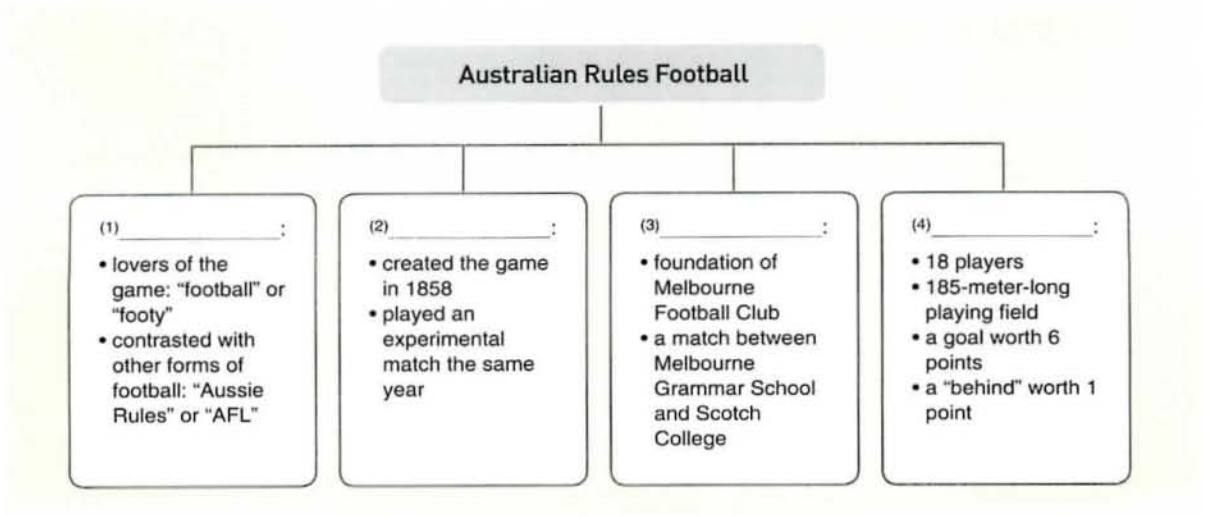
On the TOEFL Test

3. The phrase stands for in the passage is closest in meaning to

(A) supports
(B) recalls
(C) endures
(D) represents

4. The phrase in any code in the passage is closest in meaning to

(A) of any style
(B) in any order
(C) in any country
(D) of any name



D Read the following passage, and answer the questions.

The Human Genome Project

Time Limit: 2 min. 40 sec.

The Human Genome Project (HGP) is a very important effort in science. It attempts to map and sequence the genome. There are 3 billion codes in the human genome. All of these have been identified. But they still need to be sequenced. The project will also identify all the genes present.

The international HGP was launched in 1986 by Charles DeLisi. A 1987 report stated, "The ultimate goal of this initiative is to understand the human genome. Knowledge of the human genome is necessary to the continuing progress of medicine and other health sciences, as human anatomy has been for the present state of medicine."

This $3 billion project was formally founded in 1990. It was expected to take 15 years. The international consortium included geneticists from around the world.

Recently the press has made claims that the genome map is complete. But, as of 2006, it is not. The map is not expected to be finished for many more years. The central regions of each chromosome are highly repetitive DNA sequences. It is very difficult for current technology to put these in order.

The HGP has completed mapping about 92% of the genome now. Hopes are high for completion in the near future. The task is becoming easier as mapping and sequencing technologies improve.

A clear map of the genome will provide doctors with much important information. It will allow them to make many medical advances. This knowledge will lead to significant advances in the early diagnosis of breast cancer. It will also improve our ability to deal with liver and Alzheimer's disease.

Analysis of the genome promises to open new avenues in the study of human evolution. The sequence of human DNA is stored on the Internet. It is housed in a database called Genebank. This data is available for viewing by anyone.

General Comprehension

1. According to the passage, which of the following is true about the human genome?

(A) All the codes in the human genome have been identified.
(B) The Human Genome Project has helped people learn more about human anatomy.
(C) The genome map has been completed recently by the Human Genome Project.
(D) Knowledge of the human genome will enable doctors to cure breast cancer.

- **identify (v)** to become thoroughly familiar with
- **launch (v)** to start; to begin
- **progress (n)** development; advance
- **anatomy (n)** the parts of the human body
- **initiative (n)** an organized effort
- **consortium (n)** a group of organizations that have agreed to cooperate with each other

2. **According to the passage, all of the following people would get help from the Human Genome Project EXCEPT:**

   (A) A middle-aged woman with breast cancer
   (B) An old man with senile dementia
   (C) A child with autism
   (D) A middle-aged man with a liver problem

On the TOEFL Test

3. **In stating that the codes in the human genome still need to be sequenced, the author means that they still have to**

   (A) be taken apart
   (B) be put in order
   (C) be discovered
   (D) be processed

4. **In stating that analysis of the genome promises to open new avenues in the study of human evolution, the author means that it helps to**

   (A) build new roads
   (B) create new possibilities
   (C) save people
   (D) try new methods

The Human Genome Project

- What – a scientific effort to map and sequence (1)_____
- Why – to advance medicine and other health sciences
- When – formally founded in (2)_____
- Current state – about 92% of the human genome mapped
- Future benefits:
  – early diagnosis of breast cancer possible
  – improved treatment of (3)_____
  – progress in the study of human evolution

E Read the following passage, and answer the questions.

Gangs and Violence

Time Limit: 2 min. 50 sec.

Many young people from disadvantaged social classes join gangs. Gangs are groups of individuals who share a common identity. Some anthropologists believe the gang structure is one of the most ancient forms of human organization. Gangs are often associated with criminal activities.

Street gangs tend to be populated with young people from low income or impoverished homes. In contrast, organized crime gangs such as the Italian-American Mafia usually occupy the middle or upper class stratum of society.

Gangs usually take over a territory in a city or suburb. They call this territory their "turf." One common criminal activity on their turf is "providing protection." This is a common style of extortion in which a gang provides protection from its own members for money.

Since the 1970s, many gangs have been associated with selling drugs. The most problematic substance associated with gangs is crack cocaine. They are also known to commit burglaries, car theft, and armed robberies.

Individual members of gangs are usually referred to as gangsters. These members frequently join in their teens. This is often the result of early exposure to drugs and violence. Low-income housing projects and poor neighborhoods are ideal locations for gangs to exist and thrive.

Sometimes, new recruits for a gang are "jumped in." This is when the other gang members beat up the new recruit to test their dedication and loyalty. Recruits must also sometimes commit a crime such as robbery, rape, or murder to gain entry.

Once in a gang, there are only two ways for a member to quit. One way is for the member to die. The other way is for the member to desert the gang. The deserting of a gang usually gains the deserter a death sentence from the other gang members.

Members of gangs have a very short life expectancy. Because of this lifestyle, morality is often ignored. Criminal acts of violence are not a taboo. In fact, violence is often seen as a way to gain honor and prestige within the gang.

General Comprehension

1. According to the passage, all of the following are mentioned as illegal activities connected with gangs EXCEPT:

(A) selling drugs
(B) lending money
(C) killing people
(D) stealing cars

- **populate (v)** to occupy; to inhabit
- **be associated with (phr)** be connected with
- **extortion (n)** the act of getting money by threatening someone
- **exposure (n)** contact
- **thrive (v)** to prosper; to flourish

2. **According to the passage, how can a person stop being a gang member? Click on 2 answers.**

[A] Leave the gang
[B] Fight against other members
[C] Recruit a new member
[D] Stop living

On the TOEFL Test

3. **The word disadvantaged in the passage is closest in meaning to**

(A) disabled
(B) unhappy
(C) poor
(D) weak

4. **In stating that new recruits for a gang are "jumped in," the author means that they are**

(A) hit by other members
(B) asked to build up their physical strength
(C) ordered to steal money
(D) forced to show their courage

Some Important Facts About Gangs

- groups of (1)_____
- controlling an area or "turf"
- (2)_____: drug dealing, car theft, burglary, extortion, murder
- gang areas: low income housing projects and poor neighborhood
- gang members usually "jumped in"
- to quit gang: (3)_____
- low life expectancy
- violence is the only way to gain prestige

F Read the following passage, and answer the questions.

The American Craftsman Style

Time Limit: 2 min. 50 sec.

The American Craftsman style is a type of design. It was popular from 1900 to the 1930s. It changed the style of building in the United States.

The craftsman style originally began in Europe. The British Arts and Crafts style arose in the 1860s. The unique designs of this movement tried to ennoble the common person. Handmade items were preferred because they were thought better than items that were mass-produced. But this British style was still Victorian. It still only served the wealthiest clients.

In 1897 a group of Boston architects brought these handcrafted styles to America. They planned a show of craft objects, which turned out to be a huge success. Here they realized the potential and established the Society of Arts and Crafts on June 28, 1897. Its slogan was "to develop and encourage higher standards in the handicrafts."

The American style began as the Victorian Era was ending. It emphasized handmade work. Originality and simplicity were highly valued. Local materials and the quality of the handicraft were very important. These traits were meant to dignify the modest homes of the middle class.

These simple designs used glass and wood that were produced locally. They were also very elegant. The metalwork was a reaction to Victorian opulence. The increase of mass-produced housing items was rejected. The American Craftsman used clean lines. It also relied on sturdy structure. Natural materials were always used in these houses if possible.

This style introduced many changes to the average American home. New designs were made for families without servants. This was a trait of the new middle class. The kitchen went from being a hidden room to a prominent one. Another development was the breakfast nook. This new area provided the family with a place to gather at any time of day.

Also, inspirational to the Craftsman style were the Shaker and Mission designs. The American Craftsman style led to the Art Deco movement of the 1930s.

General Comprehension

1. **According to the passage, the American Craftsman style is a type of**

   (A) Shaker and Mission design
   (B) house made for families with servants
   (C) design which was popular from 1900 to the 1930s
   (D) breakfast nook

2. **According to paragraph 6, all of the following are true about the American Craftsman style EXCEPT:**

   (A) The breakfast nook provided the family with a place to gather.
   (B) The kitchen became a more prominent room.
   (C) This style did not make any changes to the middle-class American home.
   (D) Houses were designed for a new middle class with no servants.

- **originally (ad)** at first; in the beginning
- **arise (v)** to happen
- **unique (a)** one of a kind
- **potential (n)** possibility
- **sturdy (a)** durable; well-built
- **inspirational (a)** motivating; encouraging creativity
- **nook (n)** a small quiet place set back from the rest of a room

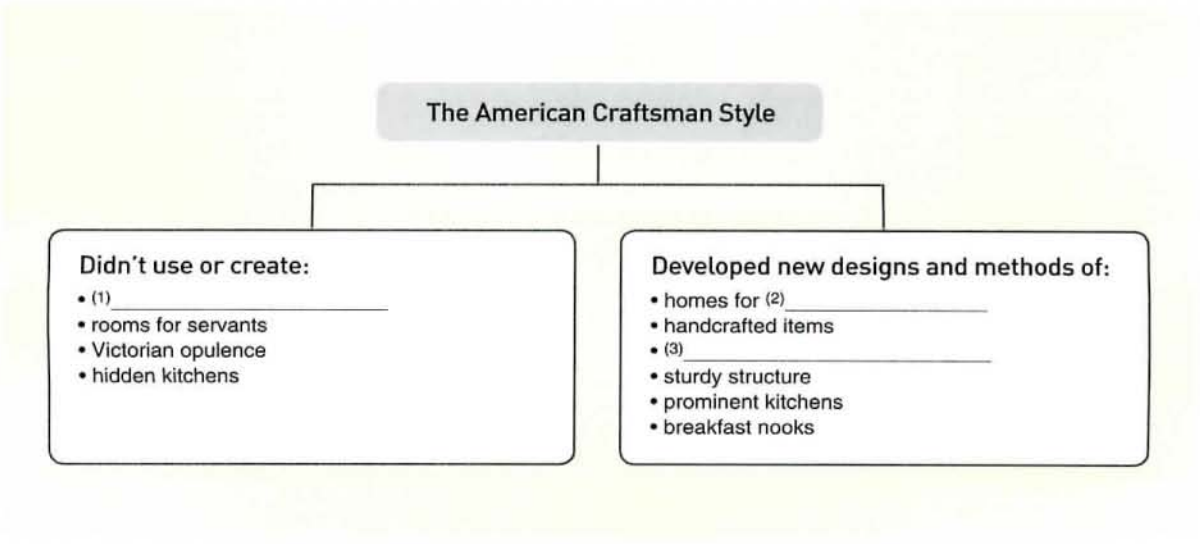
On the TOEFL Test

3. In stating that the unique designs of this movement tried to ennoble the common person, the author means that the designs tried to

(A) make ordinary people rich
(B) become very popular among common people
(C) raise ordinary people to royalty
(D) offer dignity to normal people

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

(A) richness
(B) greed
(C) ugliness
(D) distaste



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Monarchy in Europe

a single ruler	government	the laws of the constitution
total power	no power	

Monarchy is a form of (1) _____ in which there is (2) _____. Some forms of monarchy are symbolic, absolute, and constitutional. In a symbolic monarchy, the ruler has (3) _____. In an absolute monarchy, the ruler has (4) _____. In a constitutional monarchy, the ruler must follow (5) _____.

2. Alternative Energy Sources

fossil fuel consumption	pollution and wars	soft energy path
fossil fuels	solar cell technology	

(1) _____ cause many problems, such as (2) _____. But (3) _____ is not currently advanced enough to replace fossil fuels. Many proponents say societies should adopt the (4) _____. This is a plan for reducing (5) _____ while adopting new clean energy technologies as they emerge. Some countries are already adopting the soft energy path.

3. The History of Australian Rules Football

a cricket field	Australian Rules Football	Tom Wills
six points	1858	

(1) _____ is a popular game in Australia. It was created by (2) _____ in (3) _____. The game went through many steps before it became popular. It is played between two teams of 18 on (4) _____. A goal is worth (5) _____, and a "behind" is worth one point.

4. The Human Genome Project

medicine	fifteen years	knowledge of the genome
incomplete	identify and sequence	

The Human Genome Project is an important effort to (1)_____ the human genome. After working on it for over (2)_____, the project is still (3)_____. But this project is so important that it must be completed. Once completed, (4)_____ will lead to many advances in (5)_____.

5. Gangs and Violence

crime and drugs	a violent and short life	morality
poor homes	die or desert	

Many young people from (1)_____ join street gangs. The gangs offer them (2)_____. The life of a gang member is filled with (3)_____. The only way to escape the gang lifestyle is to (4)_____ the gang forever. The gang lifestyle ignores (5)_____.

6. The American Craftsman Style

prominent architects	influenced	middle-class homes
unique, simple, and elegant	the British Arts and Crafts Movement	

The American Craftsman style was the American version of (1)_____. It was brought to North America by (2)_____. This movement sought to create a (3)_____ American style of home. It introduced many design changes to (4)_____of the time. This style (5)_____ a later style as well.

1. **The word abounded in the passage is closest in meaning to**

   (A) were scanty (B) were plentiful (C) were successful (D) were approved

2. **All of the following are true about the Renaissance EXCEPT:**

   (A) The Renaissance was a period between the Middle Ages and the Reformation.
   (B) Renaissance architecture led painters to avoid perspective in their paintings.
   (C) Renaissance artists were eager to reflect ancient Greek and Roman art.
   (D) Printed materials about ancient Greek philosophies became popular among intellectuals.

3. **In stating that the use of perspective also came into prominence, the author means that the use of perspective**

   (A) became popular (B) was gathered
   (C) became highly developed (D) was discovered

4. **The author uses Giotto and Fra Angelico as examples of which of the following?**

   (A) writers who praised Renaissance ideals
   (B) sculptors who revived classical themes
   (C) purchasers of Renaissance paintings which expressed religious themes
   (D) painters who made great progress in the art of painting

5. **Which of the sentences below best expresses the essential information in the highlighted sentence in the passage?**

   (A) Da Vinci and Michelangelo gave support to Florentine artists.
   (B) Artists were eager to learn from da Vinci and Michelangelo in Florence.
   (C) Florentine artists used the work of da Vinci and Michelangelo to develop their own.
   (D) Artists who lived in Florence were envious of da Vinci and Michelangelo.

6. **Directions:** Complete the table below to summarize information about the two types of theories about the advent of the Renaissance. Match the appropriate statements to the types of theories with which they are associated. ***This question is worth 3 points.***

Answer Choices	The Great Man Argument
(A) Individual geniuses inspired the great age.	•
(B) The Christian worldview was challenged.	•
(C) The printing press was invented at this time.	•
(D) This circular argument fails to explain why their genius was special.	**The Black Plague Theory**
(E) People started thinking more about life than the afterlife.	•
(F) Great artists led others.	•
(G) There were also some plainly figurative themes.	•

Italian Renaissance Art

The Renaissance was a historical age in Europe. It followed the Middle Ages and preceded the Reformation. This period spanned roughly from the 14th through the 16th centuries.

The Renaissance was characterized by new techniques in the arts. Italy was the focal point of these changes, and the city of Florence became the center for this age of enlightenment. The culture in Florence was classical. Artists longed to revive the republican ideals of Athens and Rome.

Rucellai wrote that he belonged to a great age. Leonardo Bruni's *Panegyric to the City of Florence* expressed similar feelings.

The art of sculpture made great progress at this time. Sculptors used Roman models with classical themes. Nude statues with expressions of human dignity abounded.

The art of painting also flourished. Huge leaps forward were made by artists like Giotto and Fra Angelico. The themes were mainly religious because the church was the main client of these artists. But there were also some plainly figurative themes.

Normal themes were often treated via mythological or religious representation. For instance, artists sometimes used the biblical characters of Adam and Eve to represent male and female nudes. This made it morally acceptable. A fig leaf was often used to hide the genitals.

The use of perspective also came into prominence. This was the first time the painting was treated as a window into space. This added to the realistic presentation of architecture. It moved painters into using more unified compositions.

The printing press was also invented at this time. Many humanistic philosophical texts by Plato and Aristotle were published and read. This led to the intellectual climate of the Renaissance.

Several causes for the rise of the Renaissance have been offered. One theory is that the powerful Medici family brought this age about. This family patronized many of the artists of Florence. But critics argue that the Renaissance began in the early 1400s before the Medici family rose to power.

Another theory is called the Great Man Argument. It says that the existence of individual geniuses sparked this great age. Great artists such as Donatello and Brunelleschi pushed others forward. The artists of Florence stood on the shoulders of Leonardo da Vinci and Michelangelo. But this circular argument fails to explain why their genius was different from the genius of any other age.

Yet another argument is the Black Plague Theory. In the 14th century, the Black Plague killed more than one third of Europe's population. It killed kings and priests as well as the poor. Christian beliefs did not protect anyone from this scourge. It caused the Christian world view to suffer. People began to think more about life than the afterlife.

7. **The word rampant in the passage is closest in meaning to**

(A) serious
(B) widespread
(C) uncommon
(D) increasing

8. **According to paragraph 1, all of the following are true EXCEPT:**

(A) The French Revolution was a significant event in Western history.
(B) Absolute monarchs controlled France before the revolution.
(C) The French people formed a new government after the revolution.
(D) The Roman Catholic Church welcomed the revolution.

9. **According to the passage, which of the following is NOT true of the factors that led to the revolution?**

(A) Old rulers were destroyed by their rigid ways.
(B) The rising middle class joined the workers and poor people.
(C) Napoleon started a group that began the revolution.
(D) Enlightenment ideas influenced the people.

10. **Which of the following can be inferred about the guillotine?**

(A) It was a chair for royalty to sit upon.
(B) It was highly regarded by the king of France.
(C) It was a device used to enact death sentences.
(D) It was used to chop off the hands of criminals.

11. **According to the passage, why did some noblemen flee the country?**

(A) Because they were in great danger
(B) Because they did not like living a lower-class lifestyle
(C) Because the Roman Catholic Church had too much power
(D) Because King Louis XVI was sentenced to death

12. **In stating that Queen Marie Antoinette followed him, the author means that the queen**

(A) walked behind him
(B) was also killed
(C) went to jail for life
(D) became the new king

The French Revolution

The French Revolution was an important period in the history of Western Civilization. During this time, France's absolute monarchy was replaced with a republican government. The Roman Catholic Church was also forced to give up much of its power.

France would still swing between republic, empire, and monarchy for 75 years after the revolution ended. But this event is seen as a major turning point in the age of democracy.

Many political, social, and economic factors led to the revolution. The old rulers were destroyed by their own rigidity. The rising middle class allied itself with workers and the poor. They were influenced by the ideas of the Enlightenment.

In the months before the revolution, food was scarce. The price of bread was so high that workers could not afford it. Unemployment was rampant. Those who were caught stealing risked being beheaded by the guillotine. King Louis XVI failed to deal with these problems effectively.

As the revolution proceeded, the king began to fight with his officials, which led to much bloodshed. The national debt was out of control, and taxes were too high.

By this time, King Louis XVI tried to have the National Assembly closed. So, they had their meeting on a tennis court and vowed not to take a break until France had a constitution.

On July 11, 1789, King Louis tried to banish the reformist minister, Necker. Many of the citizens of Paris flew into open rebellion. On July 14th, they stormed the Bastille prison and killed its governor. They freed criminals and killed the mayor of Paris. The frightened king signed an agreement to give the people a constitution. This saved him for a while.

The slogan of the revolution was, "Liberty, equality, fraternity, or death!" This slogan is still used. It has become the rallying cry for people trying to overthrow oppressive governments.

The noblemen of France were not safe. Some tried wearing their servants' clothes while many others fled the country. Many changes took place. Towns lost their powers of heavy taxation, and the church lost most of its power and land.

By 1793, King Louis XVI was condemned to death. He was charged with conspiracy against public liberty and the general safety. On January 21, his head was chopped off by the guillotine. On October 16, Queen Marie Antoinette followed him.

By 1795, a new constitution was ratified. It installed a new legislature called the Directory. It consisted of 500 representatives. During this time, a general named Napoleon Bonaparte gained much power. By 1799, he staged a coup, and five years later, he declared himself emperor. This brought the republican phase of the French Revolution to a close.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. The people of the province wanted to become a sovereign state.
   (A) rich (B) self-ruling (C) new (D) colonized

2. The prince was next in the order of succession.
   (A) death (B) eating (C) height (D) replacement

3. There was always sufficient money to go out for dinner.
   (A) not enough (B) too much (C) enough (D) none

4. Parents usually want their children to go to prestigious colleges.
   (A) low-level (B) cheap (C) new (D) highly respected

5. The government initiative to clean up the beaches was a success.
   (A) higher taxes (B) organized effort (C) introduction (D) time period

6. His new degree opened up many avenues of opportunity for him.
   (A) channels (B) streets (C) names (D) problems

7. She hoped her new plant would thrive in the garden.
   (A) wither (B) bloom (C) prosper (D) dry

8. As a manager, she tried to ennoble the people who worked for her.
   (A) inspire fear (B) inspire pride (C) inspire greed (D) inspire health

B Match each word with the correct definition.

1. dependable	•	• **a.** the quality of knowing what will come next
2. burglary	•	• **b.** damage to the environment caused by waste
3. predictability	•	• **c.** the criminal activity of stealing things
4. stability	•	• **d.** the quality of encouraging creativity in others
5. client	•	• **e.** based on family lineage
6. experimental	•	• **f.** having come to prominence
7. inspirational	•	• **g.** a person who buys products
8. pollution	•	• **h.** the quality of being reliable
9. arise	•	• **i.** the quality of not being easily changed or shifted
10. hereditary	•	• **j.** to be attempted without knowledge of the result

Unit 2

Reference

Unit 2

Reference

Overview

■ Introduction

Reference questions ask you to understand the relationship between a pronoun and the word which the pronoun refers to. Usually, personal pronouns such as *it, its, they, their,* and *them* are tested on the TOEFL® iBT. Sometimes other reference words such as *which, this, one, the former,* and *the latter* are also asked.

■ Question Types

1. The word _____ in the passage refers to

2. The phrase _____ in the passage refers to

■ Useful Tips

- The referent (the word to which a pronoun refers) usually appears before the pronoun in the same sentence or shows up in an earlier sentence. Sometimes, however, the referent might be found after the pronoun.
- Substitute your answer for the highlighted word or words in the passage.
- Make sure that your answer is the same number (singular or plural), gender (male or female), and case (first, second, or third person) as the highlighted pronoun.

Sample iBT Question

The word they in the passage refers to

(A) floods
(B) effects
(C) storms
(D) humans

Hurricanes

The scientific name for a hurricane is a tropical cyclone. It is fueled by the heat that is released when moist air rises and condenses. Hurricanes rotate counter-clockwise in the northern hemisphere and clockwise in the southern.

Hurricanes can produce extremely strong winds, tornadoes, heavy rain, and huge waves called storm surges. The heavy rains and huge waves create giant floods. Though the effects of these storms on humans can be catastrophic, they are also known to relieve drought conditions.

Hurricanes also carry heat away from the tropics. This is an important part of global circulation and is the way balance is maintained in the Earth's troposphere.

Correct Answer The highlighted word *they* is a part of the sentence which explains the effects of hurricanes on human beings. So, the pronoun *they* refers to the word *storms*, which is mentioned earlier in the same sentence. The correct answer is (C).

In order to deal with Reference questions, you need to understand the relationships between pronouns and the words which they refer to. There are four kinds of referential relationships which are asked on the TOEFL® iBT.

Personal Pronouns

Personal pronouns refer back to someone or something previously mentioned in the passage. Sometimes they can refer forward to what is mentioned later in the passage. On the TOEFL® iBT, third-person pronouns such as *it, its, they, their,* and *them* are frequently asked.

- Capuchins crack walnuts by repeatedly pounding them with stones.
- When it was first introduced in Europe, coffee was sold in pharmacies as a medicinal remedy.

Demonstratives

Demonstratives are pronouns or adjectives pointing out which item is being referred to. In English, they include *this, that, these,* and *those*. Sometimes *the former* and *the latter* are also asked on the TOEFL® iBT.

- Although the initial cost of a timber house is less than that of one made of brick or concrete, the long-term expense is greater.
- An organization designed to accomplish some task is called a utilitarian organization. Businesses are examples of this type.

Relative Pronouns

Relative pronouns such as *which, that, who, whose,* and *whom* introduce a clause that modifies the noun or noun phrase right before them. Sometimes *which* can refer to the entire previous clause.

- Penicillin kills a wide variety of bacteria, many of which cause disease in humans.
- In the early 1850s, many daguerreotypists were practicing in the United States, most of whom were in the business to make money, not art.

Indefinite Pronouns

Indefinite pronouns refer to an unknown or undetermined person, place, or thing. Indefinite pronouns include words with *some, any, every,* or *no* (e.g. *someone, anyone, everyone,* and *no one*) and *one, another, some, others, each,* and *none*.

- Diffusion is the process of introducing cultural elements from one society into another.
- By looking at examples of atoms, one discovers that each contains an equal number of electrons and protons in the nucleus.
- Lactose, a sugar present in milk, is one of the simple sugars used in food preparations for infants.

The Formation of Fog

The Fog is a cloud in contact with the ground. It only differs from other clouds in that it touches the Earth's surface. Most types of fog form when the relative humidity reaches 100% at ground level. Fog can form suddenly. It can dissipate just as rapidly, depending on what side of the dew point the temperature is on. Evaporation and precipitation fog are two kinds. The former is caused by water changing into gas very quickly while the other is caused by the release of water.

The foggiest place on the Earth is the Grand Banks of Newfoundland, Canada. Frequent fog in this area is caused by the meeting of the cold Labrador Current from the north and the much warmer Gulf Stream from the south.

1. The phrase the other in the passage refers to

(A) evaporation fog
(B) precipitation fog
(C) release of water
(D) water changing into gas

The Dragonfly

The dragonfly is an insect with large, multi-faceted eyes that allow 360 degrees of vision. It has two pairs of strong, transparent wings and a stretched-out body.

Dragonflies usually eat mosquitoes, flies, and other small insects. Many humans like them because they feed on these pests. Dragonflies live near lakes, ponds, streams, and wetlands. Their larvae, known as nymphs, are aquatic.

The life cycle of a dragonfly, from egg to the death of the adult, can last anywhere from six months to six or seven years. Most of this life cycle is spent in the larval state. During this stage, the nymph uses its gills to breathe and eats tadpoles or fish.

2. The word them in the passage refers to

(A) dragonflies
(B) mosquitoes
(C) flies
(D) insects

Ecology

Ecology is the study of living things in their habitats. It studies why they live in a certain area and how many of a species can survive in one place. It also looks at a species' interactions with other living things.

The environment of a living thing includes various physical factors. Some such factors are sunlight and climate. Geology is another factor. The other living things that share a habitat make up yet another factor.

Ecology is a broad science. One branch is behavior ecology. It looks at the way a single living thing adapts to its habitat. Population ecology studies a single species. There are many more branches of this science.

3. The phrase this science in the passage refers to

(A) geology
(B) ecology
(C) behavior ecology
(D) population ecology

Hypothesis

A hypothesis is a suggested explanation of an event that is not already understood by science. It suggests a possible connection between two or more phenomena in a reasoned way. Scientists base hypotheses on their observations or on theories.

The scientific method requires that one can test a hypothesis. Many members of the scientific community demand that a hypothesis be falsifiable. This means that it can possibly be proven false.

A famous example posits a man who goes to a new country and sees only white sheep. He forms a hypothesis that all the sheep in this country are white. But if one black sheep is observed, the hypothesis would be proven false.

4. The word it in the passage refers to

(A) scientific method
(B) scientific community
(C) hypothesis
(D) example

Newton's Laws of Motion

Newton's Laws of Motion are three physical laws. To understand the first law, imagine an apple resting on a table. If a force, such as a hand, pushes the apple, it will gain inertia and move.

For the second law, imagine a hand pushing the same apple softly, causing it to move just a little. If the hand hits it with increased force, the force will make it hit a wall in the direction and with the momentum with which it was hit.

An example of Newton's third law is the reaction of the apple hitting the wall. There must be an opposite and equal reaction for every action. In this case, the reaction could be a dent in the wall or the apple exploding into bits.

5. The word it in the passage refers to

(A) hand
(B) apple
(C) force
(D) momentum

Biological Kingdoms

In 1735, Carolus Linnaeus published a book about kingdoms. In his book, he distinguished two kingdoms of living things: the animal kingdom and the vegetable kingdom. Everything on Earth fell into one or the other. He later created a third kingdom for minerals.

Years later, bacteria were discovered. Biologists realized that they did not fit into any of the three kingdoms. Another kingdom was named for them. This was called the kingdom Monera.

As science progressed and learned more about living things, new kingdoms were needed. In 1969, Robert Whittaker recognized a fifth kingdom. This kingdom was named for Fungi. By 1980, yet another kingdom was named. It was named to separate further microscopic organisms.

6. The word them in the passage refers to

(A) minerals
(B) bacteria
(C) biologists
(D) kingdoms

Practice with Long Passages

A Read the following passage, and answer the questions.

El Nino and La Nina

Time Limit: 3 min.

El Nino and La Nina are phenomena that take place between the ocean and the atmosphere on a global scale. These are major temperature changes in the surface waters of the tropical Pacific Ocean. El Nino indicates a rise of 0.5℃ or more. La Nina indicates a drop of the same degree. These changes must be sustained for a period longer than five months to be called El Nino or La Nina.

Many of the countries affected by these climatic changes are third-world nations in South America and Africa. Their economies are largely dependent on the farming and fishing sectors. These industries are a major source of food supply, employment, and foreign exchange. So, new methods for predicting these climatic changes can have a great socio-economic impact for these countries.

El Nino/La Nina episodes usually occur irregularly. In recent years, they have happened every 2 to 7 years. They usually last for one or two years. The effects of El Nino are very wide ranging. Many places experience weather that is the reverse of their normal climate. Some areas even experience terrible flooding due to heavy rainfall. There are also many forest fires because of heavy drought. On the other hand, the effects of La Nino begin to develop worldwide. During a La Nina, trade winds can become very strong, and an abnormal accumulation of colder than normal water can occur in the Central and Eastern Pacific.

In the normal Pacific pattern of ocean atmosphere system, equatorial winds gather, and then warm water pools towards the west. Cold water upswells along the South American coast. This brings fish up the coast, where they support the local fishing industry, because they follow the cool, nutrient-rich water.

When El Nino takes effect, the warm water flows toward the South American coast. The absence of cold upswelling increases warming. This sends the fish population out to sea instead of swimming along the coast. These conditions severely damage the local fishing industries.

The causes of El Nino and La Nina are still undiscovered. But many scientists are dedicating their careers to understanding these global weather phenomena better.

General Comprehension

1. According to the passage, the causes of El Nino and La Nina are

(A) not yet discovered
(B) normal ocean atmosphere patterns
(C) cold water that upswells along the South American coast
(D) heavy drought and flooding

- **phenomenon (n)** a natural occurrence that requires scientific explanation
- **impact (n)** a strong effect
- **drought (n)** a period of abnormally dry weather
- **upswell (n)** the forceful movement of water rushing up towards the surface

2. According to paragraph 4, all of the following about the normal Pacific pattern of ocean atmosphere system are true EXCEPT:

(A) Equatorial winds gather.
(B) Fish do not swim in the cool, nutrient-rich water.
(C) Cold water upswells along the South American coast.
(D) Warm water pools towards the west.

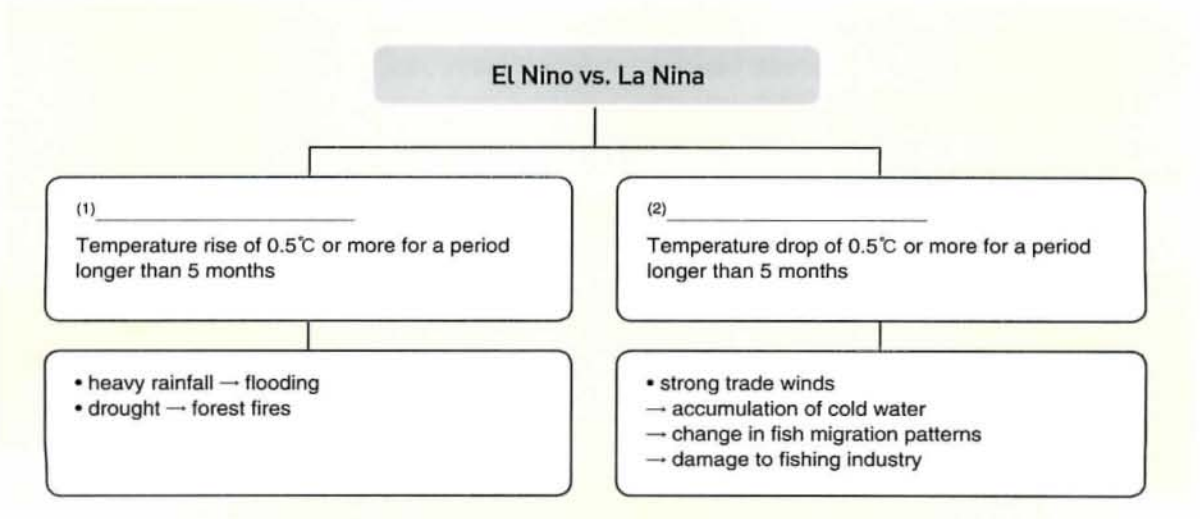
On the TOEFL Test

3. The word their in the passage refers to

(A) the countries
(B) climatic changes
(C) third-world nations
(D) South America and Africa

4. The word this in the passage refers to

(A) El Nino
(B) South American coast
(C) cold upswelling
(D) warming



B Read the following passage, and answer the questions.

The Decline of Biodiversity

Time Limit: 2 min. 50 sec.

Biodiversity is the range of living things in an area. During the last 100 years, scientists have seen a great decline in biodiversity. This means a great loss for humans as the stewards of the planet Earth.

Some studies show that one in eight plant species is threatened with extinction. It is estimated that 140,000 species of plants are lost each year. Many of these lost plants could have been very useful in creating new drugs to combat disease. This is due to the use of unsustainable ecological practices.

Most of the extinctions in the last thousand years are due to humans. The main cause is the chopping down of tropical rain forests. These habitats are being turned into pasture, cropland, and orchards. Most of this destruction is done to create pasture for beef cattle. It is also done to make wheat for bread as well as fruit for human consumption.

The introduction of exotic species is another threat. When exotic species are introduced to a habitat, they try to establish a self-sustaining population. Then they threaten the local species. These foreign species may be predators or parasites. Or they may simply be aggressive. They deprive the local species of nutrients. Because the local species haven't had a chance to evolve, they often lack defenses. They cannot compete against the exotic species.

The rich diversity across the world exists only because of barriers. The main barriers are seas and oceans. These barriers could never be crossed by natural means. But since humans invented ships and airplanes, it is now possible for species to meet. There is no time for them to adapt, but humans continue to combine species from different regions. The world's ecosystems will soon be dominated by very few, aggressive super-species.

In order to reverse these problems, people need to minimize their consumption. They need to consume less beef and other products that require damage to the natural environment. Also, governments need to impose strict rules against destroying natural land and introducing exotic species.

General Comprehension

1. According to the passage, which of the following is true about most extinctions in the last thousand years?

(A) They are due to biodiversity.
(B) They are caused by humans.
(C) They may have been caused by predators or parasites.
(D) They are caused by combining species from different regions.

- **decline (n)** a decrease
- **unsustainable (a)** that cannot be maintained for a length of time
- **chop down (v)** to cut down
- **aggressive (a)** threatening or dangerous towards others
- **exotic (a)** foreign; strange

2. **According to paragraph 4, all of the following about exotic species are true EXCEPT:**

(A) They try to established a self-sustaining population when introduced to a new area.
(B) They are a threat to biodiversity.
(C) They assist the local species in finding nutrients.
(D) They may be predators or parasites.

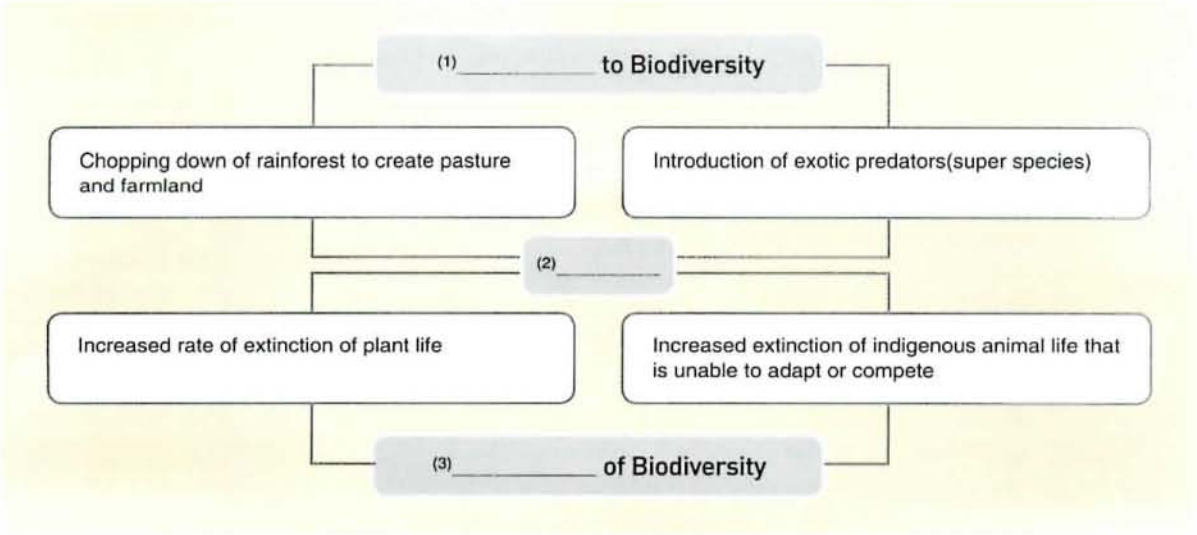
On the TOEFL Test

3. **The word this in the passage refers to**

(A) biodiversity
(B) decline
(C) loss
(D) Earth

4. **The word many in the passage refers to**

(A) studies
(B) plant species
(C) lost plants
(D) new drugs



C Read the following passage, and answer the questions.

Tidal Power Plants

Time Limit: 2 min. 50 sec.

Tidal power is a way of creating electricity. Tidal power systems capture the energy contained in masses of water as the tide moves them. The ecological effects of this method are still being studied, and there are only a few of these power plants in use around the world. But many governments are making plans to build more. Right now, there are eight tidal power plants proposed for America, Mexico, and Canada.

The Rance Tidal Power Plant was the world's first electrical generating station powered by tidal energy. It is located on the Rance River in Bretagne, France. The construction of this plant necessitated draining the surrounding area. Two dams were built over two years.

Construction of the actual plant took place on July 20, 1963. At this time, the Rance was entirely blocked by the two dams. The plant was completed in 1966. On December 4, 1967, it was connected to the French national power grid. The plant cost about 524 million Euros to build. It produces 3% of the power consumed by Bretagne. The project had very high costs, but these costs have been recovered. The power from this plant is cheaper than the cost of nuclear power.

The plant's barrage has caused progressive silting of the Rance ecosystem. Sand-eels and plaice have disappeared. But sea bass and cuttlefish have returned to the river. Tides still flow in the estuary. The operators of the plant are still trying to minimize the biological impact.

The first and only tidal power plant in North America is the Annapolis Royal Generating Station. It is located in Annapolis Royal in Canada. It was originally constructed in 1984 to look at alternative methods for generating electricity. However, it has also created changes to the local environment. The water and air temperature in the area have changed. Moreover, the siltation patterns of the river have shifted, and the riverbanks on both sides of the dam have increased.

General Comprehension

1. According to the passage, which of the following is true about the Rance Tidal Power Plant?

(A) It is the first and only tidal power plant in North America.
(B) This project had very low costs.
(C) It produces 3% of the power consumed by Bretagne.
(D) Its costs have never been recovered.

2. According to paragraph 4, all of the following are true of the environmental effects of the Rance Tidal Power Plant EXCEPT:

(A) The plant's barrage has caused progressive draining of the Rance ecosystem.
(B) Sand eels and plaice cannot be found anymore.
(C) The estuary still experiences tidal flow.
(D) Plant operators try to lessen the biological impact.

- **contain (v)** to hold something within something else
- **necessitate (v)** to create a need
- **barrage (n)** repeated hits on something
- **estuary (n)** a place where freshwater and saltwater mix
- **minimize (v)** to shrink; to make smaller
- **generate (v)** to produce; to create

On the TOEFL Test

3. The word them in the passage refers to

(A) tidal power systems
(B) masses of water
(C) ecological effects
(D) governments

4. The word it in the passage refers to

(A) North America
(B) Annapolis Royal Generating Station
(C) electricity
(D) local environment

Tidal Power Plants

- create (1)_____
- cheaper/safer/cleaner than (2)_____
- (3)_____ (the world's first power plant)
- only 1 tidal power plant in North America
  (Annapolis Royal Generating Station in Annapolis, Royal, Canada)

D Read the following passage, and answer the questions.

The Komodo Dragon

Time Limit: 3 min.

The Komodo dragon is the largest living lizard in the world. It grows to an average length of 2 to 3 meters. In the wild, adults tend to weigh about 70 kilograms. It is a member of the monitor lizard family.

Komodo dragons inhabit various islands in Indonesia. Sightings of them were first reported to Europeans in 1910. Widespread knowledge came after 1912 in which Peter Ouwens, the director of the zoological museum at Bogor, Java, published a paper on the topic. In 1980, Komodo National Park was funded to help protect their population.

Komodo dragons are carnivorous. Although they like the flesh of dead animals, they hunt live prey. They begin with a stealthy approach. Then they launch into a short, sudden charge. During this time, they can run briefly at speeds of up to 20 kilometers per hour.

The Komodo dragon is not considered venomous, but its teeth are home to over 50 strains of bacteria. If the initial bite does not kill its prey, deadly infections will kill the creature in a week. Then the Komodo dragon finds its victim. It follows the smell and feeds upon the dead flesh.

The dragon also has large claws that are used when it is younger. It uses these to climb trees to escape from the jaws of older dragons. But when they get older, these claws are used mainly as weapons.

The Komodo dragon's prey is wide-ranging. They include wild pigs, goats, deer, and water buffaloes. In the wild, it has also been observed to eat smaller dragons. Occasionally, it has eaten humans and human corpses. Over a dozen human deaths have been attributed to dragon bites in the last 100 years.

The Komodo dragon is a vulnerable species. There are approximately 6,000 living Komodo dragons. Mating occurs between May and August, with the eggs laid in September. The female lays her eggs in the ground or in tree hollows. This gives some protection. Clutches usually contain an average of 20 eggs. Once born, they take about five years to mature. They can live for up to 30 years.

General Comprehension

1. **According to the paragraph, which of the following is true about Komodo Dragons?**

   (A) They tend to weigh 12 kilograms.
   (B) They only eat humans.
   (C) They are members of the monitor lizard family.
   (D) They can live for up to 100 years.

- **inhabit (v)** to live somewhere
- **carnivorous (a)** meat-eating
- **prey (n)** a living thing that is killed to feed another living thing
- **stealthy (a)** secretive
- **charge (n)** attack

2. **According to paragraph 4, all of the following are true of the Komodo Dragon EXCEPT:**

(A) Over 50 strains of bacteria live in its teeth.
(B) It will not eat rotten flesh.
(C) It follows the scent of rotting flesh to find its victim.
(D) A victim of its bite will die from infections within a week.

On the TOEFL Test

3. **The word them in the passage refers to**

(A) Komodo dragons
(B) islands
(C) Europeans
(D) Komodo National Park

4. **The word these in the passage refers to**

(A) claws
(B) trees
(C) jaws
(D) weapons

The Komodo Dragon

- (1)_____ in the world – 2 to 3 meters long
- A member of the monitor lizard family
- Inhabits (2)_____
- First sighted by Europeans in 1910
- Teeth hold over 50 strains of bacteria
- Eats wild pigs, goats, deer, water buffaloes, and humans
- (3)_____ Komodo dragons currently living

E Read the following passage, and answer the questions.

Nanotechnology

Time Limit: 2 min. 40 sec.

Nanotechnology is a new field of applied science. It is an effort to create very tiny machines on a nano scale. A nano is a unit of measurement which stands for ten to the negative power of nine. It is used to describe very small things.

One example of nanotechnology in modern use is the making of polymers. These are based on molecular structure. Another is the design of computer chip layouts. These are based on surface science.

At the nano-size level, the properties of many materials change. For example, copper changes from opaque to clear. Solid gold becomes liquid at room temperature. Insulators like silicon become conductors. All of these activities open up many potential risks.

Due to their altered states, nano particles become more mobile. They are also more likely to react with other things. There are four ways for nano particles to enter the human body. They can be inhaled, swallowed, absorbed through the skin, or injected. Once these particles are in the body, they are highly mobile.

In fact, the way these particles react inside living things is still not fully understood. But scientists guess that these tiny objects could easily overload defensive cells. This would weaken a body's defenses against diseases. Humans could easily lose control of particles this size. This would lead to mass epidemics that would cause widespread disease and death.

Another concern about nanotechnology is of the environmental risks. One report details the possible disaster of the Earth being covered in a gray, sticky substance. This terrible event is attributed to the unrestrained self-replication of microscopic robots. These robots are called nanobots and are able to control themselves.

Therefore, scientists need to collect much more data before they are allowed to create and release nanobots. They should be highly regulated by laws that only allow licensed scientists to do safe experiments.

apply (v)
to use something

regulate (v)
to control something using laws

opaque (a)
that cannot be seen through

inhale (v)
to breathe in

epidemic (n)
a wave of sickness that sweeps over a group of people

General Comprehension

1. According to the passage, a modern use of nanotechnology is

(A) for the construction of microscopic robots
(B) for creating gray, sticky substances
(C) in the making of polymers
(D) to create environmental weapons

2. According to paragraph 1 which of the following is NOT true about nanotechnology?

(A) Its name describes things that are very small.
(B) It describes the effort to make machines on a tiny scale.
(C) Its name describes the measurement of ten to the negative power of nine.
(D) It is an old field of theoretical science.

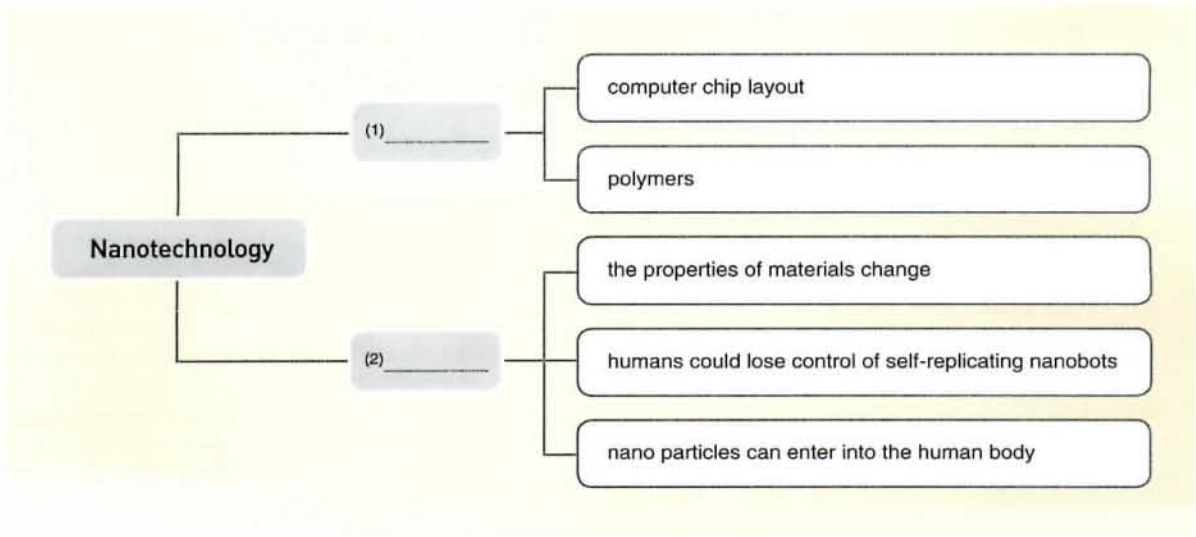
On the TOEFL Test

3. The word another in the passage refers to

(A) example
(B) nanotech
(C) molecular structure
(D) surface structure

4. The word they in the passage refers to

(A) scientists
(B) data
(C) nanobots
(D) experiments



F Read the following passage, and answer the questions.

The Dust Bowl

Time Limit: 2 min. 30 sec.

The Dust Bowl was a series of dust storms in the central United States and Canada. These took place in the mid to late 1930s. They were caused by massive droughts and decades of inappropriate farming techniques. The fertile soil of the Great Plains was exposed through the removal of grass during plowing.

During the droughts the soil dried out, became dust, and blew away. The wind blew the dust east in very large black clouds. The clouds made the sky appear black all the way to Chicago. Eventually the soil was lost when it blew out to the Atlantic Ocean.

The Dust Bowl began in 1934 and lasted until 1939. On November 11, 1933, a very strong dust storm stripped topsoil from parched South Dakota farmlands. It was just one of a series of terrible dust storms that year.

Then, on May 11, 1934, a strong, two-day storm removed massive amounts of Great Plains topsoil in one of the worst storms of the Dust Bowl. Once again, the dust clouds blew all the way to Chicago, where the filth fell like snow.

April 14, 1935, is known as Black Sunday. One of the worst "black blizzards" occurred throughout the Dust Bowl. It caused extensive damage and turned the day to night. Witnesses reported that they could not see five feet in front of them at certain points.

Topsoil across millions of acres was blown away because the indigenous sod had been broken for wheat farming. Vast herds of buffalo were no longer fertilizing the rest of the indigenous grasses. This ecological disaster caused an exodus from Texas, Arkansas, Oklahoma, and the surrounding Great Plains. Over 500,000 Americans became homeless. Many of these homeless people migrated west looking for work. These people were called "Okies" even when they were not from Oklahoma.

General Comprehension

1. According to the passage, which of the following is true about the Dust Bowl?

(A) It began in 1934 and lasted until 1939.
(B) These terrible dust storms were caused by tidal waves.
(C) The worst dust storm occurred on April 1, 1930.
(D) It caused many homeless farmers to migrate east looking for work.

2. According to paragraph 6, all of the following are true about the Dust Bowl EXCEPT:

(A) The indigenous grasses were no longer fertilized by vast herds of buffalo.
(B) Wheat farmers had broken the indigenous sod.
(C) Topsoil across hundreds of islands was blown away.
(D) Many desperate farmers left their lands in Texas, Arkansas, and Oklahoma.

- **inappropriate (a)** unsuitable; improper
- **plow (v)** to break through the top layer of soil and mix it before planting
- **soil (n)** dirt; dust; earth
- **blizzard (n)** a terrible snowstorm with strong winds
- **extensive (a)** broad; far-reaching; large-scale
- **indigenous (a)** that is born or comes from a certain place

On the TOEFL Test

3. The word it in the passage refers to

(A) drought
(B) dust
(C) wind
(D) soil

4. The phrase that year in the passage refers to

(A) 1933
(B) 1934
(C) 1935
(D) 1939

Important Dates of the Dust Bowl of the 1930s

- (1)_____ – A very strong dust storm strips topsoil from South Dakota farmlands
- (2)_____ – A strong 7-day storm removes massive amounts of Great Plains topsoil
- (3)_____ – Black Sunday → one of the worst "black blizzards" occurs
- Results – By 1939, more than 500,000 Americans are homeless

Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. El Nino and La Nina

South America and Africa	drought, flooding, and forest fires	irregularly
migratory patterns	temperature changes	

El Nino and La Nina are major (1)_____ that affect a large portion of the world's climate. The economies of many nations in (2)_____ are strongly affected by these climate changes. El Nino and La Nina occur (3)_____ and can cause some damaging effects such as (4)_____. These changes also affect the (5)_____ of fish, which affects the fishing industry. Scientists do not fully understand El Nino and La Nina yet, but they are studying them very closely.

2. The Decline of Biodiversity

living things	unsustainable environmental practices	biodiversity
rain forests	foreign species	

(1)_____, which describes the range of (2)_____, has been declining rapidly over the past century. Many species of plants are becoming extinct because of (3)_____. Humans are the biggest cause of these environmental problems, mainly because they chop down so much of the (4)_____. Another threat to biodiversity is the introduction of (5)_____, which overtake local species. Humans need to take strong steps to stop the decline of biodiversity.

3. Tidal Power Plants

local ecosystem	moving water	time and money
Annapolis Royal	generating electricity	

Tidal power plants are a method of (1)_____ through the power of (2)_____ and are gaining popularity around the world. The Rance Tidal Power Plant in France is the world's first power plant that uses this method. The construction of the Rance Tidal Power Plant took a lot of (3)_____, but it has generated enough power to cover its costs. Tidal power plants affect the (4)_____, and scientists are still studying how. The first and only tidal power plant in North America is in (5)_____ in Canada.

4. The Komodo Dragon

their own species	infects the prey	largest living lizards
population	the islands of Indonesia	

Komodo dragons are the (1)_____ in the world today. They live on (2)_____. They eat meat, which they kill by a bite that (3)_____ and kills it over a period of days. Komodo dragons eat a wide range of other animals, including (4)_____. Today, the (5)_____ of Komodo dragons is not very large.

5. Nanotechnology

human bodies	microscopic machines	nanotechnology
unpredictable	self-replicating nanobots	

(1)_____ is the risky science of building (2)_____. This technology could be very useful, but it is (3)_____ since the properties of many materials change at the microscopic level. Some scientists worry that machines this small could easily enter (4)_____ and cause effects that nobody can predict. Another concern is that (5)_____ could damage the environment on a very large and unexpected scale. Experiments with nanotechnology should be done in a very cautious fashion as regulated by the government.

6. The Dust Bowl

blown away	a series of terrible storms	natural disaster
dusty, infertile ground	America and Canada	

The Dust Bowl was (1)_____ in the 1930s that damaged the farming industries in (2)_____. Farming was damaged because the fertile layer of topsoil was (3)_____ by powerful winds, leaving only (4)_____. Some of these storms were so bad that the sky was turned black and no one could see the sun. Many farmers were made homeless by this (5)_____ and were forced to travel west looking for work.

1. **The word deduced in the passage is closest in meaning to**

   (A) reduced
   (B) inferred
   (C) told
   (D) eliminated

2. **The word them in the passage refers to**

   (A) climate models
   (B) weather data
   (C) current conditions
   (D) supercomputers

3. **According to paragraph 1, which of the following is true of meteorology?**

   (A) It explains the science of outer space bodies such as meteors.
   (B) It explains biological phenomena.
   (C) It explains events that occur in the weather.
   (D) It explains the science of things that fall to Earth such as rain and snow.

4. **According to paragraph 2, all of the following are true EXCEPT:**

   (A) Aristotle was the first to use the term meteorology.
   (B) Aristotle was the first to examine the evaporation process.
   (C) Aristotle could predict the weather up to a week in advance.
   (D) Aristotle saw how the hot sun turned water into mist.

5. **According to the passage, what can be inferred about satellites and weather forecasting?**

   (A) Global weather information was not available before the launch of satellites.
   (B) Satellites enabled scientists to identify the cause of El Nino.
   (C) Satellites are responsible for influencing weather patterns.
   (D) Human methods of weather forecasting have become useless because of satellites.

6. **Why does the author mention a Norwegian scientist in paragraph 6?**

   (A) To explain why the purposes of weather forecasting changed
   (B) To show how modern methods of weather forecasting began
   (C) To describe when scientific concepts began to be used in forecasting
   (D) To claim that weather forecasting should be based on natural laws

Meteorology

Meteorology is the study of the Earth's atmosphere. It focuses on weather processes and forecasting and explaining weather events. These events are bound by the factors that exist in the atmosphere, such as temperature, air pressure, and water vapor. These factors interact to create climate patterns.

The term *meteorology* was first coined by Aristotle in 350 B.C. He was the first to observe and record the process by which water evaporates. He noticed how the hot sun turned it into mist and then the cool air returned it to Earth on the following day.

In 1607, Galileo made the first tool to measure temperature. A few years later, his assistant made the first barometer. By 1648, Pascal saw that air pressure falls with height. He also guessed that there is a vacuum above the atmosphere.

In 1667, Robert Hooke built a tool to measure the speed of wind. Later, Edmund Haley mapped the trade winds for sailors. He also deduced that changes in the atmosphere are driven by solar heat.

By the 20th century, science began to understand many important weather events. Perhaps the most important concept was how the rotation of the Earth affects the flow of air. This large-scale force was named the Coriolis Effect.

In 1904, a Norwegian scientist said that it was possible to predict the weather by means of calculations based on natural laws. This led to the field of modern weather forecasting.

By the 1950s, forecasters began using computers. These early machines helped them to do experiments. The first forecasts were produced using models of low and high temperatures.

After about a decade, the first weather satellite was launched. This event led to the age of global weather information. Satellites became important tools for studying everything from forest fires to El Nino. They gave scientists a large-scale view of the planet.

These days, climate models are used to compare weather data from past years. The historical data is cross-referenced with current conditions. This gives scientists data to study long-term climate shifts. Effects such as global warming are now better understood. Currently, powerful new supercomputers are being used. With them it is possible to create working models of the atmosphere.

Many human methods of weather forecasting are also employed. These methods rely on the skill and judgment of the forecasters who used them. Many of the methods allow us an accuracy rate of more than 50%.

In this age of weather forecasting, many people depend on information about the weather. It increases the successful production of food. It also saves lives when natural disasters strike. Mankind's ability to predict the weather has reached new levels of unprecedented accuracy.

7. **The phrase fend for in the passage is closest in meaning to**

(A) take care of
(B) move
(C) feed
(D) look for

8. **According to the passage, which of the following is NOT true of chipmunks?**

(A) The chipmunk breeds during two seasons every year.
(B) The average number of offspring is six.
(C) Chipmunk mothers hide their young underground.
(D) Chipmunks have various kinds of natural predators.

9. **Which of the following can be inferred about chipmunks?**

(A) They cannot fight against their predators.
(B) They grow their own food.
(C) They use the homes of other animals.
(D) They cannot climb trees.

10. **Why does the author mention the chipmunk's cheeks?**

(A) To show that the chipmunk uses them to defend itself
(B) To explain that they help the chipmunk carry and store food
(C) To show that they are extremely large
(D) To describe the chipmunk's ability to fly

11. **In stating that chipmunks are traditionally hoarders, the author means that chipmunks**

(A) can run extremely fast to escape predators
(B) can fly using their cheek muscles
(C) have twelve breeding sessions per year
(D) store food in order to survive during the long winter months

12. **The word they in the passage refers to**

(A) seeds
(B) animals
(C) chipmunks
(D) habitat

Chipmunks

The Earth is covered with millions of species of animals, and each is responsible for filling an important niche in the delicate ecosystem of the planet. The chipmunk, although small in size, is no less vital to the health of a habitat. Chipmunks are small rodents that inhabit the forests of North America and Asia. There are twenty-five different species of chipmunks. Many of them are marked by their reddish-brown fur with white and black stripes that cover the length of their bodies.

Unlike many of its rodent relatives, the chipmunk has two breeding seasons a year. The first spans from February to April, and the second from June to August. The average number of offspring for a chipmunk is four, but there have been litters as small as one and as big as nine. Mothers keep their young hidden underground in their homes for up to six weeks until they are old enough to fend for themselves. Some of their natural predators include cats, dogs, eagles, hawks, foxes, coyotes, and wolves. In the wild, a chipmunk's lifespan is typically only a year, but some have been known to live up to five years.

Although mating season is an exception, chipmunks spend most of their time alone building their homes, looking for food, and hiding from predators. They are often found climbing in trees looking for food.

Chipmunks are traditionally hoarders. They spend the spring and summer stocking their burrows with nuts, seeds, insects, berries, and other foods in order to hibernate during the long winter without starving. Other sources of food include fungi, bird's eggs, grain, and worms.

One of the most remarkable features of chipmunks is their cheeks. Chipmunks have special pouches on both sides of their head that can be stretched and filled with food. Once completely filled, each cheek can become as large as the chipmunk's head. This ability allows chipmunks to carry a large amount of food to and from their burrow with ease.

Chipmunks, like other small rodents, are known as "spreaders." They are responsible for the spreading of seed, fungi, and other types of vegetation. Often times, a few pieces of food that the chipmunk brings to the burrow get left behind or dropped along their way. This seed begins to grow, in turn providing more food and shelter for other animals in the habitat.

Whether they are spreading seeds or they become the prey of other animals, chipmunks are an important part of any habitat. They are very much a part of the ever-evolving cycle present in nature.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. The sign indicates the correct direction to the store.
   (A) looks (B) shows (C) says (D) needs

2. The impact of the tidal wave on the coastal people was terrible.
   (A) time (B) cost (C) effect (D) use

3. The decline of the African elephant can be linked to poaching.
   (A) decrease (B) change (C) growth (D) limitation

4. Because of his hard work, he was able to recover his losses from the accident.
   (A) find (B) sell (C) take back (D) escape

5. This dinosaur was known to be carnivorous.
   (A) vegetative (B) nocturnal (C) tardy (D) flesh-eating

6. His approach was so stealthy that no one noticed him coming.
   (A) fast (B) secretive (C) expected (D) noisy

7. He is applying everything he learned in photography class at his new job.
   (A) using (B) needing (C) saying (D) wanting

8. If you look at the watch, you can tell it is exotic.
   (A) sharp (B) normal (C) original (D) unusual

B Match each word with the correct definition.

1. upswell	•	• **a.** to cut down
2. soil	•	• **b.** to break through the top layer of soil and mix it before planting
3. phenomenon	•	• **c.** a wave of sickness that sweeps over a group of people
4. plow	•	• **d.** the forceful movement of water rushing up towards the surface
5. chop down	•	• **e.** a natural occurrence that requires a scientific explanation
6. epidemic	•	• **f.** to control something using laws
7. barrage	•	• **g.** a living thing that is killed to feed another living thing
8. regulate	•	• **h.** to create a need
9. necessitate	•	• **i.** a nutrient-rich layer of dirt for planting
10. prey	•	• **j.** repeated hits on something

Unit 3

Factual Information

Unit 3

Factual Information

Overview

■ Introduction

Factual Information questions ask you to identify facts, details, or other information that is explicitly mentioned in the passage. The information is often found in just one or two paragraphs of the passage. So you can find the correct answer without even reading the whole passage. You just need to quickly find the right spot in the passage that has the information about which the question asks. This is one of the most frequent question types on the TOEFL® iBT.

■ Question Types

1. According to the passage, which of the following is true of _____?

2. According to paragraph X, who [when/ where/ what/ how/ why] _____?

3. According to the passage, X did Y because _____?

4. The author's description of X mentions which of the following?

■ Useful Tips

- Read the questions first to know what exactly is being asked.
- Scan the passage to find out where the relevant information is in the passage.
- Remove the choices that are not relevant to the passage.
- Do not choose an answer just because it is mentioned in the passage.

Sample iBT Question

According to the passage, what are ballet dancers famous for?

(A) Their dancing, miming acting, and music
(B) Their clothes and shoes
(C) Their elegant movements
(D) Their balancing skills

Ballet

Ballet is an art form that makes use of dancing, miming, acting, and music. It can be performed alone or with an opera. Ballet dancers are famous for their gracefulness. They are also known for amazing feats of physical strength. Many ballet techniques resemble positions and footwork used in fencing. Both ballet and fencing have similar requirements of balance and movement. Also, both of these forms developed during the same historical period. Ballet became popular in the royal courts of Italy and France during the Renaissance. For the past four hundred years, this dance form has been refined, most notably by Russian dance companies that travel and perform. Today, ballet is one of the most well-preserved dances in the world.

Correct Answer The question asks what is famous about ballet dancers. The third sentence of the passage says that they are famous for their gracefulness. So the correct answer is (C) because 'elegant movement' is a paraphrase of 'gracefulness.'

Skill & Drill

The key to success in Factual Information questions is the ability to scan for correct information in the passage. You need to practice reading the questions first and spot the relevant information in the passage quickly. You do not have to read every part of the passage.

Read the questions first. Use the key words highlighted in each question to scan for the answer in the passage.

Opinions

An opinion is a thought or idea held about something that is important to the holder. It is not a fact, so it cannot be proven correct or incorrect. But in the case of the United States Supreme Court, the word "opinion" has a different meaning. For the court, an opinion is a decision. It establishes the way a law will be followed in the future. The court gave an opinion in the 1971 case of *Roe vs. Wade*. It was in favor of abortion being legal. This made it possible for pregnant women in the United States to have an abortion. It is an example of an opinion that has caused controversy. This has continued for many years after it was issued.

1. **According to the passage, what does a court's opinion establish?**

   (A) Thoughts or ideas about a particular event
   (B) Controversy over important issues
   (C) Future interpretations of the law
   (D) Facts about legal matters

Quilting

Quilts were traditionally used to cover beds as warm, top blankets. But these days, many quilts are treated as works of art and are hung on walls to be displayed. In colonial times, most women spent their time weaving and making clothing. But wealthy women were able to spend their time making fine quilts. These women formed groups called quilting bees. Quilts are often sewn to commemorate important events such as a wedding or a birth. Quilters sew important dates or names into a quilt using a needlepoint technique. They also incorporate pieces of a person's clothing or an important flag in the quilt to create a historical document.

2. **According to the passage, why do people often sew quilts?**

   (A) To remind people of historic events
   (B) To make flags that people can enjoy and use to represent them
   (C) To make lots of money for use by the federal government in wars
   (D) To make them displayed in cultural exhibits

The History of Medicine

In 1960, the earliest proof of medicine was found buried with a prehistoric man. With him were eight kinds of plants. All of these are still used for their healing benefits today. In cultures around the world, medicine has developed differently. In traditional Chinese medicine, doctors heal by changing the flow of energy through the body. In India, doctors heal by trying to restore harmony between the mind, the body, and the soul. Western medicine first developed in Europe. Doctors focus mainly on diet and hygiene as a way to restore health. Now, as technology grows and the world becomes smaller, doctors are using the best parts of medicine from all over the world.

3. According to the passage, what are doctors doing with medicine from all over the world?

(A) They bury it with prehistoric men in order to create historical records.
(B) They develop it in European clinics.
(C) They use it to heal the mind, body, and soul of wounded people.
(D) They combine and use the most effective parts.

Print Journalism

Print journalism can be split into several categories. They are newspapers, news magazines, and general interest magazines. There are also trade and hobby magazines. Finally, there are newsletters, private publications, online news pages, and blogs.

Newspaper journalists use the inverted pyramid style. This style is used for straight or hard news reports rather than features. Written hard news reports are expected to be spare in the use of words, and to list all of the important information first. The story can be cut from the bottom when there is not enough space for it. Feature stories are written in a looser style.

4. According to the passage, what is the characteristic of written hard news reports?

(A) They are long and wordy.
(B) They do not use many words.
(C) They deal with as few facts as possible.
(D) They are printed in a magazine.

Practice with Long Passages

A Read the following passage, and answer the questions.

Optical Fiber

Time Limit: 2 min. 30 sec.

Optical fibers are thin and transparent fibers made of glass or plastic. They are used for sending light signals. The signals can carry information or light. Optical fibers are commonly used in communication systems.

The study of optical fibers and their uses is called fiber optics. Optical fibers transmit light because of a scientific principle called total internal reflection. According to the principle, light continues to bounce through an optical fiber when the outer layer of the fiber is thicker than in the center.

The history of fiber optics began in England during the Victorian period. At that time, scientists used the total internal reflection principle to light streams of water in public fountains. In the middle of the 20th century, fiber optics was used by doctors. They created a tool called the gastroscope. This tool allowed doctors to see into a patient's stomach and intestines. By 1977, telephone companies began to use fiber optic cables. They used them to send telephone signals very long distances.

In the past, copper cable was used to send electric signals. But the optical fiber has become more popular because it offers several advantages over copper cable. Optical fibers can send signals very long distances with low loss. It is also much lighter than copper. Just 7 kilograms of optical fibers can replace 20 tons of copper cable. This is very useful for aircraft.

The only disadvantages of optical fibers are in short distances. In small amounts, optical fibers can be more expensive than copper cable. It is also harder to splice and cannot send power along with a signal.

In this age of computers, there is an increased need for bandwidth. Optical fibers can send huge amounts of data over long distances. The science of fiber optics is more useful than ever.

General Comprehension

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

(A) send
(B) control
(C) trap
(D) save

2. The word them in the passage refers to

(A) telephone companies
(B) fiber optic cables
(C) telephone signals
(D) very long distances

- **transparent (a)** clear and easy to see through
- **internal (a)** inside
- **bounce (v)** to rebound off of something
- **intestine (n)** the tubes in a human body that process food and carry waste out of body
- **splice (v)** to connect two cables

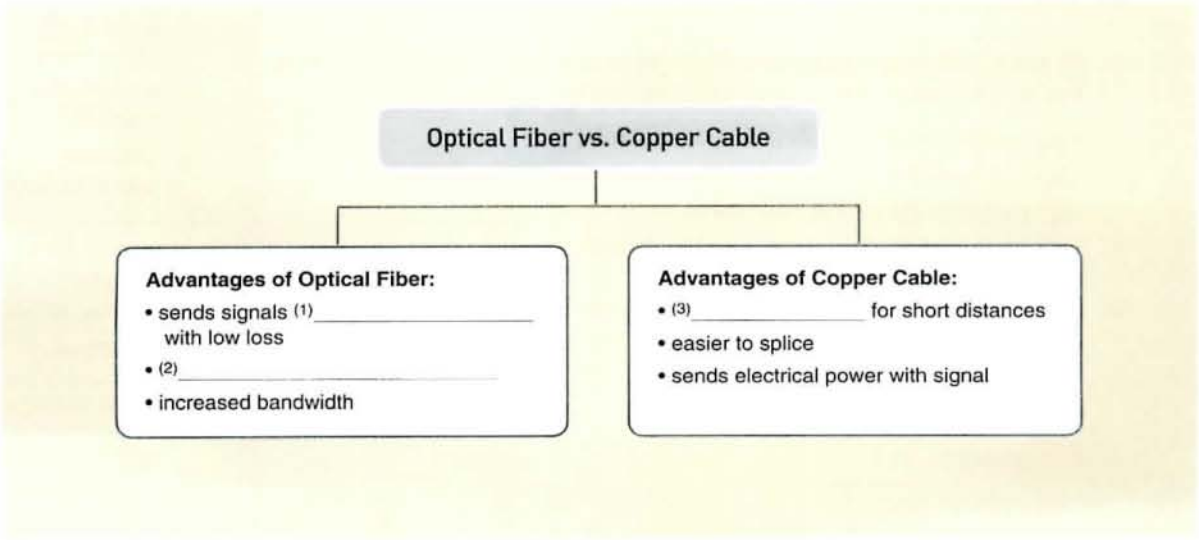
On the TOEFL Test

3. The author's description of total internal reflection mentions which of the following?

(A) the explosion of light
(B) a vacuum of light
(C) the continuous bouncing of light
(D) the absence of light

4. According to the passage, copper cable was used in the past to

(A) make optical fibers
(B) send light through streams of water
(C) see into patients' stomachs
(D) send electric signals



B Read the following passage, and answer the questions.

The American Revolution

Time Limit: 2 min. 30 sec.

The American Revolution ended British rule over America. The result was the formation of the United States in 1776.

The American Revolution began with a shift in ideology. The Americans were unhappy with the British monarchy. Founding fathers such as Thomas Jefferson and Samuel Adams led the new way of thinking. People from all classes wanted to have a voice in the government. Corruption was seen as the greatest evil. Civic virtue was seen as the greatest good. Family status no longer decided a person's place in society.

The unrest that led to the Revolutionary War can be linked to three events. First, in 1765, the British Parliament passed the Stamp Act. This tax on all paper goods was passed to pay for more British troops in America. The colonists complained because they were already being taxed to pay for troops to put them down. This led to more protests and disobedience. The Stamp Act was repealed.

The second wave came in 1767. Parliament passed the Townshend Acts. These acts taxed goods such as glass, paint, and paper. Colonists organized boycotts of these products. More British troops arrived in Boston, and violence broke out. British soldiers fired their guns into an angry mob. They killed five colonists. This was called the Boston Massacre.

The third event leading to the revolution took place in 1773. Although the British government repealed the Townshend Acts, it left behind one tax on tea. A group of angry Bostonians boarded a British ship. They dumped all of its tea into the harbor. This event was called the Boston Tea Party.

The British government and the American colonists could not repair their relationship. By 1775, fighting broke out in Lexington. In 1776, the American Declaration of Independence was passed. By 1781, the fighting ended. The British withdrew from America.

General Comprehension

1. In stating that people from all classes wanted to have a voice in the government, the author means that they wanted to

(A) speak out in favor of the government
(B) overturn the government
(C) participate in the government
(D) be united in opinion about the government

2. The word them in the passage refers to

(A) paper goods
(B) colonists
(C) troops
(D) protests

- **ideology (n)** way of thinking
- **corruption (n)** dishonesty
- **unrest (n)** dissatisfaction; protest
- **repeal (v)** to cancel a law
- **board (v)** to get on; to embark
- **boycott (n)** an organized effort by a group of people not to buy something as a means of complaining
- **massacre (n)** slaughter; holocaust

On the TOEFL Test

3. According to the passage, which of the following is true of the American Revolution?

(A) It helped the British gain more land.
(B) It freed America from British rule.
(C) It was a minor war.
(D) It was triggered by the British government's corruption.

4. According to paragraph 5, why did the American colonists bring about the Boston Tea Party?

(A) They were angry about the British tax on tea.
(B) They did not want the Townshend Acts.
(C) They wanted to fight the British.
(D) They wanted to go back to Britain.

Events Leading to the American Revolution

1765: • Stamp Act
• colonists complain, protest, and disobey
• Stamp Act repealed

1767: • Townshend Acts
• colonists organize boycott
• (1) _____

1773: • tax on tea remains
• (2) _____

1775: • fighting breaks out

1776: • (3) _____ is published

C Read the following passage, and answer the questions.

American Newspapers in the 19th Century

Time Limit: 2 min. 50 sec.

In 1844, the telegraph became widely used. Now newspapers could get reports from far away. A wire service called the Associated Press (AP) was started to gather news. With fresh daily news reports, local newspapers began all around the country. But New York City was the center of the newspaper industry.

Newspapers around the nation entered an age of growth. This lasted until the Civil War broke out in 1961. During this time, newspapers improved. Methods of printing and delivery were perfected, and writing and reporting became clearer and fresher. Editors such as Samuel Bowles and Horace Greeley made editorials popular again. At that time, editorials had fallen into disfavor. Most people felt they were just tools for the propaganda of political parties. Through his editorials, Greeley became a leading voice against slavery.

In 1851, Henry J. Raymond began the *New York Times*. This paper greatly improved upon the other newspapers. People thought that Greeley's *New York Tribune* was too political. On the opposite end, James G. Bennett's *New York Herald* was only concerned with looking nice and selling more copies. But the *New York Times* had both journalistic integrity and visual appeal. It reached a new height of excellence. The *New York Times* became the most respected newspaper in the country. It still is today.

By 1895, two men ruled media empires. Both Joseph Pulitzer and William Randolph Hearst owned newspapers in cities around the country. In New York, Pulitzer's *New York World* and Hearst's *New York Journal* battled to win readers. They were both accused of focusing on crime stories and deaths. People felt they were exaggerating headlines. They only wanted to attract the curiosity of readers. This practice was termed "yellow journalism." It was called "yellow" for two reasons. One reason was that both papers published a cartoon about the same popular character named the Yellow Kid. The other reason is that yellow was the color used to describe anything cowardly and dishonest. Many people think this problem still takes place in journalism today.

General Comprehension

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

(A) authority
(B) preciseness
(C) morality
(D) swiftness

2. The word they in the passage refers to

(A) newspapers
(B) methods of printing
(C) editors
(D) editorials

- **editorial (n)** a written opinion published in a newspaper
- **disfavor (n)** dislike; disapproval
- **propaganda (n)** material that promotes the views of one group
- **integrity (n)** honesty; uprightness

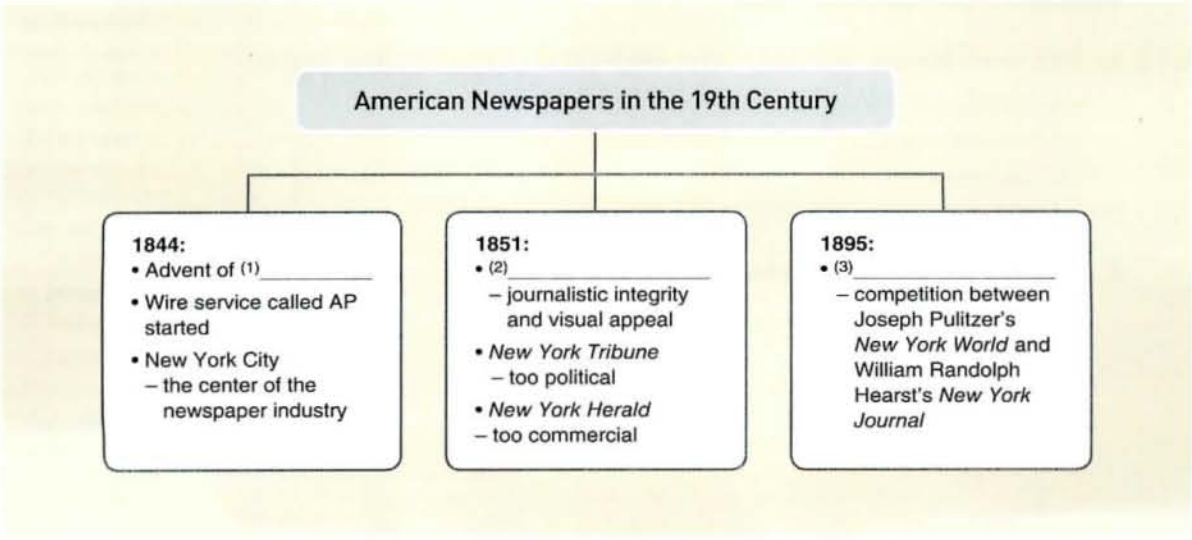
On the TOEFL Test

3. According to paragraph 1, newspapers were able to get reports from far away because

(A) they had long-distance reporters
(B) the telegraph was used to send information
(C) New York City started a wire service
(D) lots of local newspapers began throughout the country

4. According to paragraph 4, why was the practice of exaggerating headlines to win readers called "yellow journalism"?

(A) The color yellow described actions thought to be cowardly.
(B) Yellow was the color that stood for both the *New York World* and *New York Journal*.
(C) People liked a cartoon character called the Yellow Kid.
(D) The newspapers were printed on yellow paper.



D Read the following passage, and answer the questions.

The Statue of Liberty and the Liberty Bell

Time Limit: 2 min. 50 sec.

In America, two monuments symbolize the ideal of freedom that the country holds dear. The Statue of Liberty and the Liberty Bell represent freedom in different ways. The Statue of Liberty brings about feelings of hope for freedom to immigrants who enter the USA. The Liberty Bell commemorates the struggle for freedom that marks America's past.

In the past, the Statue of Liberty was the first thing people saw when their boats approached America. The statue stands over 45 meters tall. It was given as a gift to the United States in 1885 by France. The date was chosen to mark the centennial of the establishment of the United States.

The sculpture is made of copper. The internal structure was designed by Gustave Eiffel, who also designed the famous tower bearing his name in Paris. The statue is located on Liberty Island in New York Harbor. In her right hand Lady Liberty holds a torch. It is meant to light the way of freedom across the land. In her left hand she holds a tablet with the date 1776 inscribed on it. This is to commemorate the year America declared its independence from Great Britain. It is possible to go inside the statue. Many people enjoy climbing the stairs to enter her head and torch.

The Liberty Bell is located in Philadelphia, Pennsylvania, and is most famous for being rung on July 8, 1776. It was rung to summon citizens for the first public reading of the Declaration of Independence. It was also rung in 1774 to announce the opening of the First Continental Congress. Inside the bell is cast an inscription from the Bible's Leviticus 25:10. This passage states, "Proclaim liberty throughout all the land unto all the inhabitants thereof." The Liberty Bell was originally cast in 1752. It got its famous crack in 1753 the first time it was rung.

In 1965, the FBI uncovered a plot by terrorists to destroy the Statue of Liberty and the Liberty Bell. But these attacks on the symbols of freedom were quickly stopped.

General Comprehension

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

(A) celebrates
(B) commences
(C) destroys
(D) claims

2. The word her in the passage refers to

(A) the Liberty Bell
(B) the famous tower
(C) the statue
(D) America

- **monument (n)** an object meant to symbolize an important event or concept
- **immigrant (n)** a person who moves from one country to another
- **commemorate (v)** to celebrate
- **struggle (n)** fight; conflict
- **centennial (n)** a 100-year birthday
- **sculpture (n)** a structure that represents the image of something

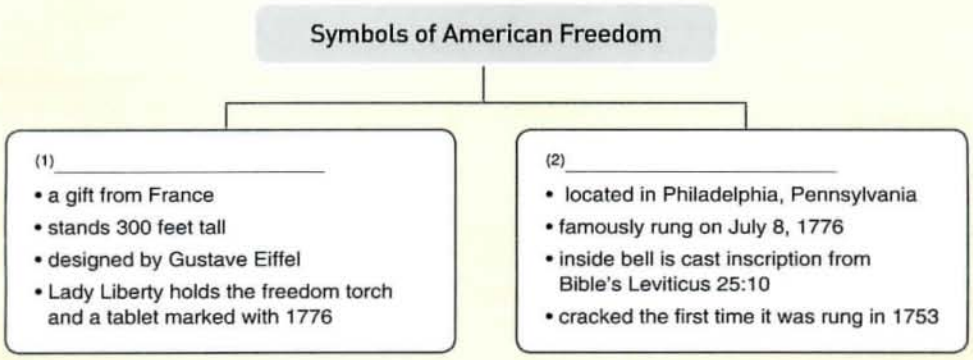
On the TOEFL Test

3. According to the passage, why did France give the Statue of Liberty to the United States?

(A) To pay off a debt
(B) To build up the friendship between both countries
(C) To make New York Harbor look nicer
(D) To celebrate the hundred-year birthday of America

4. According to paragraph 4, the Liberty Bell is most famous for being rung when?

(A) On July 4, 1776
(B) On July 8, 1776
(C) On December 25, 1776
(D) On January 1, 1776



E Read the following passage, and answer the questions.

Acid Rain

Time Limit: 2 min. 50 sec.

Acid rain occurs when sulfur and nitrogen gases are released into the air. Once in the air, the chemicals are absorbed by rain clouds. The polluted water droplets fall to Earth as rain, snow, or sleet. This increases the acidity of the soil. It also affects the chemical balance of lakes and streams.

The United States Environmental Protection Agency says that acid rain is a serious problem which affects large parts of the U.S. and Canada. It damages rivers, streams, lakes, and forests.

The best way to show the increase in acid rain is to check glacial ice. Scientists can see the drastic increase of acid levels. These changes have been occurring since the Industrial Revolution.

This industrial acid rain is also a large problem in China, Eastern Europe, and Russia. Areas downwind from these places, such as Korea and Japan, suffer the negative effects.

Acid rain was first reported in Manchester, England. This was an important city during the British Industrial Revolution. But the acid rain problem was not studied closely until the late 1960s. A Canadian scientist named Harold Harvey was the first to research a "dead" lake. In the 1990s the *New York Times* published reports about acid rain effects. This brought the problem into public awareness.

Acid rain can be caused by natural occurrences such as the eruption of a volcano. But the main causes of acid rain are from fossil fuel combustion and industry. Factories, motor vehicles, and electricity generation are the leading causes of this problem.

Acid rain kills many forms of animal life, such as birds, fish, and insects. It also damages buildings. It is even suspected to have negative health effects on humans. In addition, acid rain damages soil. This makes it difficult for farmers to grow food.

Scientists are searching for ways to reverse the effects of acid rain. There are some international treaties that hope to reduce this global problem. One such treaty is the Convention on Long Range Transboundary Air Pollution, which is to protect human environment against air pollution.

General Comprehension

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

(A) slight
(B) endless
(C) moderate
(D) radical

2. The phrase this problem in the passage refers to

(A) acid rain
(B) the eruption of a volcano
(C) fossil fuel combustion
(D) industry

- **absorb (v)** to soak up; to take in
- **droplet (n)** the form in which water collects when in motion
- **sleet (n)** icy rain
- **glacial (a)** related to ice or glaciers
- **awareness (n)** alertness; consciousness
- **eruption (n)** explosion; ejection

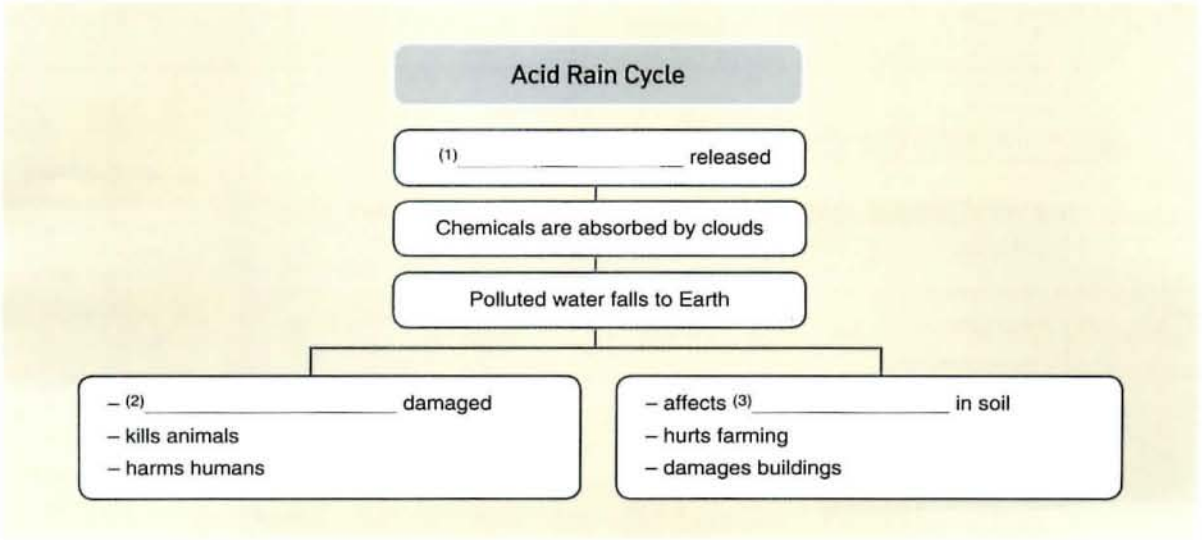
On the TOEFL Test

3. According to paragraph 1, when does acid rain occur?

(A) When the sun is too hot and burns the atmosphere
(B) When sulfur and nitrogen gases escape into the air
(C) When airplanes pollute the atmosphere
(D) When greenhouses release gas into the atmosphere

4. According to the passage, what is the best way to show the increase in acid rain?

(A) Check the floor of the ocean
(B) Test many small animals
(C) Check the ice on a glacier
(D) Check with many scientists



F Read the following passage, and answer the questions.

Vaudeville

Time Limit: 3 min.

Before the age of radio, movies, and television, many people enjoyed variety theater. In America this entertainment theater was called vaudeville. The term *vaudeville* comes from the French "voix de ville." It means "voice of the city." For just five cents, people could be entertained. Popular acts included music, comics, magic, animal acts, acrobatics, and even lectures.

A routine vaudeville show usually began with a silly act, such as acrobats or trick bicyclists. This allowed audience members to arrive late and find their seats. The show peaked in the middle with the "headliner." This act was usually the best in the show. The show would conclude with a "chaser" act. This act was considered good enough to feature but dull enough to make audiences leave the theater.

Between the years 1880 and 1920, vaudeville enjoyed great popularity. Industry was growing in the U.S. People had more money to spend on entertainment. Many theaters tried very hard to appear polite and family-oriented. They wanted to draw in middle-class customers. Performers were not allowed to use bad language. They could not even say the word "hell." But the performers often disobeyed the rules, and this delighted the audiences.

Successful theater owners insisted their theaters appear rich and majestic. The curtains and seats were covered in the finest red velvet. The beautiful woodwork was gilded with gold trim. They made the theaters look like palaces. Still, they housed silly acts such as juggling dogs. By the 1890s, vaudeville peaked. It became equal to churches and public schools in popularity. It was a great place for people to gather.

There was no exact end to vaudeville. But in 1910, movie theaters opened. They offered entertaining films at a lower price. This shrank vaudeville's audience continually. Ironically, movies were first shown in vaudeville theaters. By the 1930s, the Great Depression hit the U.S. Vaudeville disappeared.

Many famous American film and television stars began on the vaudeville stage. Performers such as the Three Stooges, the Marx Brothers, Buster Keaton, and Judy Garland all began their careers in vaudeville.

General Comprehension

1. **The word peaked in the passage is closest in meaning to**
   - (A) thrived
   - (B) climaxed
   - (C) began
   - (D) disappeared

2. **The word they in the passage refers to**
   - (A) theater owners
   - (B) curtains and seats
   - (C) theaters
   - (D) palaces

- **acrobatics (n)** a form of entertainment in which people perform great feats of balance, strength, and bravery
- **conclude (v)** to finish
- **delight (v)** to please immensely
- **majestic (a)** appearing royal; grand

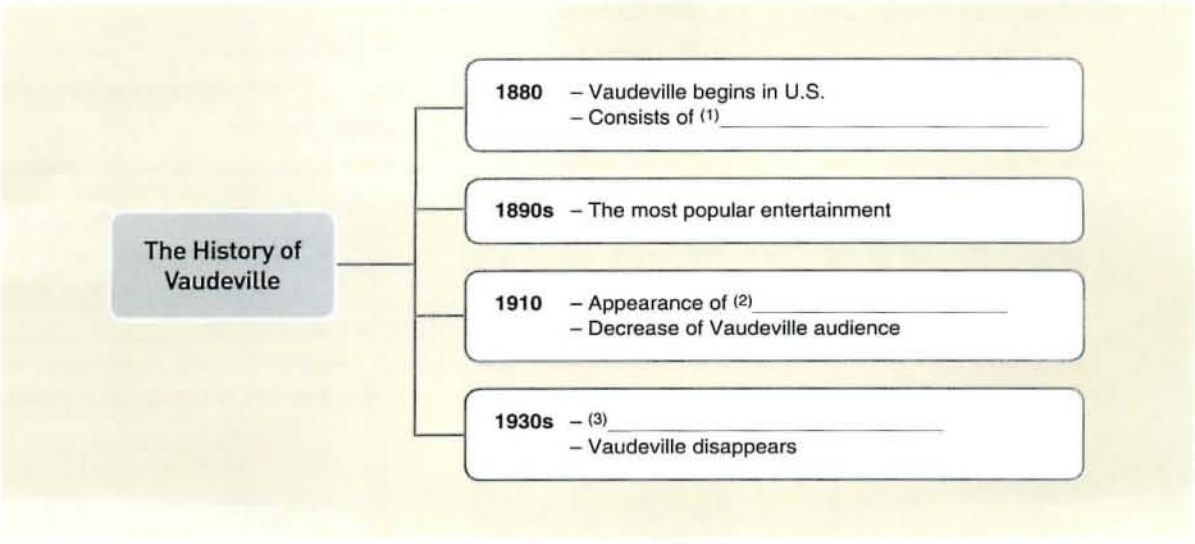
On the TOEFL Test

3. According to paragraph 2, why did a vaudeville show usually start off with a silly act?

(A) Because the audience needed time to arrive and find their seats
(B) Because the audience preferred to begin with silly acts
(C) Because silly acts got the audience ready for serious ones
(D) Because that was the only type of act the theater owner could find

4. According to the passage, what led to the disappearance of vaudeville?

(A) the invention of radio and television
(B) the decline of the middle class
(C) politicians and religious figures
(D) movie theaters and the Great Depression



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Optical Fiber

in England	copper cable	glass or plastic
medical equipment	light and information	

Optical fibers are made of (1)_____ and are very useful for sending (2)_____. The study of fiber optics has shown that light can be bounced continuously down an optical fiber. The concept behind optical fibers was discovered (3)_____ and later adapted into (4)_____. An optical fiber has many advantages over (5)_____. In this age of information, an optical fiber is very useful.

2. The American Revolution

Thomas Jefferson	the Boston Tea Party	British rule
the United States	the Revolutionary War	

The American Revolution was the war that ended (1)_____ over the colonies of North America and established (2)_____ as a country. The revolution began with a shift in ideology that was led by great men such as (3)_____ and Samuel Adams. Three main events led up to (4)_____. These events were the Stamp Act of 1765, the Townshend Acts of 1767, and (5)_____ in 1773. By 1781 the fighting ended, and the British withdrew from North America.

3. American Newspapers in the 19th Century

New York Times	the writing and visual presentation	the newspaper industry
the telegraph	William Randolph Hearst and Joseph Pulitzer	

In the middle of the 1800s, the wide use of (1)_____ enabled newspapers to get reports from far away. This led to a new age of growth in (2)_____. During this time, everything from (3)_____ to the delivery of newspapers improved. New York was the most competitive place, and the (4)_____ emerged as the most respected newspaper in the country. Meanwhile, two newspaper owners, (5)_____, battled to win readers, giving rise to the unethical practice of yellow journalism.

4. The Statue of Liberty and the Liberty Bell

Philadelphia, Pennsylvania	America's ideal of freedom	Gustave Eiffel
the Declaration of Independence	the 100-year birthday	

Two monuments are the best symbols of (1)_____: the Statue of Liberty and the Liberty Bell. The Statue of Liberty was given to the United States by France as a gift in 1885 to mark (2)_____ of the United States. It was designed by (3)_____, and stands 45 meters tall in New York Harbor. The Liberty Bell is located in (4)_____, and was most famously rung on July 8, 1776, to announce the first public reading of (5)_____. It has a crack which was made when it was rung for the first time.

5. Acid Rain

sulfur and nitrogen gases	the health of humans	acid rain
industrialized countries	the poisoning of bodies of water	

(1)_____ is a pollution problem caused by the release of (2)_____ into the air. This problem has been observed in many (3)_____. Acid rain causes many problems such as (4)_____, killing animals, damaging soil, and harming (5)_____. Scientists are searching for ways to reduce this problem.

6. Vaudeville

a variety of acts	inexpensive live entertainment	the Great Depression
a headliner	the late 1800s and early 1900s	

Vaudeville was a form of (1)_____ that was very popular in the United States in (2)_____. Vaudeville entertained the audience with (3)_____, including trained animals, acrobats, magic, comedy, musical performances, and lecturers. A typical vaudeville show began with an opener, peaked with (4)_____, and closed with a chaser. At the height of its popularity, vaudeville theaters were among the most popular places for people to gather. By the early 1900s, movie theaters and (5)_____ caused vaudeville to disappear.

1. **The word assassinate in the passage is closest in meaning to**
   - (A) help
   - (B) kill
   - (C) elect
   - (D) hurt

2. **The word his in the passage refers to**
   - (A) her first husband
   - (B) one man
   - (C) Charles Dickenson
   - (D) Andrew Jackson

3. **According to paragraph 1, the meaning of Andrew Jackson's nickname was**
   - (A) sharp steel
   - (B) hard wood
   - (C) strong wind
   - (D) tough leather

4. **According to paragraph 2, which is NOT true about Andrew Jackson?**
   - (A) He joined the army in his late teens.
   - (B) He and his brother were captured by the British.
   - (C) He got wounded by a British soldier.
   - (D) He found all his family dead when he got free and returned home.

5. **Which of the following can be inferred from paragraph 4 about Andrew Jackson?**
   - (A) He liked to swim in Florida.
   - (B) He did not like Seminole culture.
   - (C) He was a strong military leader.
   - (D) He wanted to be president of the United States.

6. **The author discusses Andrew Jackson's treatment of the Native Americans in paragraph 6 in order to**
   - (A) show the negative side of Andrew Jackson's presidency
   - (B) show that Andrew Jackson was a ruthless leader
   - (C) show that Andrew Jackson helped his country
   - (D) show how patriotic Andrew Jackson was

President Andrew Jackson

Andrew Jackson was the seventh president of the United States. He was also the first governor of Florida. Jackson was known to be a very tough soldier. His nickname was "Old Hickory," after the hard wood.

At age 13, Jackson joined the army to fight against the British in the Revolutionary War. He and his brother were captured. He was cut in the face and hand by a British soldier because he refused to clean the soldier's boots. Afterwards, he always hated the British. After being released, his brother died. He returned home and found his mother and the rest of his family dead.

In the Battle of New Orleans in 1815, Jackson led 6,000 soldiers against 12,000 British soldiers. America was victorious. The British army lost 2,000 soldiers while only 8 of Jackson's men died.

In 1817, Jackson led his men against the Spanish and the Seminole Indians in Florida. He crushed the Seminoles. Then he forced the Spanish to cede power of Florida to the U.S. He was made the first U.S. governor of Florida.

Andrew Jackson ran for president in the election of 1824. Many people, like Thomas Jefferson, thought he was too lawless to be president. Jackson lost the election to John Quincy Adams. By the election of 1828, Jackson was able to come back. He defeated Adams and became president.

The most controversial part of Jackson's presidency was his treatment of American Indians. In 1830, his Indian Removal Act became a law. At this time, 45,000 Cherokee Indians were forced to give up their land and move west. Thousands died on a march called "the trail of tears." One historian called this period "one of the unhappiest chapters in American history."

On January 30, 1835, Richard Lawrence tried to assassinate President Jackson. The mentally ill man approached Jackson and fired two pistols at him. The bullets missed Jackson. Then the president attacked Lawrence with his cane.

Andrew Jackson married his wife Rachel after she divorced her first husband. Afterwards, many people attacked her honor. Jackson fought in 103 duels to defend his wife's honor. In all of those duels, Jackson only killed one man, named Charles Dickenson. He insulted Jackson's wife, so they had a duel. Dickenson shot first. His bullet hit Andrew Jackson in his ribs. Then Jackson shot and killed Dickenson. Jackson had many wounds from his numerous duels. They hurt him for the rest of his life. He often coughed up blood. He died at the age of 78 of tuberculosis and heart failure.

7. **The word infallible in the passage is closest in meaning to**

(A) correct
(B) valuable
(C) logical
(D) doubtful

8. **The word it in the passage refers to**

(A) knowledge
(B) truth
(C) dialectic
(D) logic

9. **The author's description of Aristotle mentions which of the following?**

(A) Hercules
(B) Julius Ceasar
(C) Aristophenes
(D) King Philip of Macedon

10. **The author's description of Aristotle's life mentions all of the following EXCEPT:**

(A) He became the leader of ancient Greece.
(B) He was a student of Plato.
(C) He spent time on islands studying biology.
(D) He opened an academy called the Lyceum.

11. **Which of the following can be inferred from paragraph 3 about Aristotle?**

(A) He did not like to think about science.
(B) He was most interested in drama.
(C) He was primarily a poet.
(D) He was of very high intelligence.

12. **Why does the author mention Aristotle's system of logic?**

(A) To show how smart he was
(B) To prove that he was the greatest thinker of all time
(C) To show his influence on the formation of the scientific method
(D) To prove that Plato was a greater thinker than Aristotle

Aristotle and the Development of Science in Ancient Greece

Western science comes from ancient Greece. Aristotle was a great thinker of this era. Although he was not the first scientist or philosopher, he was the most influential. He was a student of Plato and the teacher of Alexander the Great.

From the ages of 18 to 37, Aristotle was a student. He attended Plato's school, called the Academy. Then he traveled for a few years. He studied biology on various islands. Then King Philip of Macedon called for Aristotle. He wanted him to teach his son Alexander. The boy was then 13. Years later, Alexander left Aristotle and went on to conquer Asia. Aristotle returned to Athens. He opened an academy called the Lyceum, where he trained scientists.

Aristotle wrote books on many subjects. His works covered every topic. He was aware of everything from science to art. None of his books have survived in their entirety. However, Aristotle's studies became the foundation of western philosophy and science.

Aristotle valued knowledge gained from the five senses. He used his senses and the dialectic to seek truth. This dialectic originated with Plato, but Aristotle refined it. Aristotle's dialectic relied on logic. It was a way of answering a question with another question. The answers could be used to find truth. These methods are called inductive and deductive logic.

Based on Aristotle's logic, the scientific method was formed. The scientific method is a process used by scientists. First, they make a hypothesis. Then they test it with an experiment. The scientific method is the most important method in modern western science. Aristotle did not do many experiments himself. But his system of logic led others to discover many things. Sir Isaac Newton and Galileo used the scientific method. Their discoveries are an example of Aristotle's influence.

Aristotle also created the idea of categories. He studied every branch of science possible. Then he separated them into different groups. He was familiar with every subject from zoology to geology. His written works make up a huge body of Greek knowledge.

Aristotle has many critics as well. Some scholars think he did not have respect for women. Some think his work is too confusing. He often seems not to obey his own logical rules. And in the Middle Ages, his work, which was treated as infallible, was used to oppress people. But Aristotle's work has been referenced for thousands of years. His studies are a pillar that holds up our modern society.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. The computer was experiencing an internal problem.
   (A) international (B) inner (C) outside (D) lasting forever

2. His job was to splice electrical wires inside houses.
   (A) destroy (B) remove (C) connect (D) buy

3. The group had an ideology that many other people found offensive.
   (A) vehicle (B) smell (C) haircut (D) way of thinking

4. The citizens protested until the unfair law was repealed.
   (A) canceled (B) noticed (C) joined (D) doubled

5. The actress fell into disfavor when she changed her style.
   (A) fame (B) unpopularity (C) wealth (D) debt

6. The park was unveiled to commemorate the veterans of World War I.
   (A) remember (B) scold (C) thank (D) show

7. The worker's struggle to receive fair pay was finally successful.
   (A) long question (B) long time (C) long fight (D) long speech

8. Their new house looks very majestic with its huge columns and beautiful entryway.
   (A) splendid (B) enormous (C) expensive (D) attractive

B Match each word with the correct definition.

1. propaganda	•	• **a.** the quality of coming from a large ice mass
2. unrest	•	• **b.** an internal explosion that causes outward movement
3. corruption	•	• **c.** the tubes in a human body that process food and carry waste out of the body
4. integrity	•	• **d.** an event in which three or more innocent people are killed
5. glacial	•	• **e.** material that promotes the views of one group
6. massacre	•	• **f.** the form in which water collects when in motion
7. eruption	•	• **g.** an object meant to symbolize an important event or concept
8. monument	•	• **h.** dishonesty in a publicly held office
9. intestine	•	• **i.** dissatisfaction; protest
10. droplet	•	• **j.** the quality of being honest and upright

Unit 4

Negative Factual Information

Unit 4

Negative Factual Information

Overview

■ Introduction

Negative Factual Information questions ask you to find wrong information that is not mentioned in the passage. You should decide which of the answer choices is not discussed in the passage or does not agree with one or more statements in the passage. Like Factual Information questions, scanning is the key skill for this question type. However, you need to scan more of the passage to make sure that your answer is correct.

■ Question Types

1. According to the passage, which of the following is NOT true of _____?

2. All of the following are mentioned in paragraph X as _____ EXCEPT:

3. The author's description of _____ mentions all of the following EXCEPT:

4. Which of the following is NOT mentioned in the passage?

■ Useful Tips

- Make use of the key words in the question and answer choices to spot relevant information in the passage.
- Don't forget that the necessary information may be spread out over an entire paragraph or several paragraphs.
- Make sure that your answer is NOT mentioned in the passage or contradicts the passage.

Sample iBT Question

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

(A) Ladybugs are helpful for gardening.
(B) Ladybugs are poisonous to other insects.
(C) Ladybugs are insectivores.
(D) Ladybugs are sold at many garden supply shops.

Ladybugs

Many people do not like insects. They scream or attempt to squash a bug when they see it. One exception is the ladybug. Most people see this colorful little beetle as a friend.

The ladybug is an especially useful friend to gardeners. Many garden supply shops sell these beetles. Gardeners buy them and put the ladybugs in their garden. This is because ladybugs eat other harmful insects.

Once in the garden, the ladybug will eat all sorts of pests. Aphids and fruit flies become meals for this insectivore. These pests would otherwise threaten the plants in the garden. Some gardeners even install special rows of grass called beetle-bunkers to give the ladybugs a place to thrive.

Correct Answer Check and make sure which choice is not mentioned in the passage. Ladybugs help with gardening because they eat harmful insects. For that reason, they are sold at garden supply shops and even raised by gardeners. So the correct answer is (B).

Scanning is the key skill to deal with Negative Factual Information questions. But unlike Factual Information questions, you should scan more of the passage because relevant information may be spread out over more than one part of the passage. You need to decide which of the answer choices is not true or not mentioned in the passage.

Read the questions and answer choices first. Then scan for the information you need to answer the questions. Try to eliminate obviously wrong answer choices.

Caterpillars

A caterpillar is the larval form of a butterfly or a moth. It has a long, segmented body. The body is soft. This allows it to grow quickly as it consumes much food, like a balloon. Caterpillars are eating machines as they prepare to enter the pupa stage.

Like all insects, caterpillars do not breathe through their mouths. They pull in air through tubes along the sides of their body. Their eyesight is very poor, so they use antennae to locate food.

Caterpillars have various defenses to protect them from birds and other animals. Their bodies are capable of adapting camouflage. Some caterpillars look like snakes or leaves. Some caterpillars eat poison leaves and become toxic.

1. According to the passage, which of the following is NOT true of the caterpillar?

(A) It locates food with feelers and eats a lot.
(B) It protects itself from enemies in various ways.
(C) It is the larval form of all insects.
(D) It breathes through the sides of its body.

The Refrigerator

One invention that changed the daily lives of humans is the refrigerator. In the time before its invention, people had to spend a lot of time gathering fresh food every day. The only way to keep food cold was to have a large block of ice delivered to the home. This was costly and very inconvenient.

The first home refrigerators came onto the market in 1911. At that time, a refrigerator cost almost twice as much as a new car. The early models took up a lot of space in the home. Sometimes two rooms were needed.

By 1927 General Electric introduced the Monitor-Top refrigerator. This was the first model to be widely used and is still functional today.

2. The author's description of the refrigerator mentions all of the following EXCEPT:

(A) the effect of refrigerators as an invention
(B) the convenience of using ice to keep food fresh
(C) the size of early refrigerators
(D) the popularization of refrigerators

Kinds of Wind

Wind is the movement of air over the Earth's surface. It is caused by uneven heating of the atmosphere. The two major influences on wind are the heating between the equator and the poles and the Earth's rotation.

One way to classify different kinds of wind is by the forces that cause it. Prevailing winds, such as the trade winds, the westerlies, and the jet streams, are caused by global circulation. Synoptic winds are caused by warm and cold fronts clashing. Mesoscale winds are produced by thunderstorms. Microscale winds are very short bursts that happen suddenly.

Winds are some of the most common yet powerful forces shaping our lives and our planet every day.

3. According to the passage, which of the following is NOT true about wind?

(A) The clash of cold fronts causes synoptic winds.
(B) Very short, sudden bursts of wind are called microscale.
(C) The trade winds are caused by global rotation.
(D) Thunderstorms produce mesoscale winds.

Hummingbirds

Hummingbirds are known for their ability to hover in mid-air by rapidly flapping their wings. A hummingbird flaps 15 to 80 times per second. This action enables them to maintain position while drinking from flower blossoms. They get their name from the humming sound made by their wings.

The Bee hummingbird is the smallest bird in the world, weighing 1.8 grams. The Rufous hummingbird is more typical, weighing 3 grams. The Giant hummingbird weighs as much as 24 grams.

Hummingbirds have the highest metabolism of any animal beside insects. Their hearts can beat as many as 1,260 beats per minute. In order to sustain this, they must consume more than their own body weight in food each day.

4. According to the passage, which of the following is NOT true about hummingbirds?

(A) Their name comes from the humming noise their wings make.
(B) Their wings can beat from 15 to 80 times every second.
(C) The Rufous hummingbird is about twice as heavy as the Bee hummingbird.
(D) They have a higher metabolism than insects do.

Practice with Long Passages

A Read the following passage, and answer the questions.

Coral Reefs

Time Limit: 2 min. 50 sec .

Coral reefs grow in photic zones of tropical seas, where sufficient light penetrates into the water. In order to survive, the reef must be in an area with mild wave action. Mild wave action is not so strong that it tears the reef. But it is strong enough to stir the water and deliver food and oxygen.

Coral reefs are made of millions of skeletons from small animals called polyps. After polyps die, waves and fish break down their skeletons. Then the fragments settle into the reef and cause it to grow. Algae feed on the skeletons and convert the material to limestone. The limestone is deposited over the reef and forms a protective crust. These algae grow best in clear, shallow water.

Most of the world's reefs are located in the tropical waters of the Pacific or Indian Oceans. There are few reefs on the western coasts of North and South America and Africa. This is due to the strong, cold coastal currents in these areas.

Coral reefs support a vast array of biodiversity. They create a habitat for many species of fish and plant life to thrive. Without the reefs, many of these species would face extinction.

Currently, there are several threats to the reefs of the world. Much pollution that runs off from factories and farms kills coral reef life. The water quality in these areas often becomes poisonous, killing off the coral reefs and the creatures that live on and around them.

Another threat to coral reefs is over-fishing and destructive fishing by humans. Many fishermen who trap exotic fish for pet shops use cyanide gas to stun fish. This process decreases the lifespan of the captured fish and poisons the reef. Dynamite fishing is another method that damages reef ecosystems. It kills the corals which are the habitat for a healthy reef. Many conservation groups are actively trying to protect the coral reefs of the world.

General Comprehension

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

(A) destroy
(B) change
(C) condense
(D) eliminate

2. The word them in the passage refers to

(A) factories
(B) farms
(C) these areas
(D) coral reefs

- **photic (a)** penetrated by light, especially of the sun
- **stir (v)** to mix; to shake
- **fragment (n)** a small piece
- **shallow (a)** not deep
- **current (n)** a force of waves that do not break the surface of a body of water
- **habitat (n)** a place where one or more species of living organisms thrives

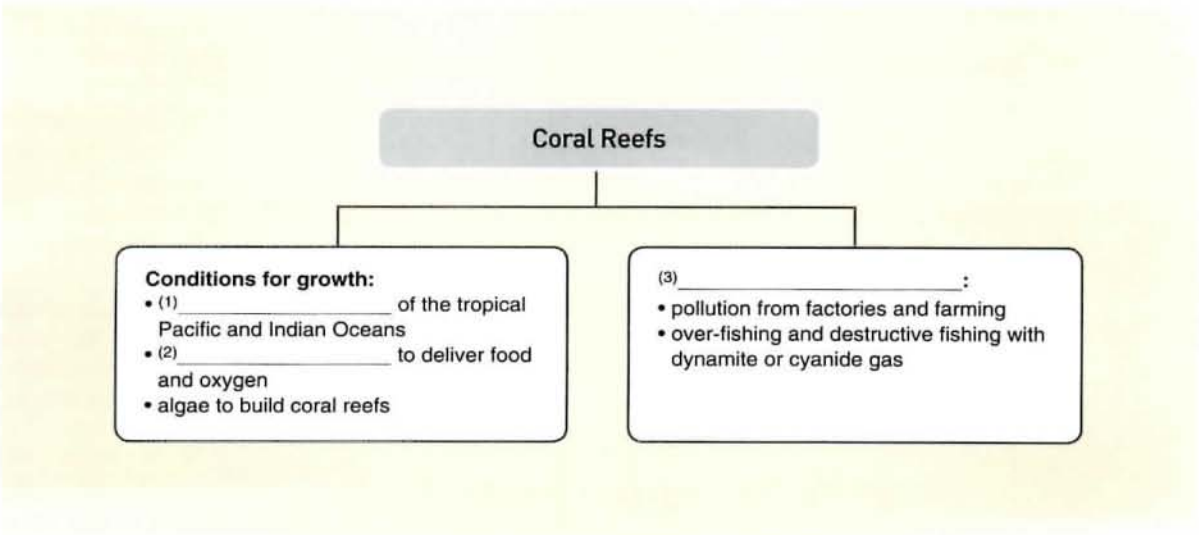
On the TOEFL Test

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

(A) Thousands of polyp skeletons settle into the reef and cause it to grow.
(B) The skeletons of reefs are decomposed by waves and fish.
(C) Clear, shallow water is the best place for algae to grow.
(D) Algae eat skeletons, turning them into limestone.

4. According to paragraph 6, which of the following is NOT true about coral reefs?

(A) Many fishermen catch exotic fish for profit by using helium gas.
(B) Coral reefs can be damaged by over-fishing.
(C) A lot of conservation groups work hard to protect coral reefs.
(D) The process of cyanide fishing poisons coral reefs.



B Read the following passage, and answer the questions.

Mass Production and the Ford Model-T

Time Limit: 2 min. 50 sec.

The production of large amounts of products on an assembly line is called mass production. The advent of the production line changed the way people worked and lived in the 20th century. This method did not become popular until Henry Ford's Ford Motor Company began manufacturing the Model-T car in 1908.

Henry Ford was the inventor of the car and president of the company. He was always searching for a more efficient method of production. In 1913 he introduced moving assembly lines to his production plants. By 1914, the Ford assembly line was so efficient that it took 93 minutes to produce one Model-T. They came off the assembly line every 3 minutes. Ford produced more cars than all of its competitors combined.

In addition, Ford's assembly line introduced a new level of worker safety. This method of having workers stay in an assigned position led to fewer accidents. Ford also shocked the nation with an unprecedented $5 per day pay scale. This effort on the part of Ford to attract talented workers more than doubled the worker's minimum wage.

In 1908, the price for a Model-T was $825, and it fell every year after. By 1916, the price of the Model-T had dropped to $360. There were more Model-Ts than any other car on the road. The only color available in this model was black. This was because black paint was cheaper and dried faster, keeping production costs down. Henry Ford was heard to have joked, "Any customer can have a car painted any color he wants, so long as it is black."

By the 1920s, 15 million Model-Ts had been produced. This record held for 30 years. Many people learned to drive in a Model-T. They had very fond memories of the car.

The Model-T revolution changed the way people around the world work and travel. Now, assembly lines employ people in every industrial nation. Also, people use cars in their everyday lives.

General Comprehension

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

(A) improvement
(B) increase
(C) appearance
(D) efficiency

2. The word it in passage refers to

(A) this model
(B) any customer
(C) a car
(D) any color

- **assembly (n)** the act of putting something together
- **manufacture (v)** to make; to produce
- **efficient (a)** productive; competent
- **competitor (n)** rival
- **unprecedented (a)** not having happened before; unusual
- **have fond memories of (phr)** to remember something with affection and pleasure

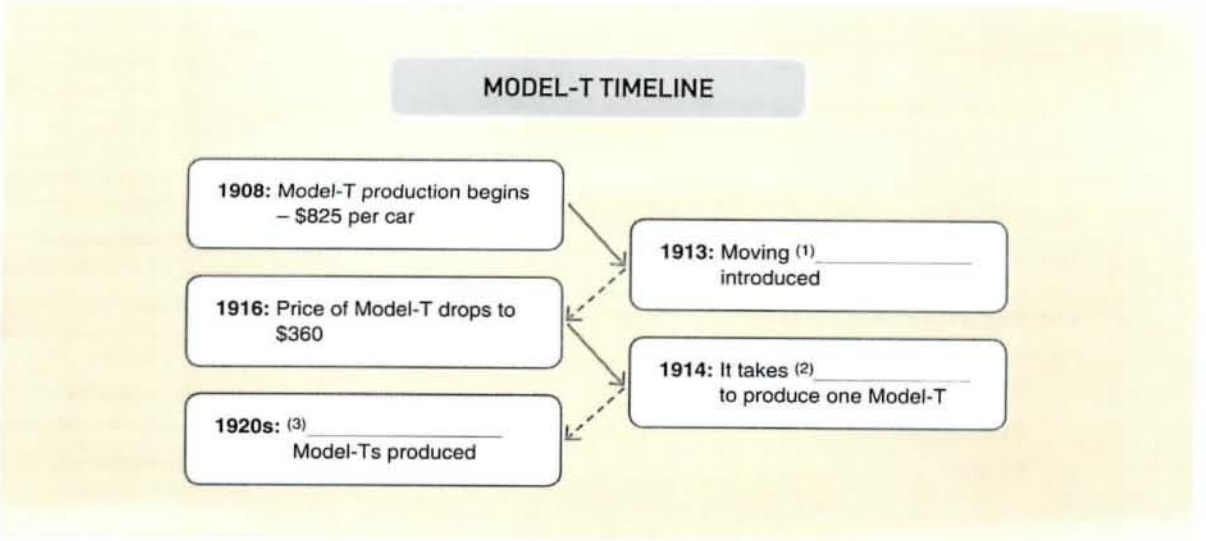
On the TOEFL Test

3. According to the passage, which of the following is NOT true of Henry Ford?

(A) He surprised the nation with a $5 per day pay cut.
(B) He was president of the Ford Motor Company.
(C) He tried to find new and better ways to produce cars cheaply.
(D) He brought automated assembly lines into the Ford production plants in 1913.

4. The author's description of the Model-T revolution mentions all of the following EXCEPT:

(A) It changed the lives of people around the world.
(B) It changed the way people went on vacation.
(C) It made every industrial nation employ people on assembly lines.
(D) It made cars a part of people's everyday lives.



C Read the following passage, and answer the questions.

Pioneers in Neurology

Time Limit: 2 min. 30 sec.

The history of neurology goes back to ancient Egypt. Scrolls depict disorders of the brain. They had a basic understanding of the nervous system. Egyptians even performed simple brain surgery.

In ancient Greece, the famous physician Hippocrates was convinced epilepsy had a physical cause. Before him, it was considered a punishment by the gods. Another Greek physician, Galen, looked at the nervous system in specimens. He cut a certain nerve in the brain of an ape. Then he noticed the ape lost its voice.

In 1664, Thomas Willis published *Anatomy of the Brain*. In it he described the circle of Willis, which enables the flow of blood through the brain. He was also the first to use the word *neurology*. In the 1700s, Bailie and Cruvielher published the first illustrations of the brain. This helped doctors and scientists. They began to understand diseases such as brain damage in stroke.

In 1837, J. E. Purkinje was the first to look at a neuron. He saw it through a microscope. This led to an understanding that progressed past crude drawings. The famous philosopher Rene Descartes thought about the brain. He had a theory about behavior. He thought every activity of an animal was a necessary reaction to an external stimulus. Some doctors experimented on patients. They were able to understand more about the nervous system.

A new understanding of neurological behavior was reached by Pavlov, a Russian physiologist. He trained his dogs to salivate at the ring of a bell. This established that a simple reflex could be modified by higher brain functions.

By 1878, William McEwen removed a brain tumor from a patient. The patient lived for many years after. When he performed his surgeries, he used tools such as the tendon hammer. X-rays and the CT scan were not far behind. These developments led to the field of neurology that helps people today.

General Comprehension

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

(A) detailed
(B) rough
(C) natural
(D) original

2. The word he in the passage refers to

(A) Thomas Willis
(B) J. E. Purkinje
(C) Rene Descates
(D) Pavlov

- **depict (v)** to describe; to show
- **epilepsy (n)** a disease of the nervous system that causes victims to shake violently
- **specimen (n)** a scientific sample
- **flow (n)** the quality of continuous motion
- **crude (a)** simple; not advanced
- **modify (v)** to change

On the TOEFL Test

3. The author's description of the ancient Egyptians mentions all of the following EXCEPT:

(A) Disorders of the brain are shown in their scrolls.
(B) They successfully completed brain transplants.
(C) The nervous system was understood on a basic level.
(D) Simple brain surgery was completed.

4. According to paragraph 4, all of the following are true EXCEPT:

(A) A working model of a human brain was built by scientists.
(B) Rene Descartes theorized about the brain and behavior.
(C) More about the nervous system could be explained by experimenting on patients.
(D) The first to look at a neuron through a microscope was J.E. Purkinje.

Development of Neurology Timeline

Ancient Egypt: scrolls depict brain disorders; simple brain surgery performed → (1)_____: epilepsy has physical cause; physician experiments on ape's brain

1664: Thomas Willis publishes (2)_____ → **1700s:** Bailie and Cruvielher publish first illustrations of the brain

1837: J. E. Purkinje examines a neuron through a microscope → **1878:** William McEwen removes (3)_____ from a patient

After 1878: the tendon hammer, X-rays, and the CT scan developed

D Read the following passage, and answer the questions.

The Effects of Desert Weather

Time Limit: 2 min. 40 sec.

A desert is a type of landscape that receives little precipitation. Deserts are normally defined as areas that receive annual precipitation of less than 250mm. But some places such as Tucson, Arizona receive more but are still called deserts. That is because they have a much higher rate of evaporation.

Many environmentalists argue that desert regions are increasing. This process is called desertification. It happens when useful soil is blown away by wind. Then the temperature rises, and an area that was once fertile becomes desert. They say that this is due to global warming. It is also due to overdevelopment. Both of these problems are major threats to humanity.

True deserts have very sparse vegetation. These deserts exist in the most arid regions of Earth. In these places, rainfall is rare and infrequent.

Deserts have a reputation for supporting little life. But this is not true. Deserts have many animals that hide during daylight. About one fifth of the Earth is covered in desert.

Desert landscapes are often composed of sand and rocky surfaces. Sand dunes and stony surfaces called regs are often found in deserts. Cold deserts have similar features but receive snow instead of rain. Antarctica is the largest cold desert. The largest hot desert is the Sahara.

Most deserts have an extreme temperature range. The temperature is very low at night. This is because the air is so dry that it holds little heat. The desert cools as soon as the sun sets. Cloudless skies also increase the release of heat at night.

Sand covers only about 20% of Earth's deserts. There are six forms of deserts. One of the forms is a mountain or a basin desert. Hamada deserts are comprised of plateau landforms. Regs consist of rock pavements. Ergs are formed by sand seas. Intermontane basins occur at high elevations. Finally, badlands are arid regions comprised of clay-rich soil.

General Comprehension

1. **The word precipitation in the passage is closest in meaning to**
   - (A) heat
   - (B) desertification
   - (C) moisture
   - (D) sand

2. **The word it in the passage refers to**
   - (A) the desert
   - (B) the sun
   - (C) the temperature
   - (D) the air

- **precipitation (n)** rain, snow, sleet, or hail
- **evaporation (n)** the process by which water is turned into gas by heat
- **fertile (a)** productive; fecund; rich
- **reputation (n)** fame; renown
- **arid (a)** very dry; lacking moisture

On the TOEFL Test

3. According to the author's description of deserts, all of the following are true EXCEPT:

(A) They receive much precipitation during the nighttime.
(B) There is a small amount of vegetation in them.
(C) They are often covered in sand and rocky surfaces.
(D) There are six forms of them.

4. According to the passage, which of the following is NOT true?

(A) Desert regions are on the rise, according to many environmentalists.
(B) Deserts are found only in hot regions on the earth.
(C) As soon as the sun sets, the desert becomes cooler.
(D) Global warming is said to be a cause of desertification.

Deserts

- have little precipitation, normally less than 250mm
- are increasing through desertification
- (1) _____ – the largest cold desert
- the Sahara – the largest hot desert

Mountain or basin desert	**Hamada:** plateau landforms	(2) _____ : rock pavements
(3) _____ : sand seas	**Intermontane basins:** at high elevations	**Badlands:** arid regions of clay-rich soil

E Read the following passage, and answer the questions.

The Migration of the Monarch Butterfly

Time Limit: 2 min. 30 sec.

The Monarch butterfly is found in North America. Since the 19th century, it has also appeared in New Zealand, Australia, and the Canary Islands. It can also be found as a migrant in the Azores, Portugal, and Spain. In some places, the Monarch is also known as the wandering butterfly.

Monarchs are known for migrating long distances. They migrate every year. They fly southward in large numbers from August through October. Then in the spring they migrate northward.

During the migration, females deposit eggs for the next generation. North American Monarchs are separated into two populations. One group lives east of the Rocky Mountains. This group spends winters in Michoacan, Mexico. The group that lives in the west spends winter in central California, mainly in Pacific Grove and Santa Cruz.

The length of the Monarch's migration journey is longer than a single butterfly's lifespan. Butterflies born in early summer live less than two months. The final generation of the summer lives about seven months. During this time they fly to their winter home. This generation does not reproduce until it leaves the winter location in the spring.

Scientists still do not understand how the species can return to the same winter location over a gap in generations. This is the subject of much research. It is assumed that the flight patterns are inherited. Studies suggest that they are based on a combination of circadian rhythm and the position of the sun in the sky. A new study suggests that the Monarchs have special ultraviolet photoreceptors that give them a sense of direction.

A few Monarchs appear in Great Britain in years with favorable conditions. Some Monarchs also live on the island of Hawaii. These butterflies do not migrate. They live for six to eight weeks if the gardens have enough nectar-producing flowers to support them.

General Comprehension

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

(A) travel seasonally
(B) escape from danger
(C) search for food
(D) prepare for winter

2. The word they in the passage refers to

(A) scientists
(B) the species
(C) generations
(D) the flight patterns

- **generation (n)** a group of the same species all born at the same time
- **reproduce (v)** to have babies
- **inherit (v)** for parents to pass down traits to offspring
- **circadian rhythm (n)** biological behavior based on day and night cycles
- **nectar (n)** the sweet, nutritious fluid within the blossom of a flower

On the TOEFL Test

3. **The author's description of the Monarch butterfly in paragraphs 1 and 2 mentions all of the following EXCEPT:**

   (A) the locations where it lives
   (B) its migration route
   (C) its nickname
   (D) the time and direction of its migration

4. **According to the passage, which of the following is NOT true?**

   (A) Hawaiian butterflies do not migrate.
   (B) Early summer butterflies do not live to be two months old.
   (C) A few Monarchs appear in Russia with the proper conditions.
   (D) Monarch butterflies migrate each year.

Facts about Monarch Butterflies

- (1)_____ every year
- Fly southward during August to October and northward in the spring
- (2)_____
  - One group living east of the Rocky Mountains winters in Michoacan, Mexico.
  - Western group winters in central California.
- Scientists don't fully understand their migration patterns.
- Some Monarchs live in (3)_____ and don't migrate.

F Read the following passage, and answer the questions.

The Development of the Typewriter

Time Limit: 2 min. 30 sec.

No single person invented the typewriter. A number of people have contributed to its creation. In 1714, Henry Mill received a patent. It was for a machine similar to the typewriter. But nothing else is known about it. Another early innovator was a man named Turri. His machine allowed the blind to write. Turri also invented carbon paper.

In 1829, William Austin Burt patented a machine called the Typographer. Some consider it the first typewriter. This machine was slower than handwriting.

In 1865, Reverend Hansen created the Writing Ball. This was the first typewriter to go into production. But it was still too slow. The first machine to type faster than a human hand could write was built in 1867 by Sholes and Glidden. They sold the patent to Remington. He began producing this machine in 1873.

One problem with the early typewriters was visibility. The position of the typebar blocked the page. So, the typist could not see what they had just typed. In 1895 this problem was solved. "Visible" typewriters were produced. The older models stayed on the market as late as 1915.

IBM began producing the electric Selectric typewriter in the 20th century. It featured a spherical type ball. It immediately dominated the market. The type ball was an important improvement. It eliminated jams when two keys were struck at once. Many of these machines are still used today.

In the 1980s came the final major development. The type ball was replaced with the daisy wheel. The daisy wheel is simpler and cheaper than the type ball. But it wears out more quickly.

Today, typewriters are still sometimes used. They are useful when a computer is impractical or inconvenient. Companies such as Smith Corona, Olivetti, and Brother still make them. Generally, however, typewriters have been replaced by computers.

General Comprehension

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

(A) inventor
(B) owner
(C) philosopher
(D) typist

2. The word it in the passage refers to

(A) IBM
(B) the electric Selectric typewriter
(C) the market
(D) the type ball

- **invent (v)** to discover or create something for the first time
- **carbon (n)** an element present in all living things
- **visible (a)** able to be seen by the naked eye
- **dominate (v)** to control with power
- **replace (v)** to take the place of something; to substitute

On the TOEFL Test

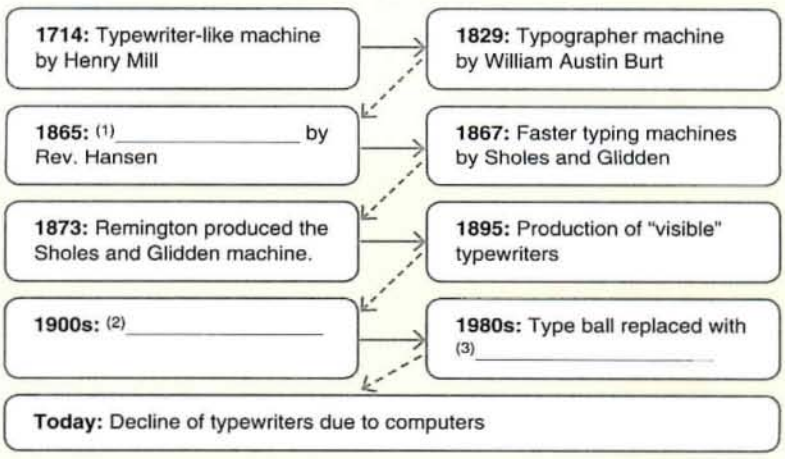
3. According to the passage, all of the following are true EXCEPT:

(A) There were many contributors to the development of the typewriter.
(B) It can be said that the first typewriter was developed by William Austin Burt.
(C) Sholes and Glidden created a typewriter that was faster than handwriting.
(D) Visible typewriters went on the market starting in 1915.

4. According to the passage, which of the following is NOT true?

(A) Remington produced Sholes and Glidden's typewriter in 1873.
(B) The IBM Selectric typewriter solved the jamming problem of older models.
(C) The daisy wheel replaced the type ball since it cost less and was more durable.
(D) Some companies still produce typewriters because they are still in use.

The Development of the Typewriter



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Coral Reefs

become extinct	the tropical Indian and Pacific Ocean regions	tiny polyps
mild wave action	pollution, over-fishing, and destructive fishing	

Coral reefs grow best in photic tropical zones with (1)_____. Reefs are made of the skeletons of millions of (2)_____ that have been turned into limestone by algae. These reefs are most common in (3)_____. Reefs are important because they support a wide range of species that would otherwise (4)_____. There are many threats to reefs, such as (5)_____ that conservation groups are fighting against.

2. Mass Production and the Ford Model-T

by the 1920s	moving assembly lines	the Model-T car
became lower	Henry Ford	

(1)_____ changed the way people worked and lived in the 20th century with his Ford Model-T and the mass assembly line it was produced on. After beginning Ford Motor Company and inventing (2)_____, Ford introduced (3)_____ in his production plants. These were so effective that the Model-T car became common around the world and the price (4)_____ every year. (5)_____, there were more Model-Ts on the road than any other car, and people around the world worked on assembly lines and drove cars.

3. Pioneers in Neurology

describing its anatomy	Egyptians and Greeks	microscopes
Thomas Willis	successful brain surgery	

The ancient (1)_____ were the first to experiment on and begin to understand the brain. Scientists such as (2)_____ created the study of neurology and furthered knowledge of the brain by (3)_____. By the 1800s, scientists and doctors, such as J.E. Purkinje began using (4)_____ to expand their knowledge of the human nervous system. By 1878, (5)_____ was performed, leading the way to a modern age of neurological understanding and treatment.

4. The Effects of Desert Weather

global warming	receive little precipitation	desertification
intermontane basins, and badlands	supporting life forms	

Deserts are regions that (1)_____. (2)_____ is the process by which fertile land becomes desert. Many environmentalists argue that temperature increases due to (3)_____ are accelerating the rate of desertification around the world. Deserts are capable of (4)_____ that have adapted to their harsh environments. There are six kinds of deserts, including mountain or basin deserts, hamada deserts, regs, ergs, (5)_____.

5. The Migration of the Monarch Butterfly

migrate so far	alive	the same winter location
very different life spans	North America	

The Monarch butterfly is found in some parts of the world, including (1)_____. Scientists wonder how the Monarch is able to (2)_____ every year. New generations of the Monarch return to (3)_____ every year even though they were not (4)_____ at the time of the last migration. Scientists are curious about the fact that Monarchs have (5)_____ based on their place in the seasonal migration cycle.

6. The Development of the Typewriter

typewriters	full of small improvements	the computer
no single person	over the years	

(1)_____ invented the typewriter, but many people have contributed to its creation (2)_____. The history of the typewriter is (3)_____ made over the years. When problems such as the type bar blocking the typist's view arose, new improvements corrected them. These days the typewriter has been replaced by (4)_____. But some people still use (5)_____, and some companies still make them.

1. **The word fatal in the passage is closest in meaning to**

(A) harmful
(B) deadly
(C) surprising
(D) dangerous

2. **According to paragraph 1, which of the following is true of chimpanzees?**

(A) West and Central Africa are home to the common chimp.
(B) The bonobo chimp lives in Madagascar.
(C) There are five kinds of chimps.
(D) The three species of chimp are separated by the Congo River boundary.

3. **According to the passage, all of the following are true EXCEPT:**

(A) Wild chimps rarely live past the age of 40.
(B) Chimps can make and use simple tools.
(C) Chimps sometimes attack children.
(D) Adult male chimps can be up to 3m tall.

4. **Which of the following can be inferred about chimpanzees?**

(A) They are as intelligent as humans.
(B) They can be very dangerous.
(C) They can do factory work if trained properly.
(D) They are not genetically related to humans.

5. **In paragraph 5, why does the author mention that plans were made to create a workforce of chimps?**

(A) To show that chimps can use simple tools
(B) To show that chimps like helping humans
(C) To show that the intelligence of chimps is sometimes exaggerated
(D) To show that chimps make excellent menial workers

6. **The word their in the passage refers to**

(A) chimps
(B) humans
(C) observers
(D) plans

Chimpanzees

There are two types of chimpanzees. The common chimp lives in West and Central Africa. Its cousin is the bonobo or pygmy chimp, which comes from the forests of the Democratic Republic of Congo. The Congo River forms a boundary between the two species.

Adult male chimps can weigh between 35 to 70kg. They usually stand 0.9 to 1.2m tall. Females usually weigh 26 to 50kg and stand 0.66 to 1m tall. Chimps rarely live past 40 years old in the wild. But in captivity they have been known to reach the age of 60.

African people have been in contact with chimps for thousands of years. The first recorded encounter between a European and a chimp occurred in the 1600s. The diary of Portuguese explorer Duarte Pacheco Pereira documented chimps. He noted their simple use of tools.

Chimps were brought from Angola to Europe in the 1600s. The first was given as a gift to the Prince of Orange in 1640. Scientists were fascinated at the similarities between the chimps and humans. Over the next 20 years, many chimps were exported to Europe.

In 1859, Darwin's *Theory of Evolution* was published. This spurred interest in chimps as a link to humans. Observers at the time were interested in the chimp's behavior. They were searching for similarities to human behavior. Their main goal was to discover whether chimps were inherently "good." Their interest was not grounded in practical science, however. The tendency of the time was to greatly exaggerate the chimp's intelligence. At one point, plans were made to create a workforce of chimps. The idea was make chimps fill menial labor positions such as factory work.

Chimps were treated with much more serious scientific interest in the 20th century. Before 1960, almost nothing was known about chimps' behavior in their natural habitat. Then Jane Goodall went to live in Tanzania's Gombe Forest. There she lived among the chimps and observed their habits. Her discovery of chimps making tools was groundbreaking. It was previously believed that only humans did this.

Common chimps sometimes attack humans. In Uganda, many children have been attacked by chimps. These attacks are usually fatal for the children. One reason for these attacks is that the chimps mistake the children for a species of monkey. This monkey is called the Western Red Colobus. It is one of the common chimp's favorite foods.

Humans must be very careful around chimps. They view humans as their rivals. Also, the average chimp has five times the upper body strength of an adult human male. This was proven when former NASCAR (National Association for Stock Car Automobile Racing) driver Saint James Davis was attacked and almost killed by a chimp.

7. The word it in the passage refers to

(A) glass
(B) sand
(C) silicon
(D) iron

8. Which of the following is the author's definition of glass?

(A) uniform, amorphous, solid material
(B) silicon dioxide formed into a shape
(C) solid material with iron content
(D) tin oxide mixed with sulfur and carbon

9. According to paragraph 3, which of the following is NOT true about glass?

(A) Obsidian is a naturally occurring form of glass.
(B) Stone Age people made weapons and tools from glass.
(C) It is believed that the Phoenicians produced glass for the first time in history.
(D) The Phoenicians coated their pottery with glass 3000 years ago.

10. The author of the passage implies that

(A) the Romans were the first to produce soda glass using a new technique
(B) Mediterranean people did not use potash in their glassworks
(C) hand-blown glassworks are now considered antique items due to their scarcity
(D) delicate crystal works are created by many diamond artisans

11. The author discusses glass jars and beads in paragraph 4 in order to show that

(A) glass comes from natural sources in ancient Egypt
(B) glass was once a rare and prized object in ancient Egypt
(C) glass was used as a currency in ancient Egypt
(D) glass was invented by the ancient Egyptians

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

(A) rub
(B) break
(C) bond
(D) sell

Glassmaking

Glass is a uniform, amorphous, solid material. It is composed mainly of silicon dioxide. This is the major raw material of sand. If raw materials contain as much as 1% iron, the glass will come out colored. So fine glass factories enrich their silicon to make it more pure.

When glass is made naturally, it tends to be colored green. This is due to the iron content. But glassblowers add powdered metals to change the color of the glass. By adding sulfur and carbon, glass will become colored yellowish to black. Tin oxide can be used to create white glass. Also, a little cobalt will color glass a deep blue. And small concentrations of selenium can yield a brilliant color known as "selenium ruby."

Obsidian is glass that occurs naturally from hot magma flows. This glass has been used to create sharp knives, arrowheads, and tools since the Stone Age. According to history, the first glassmakers were the Phoenicians. They used glass to coat their pottery as early as 3000 B.C.

Around 1500 B.C., the ancient Egyptians made glass jars and beads. The beads they created consisted of metal rods with melted glass wrapped around them. The beads were prized possessions. They were thought to have magic powers.

The Romans developed many new glassmaking techniques. They also spread the use of glass as far as China and the British Isles.

In Northern Europe, around 1000 A.D., a new method of glasswork was discovered. The use of soda glass was replaced with some other glass contained potash. This was important because potash was much more plentiful. Potash is obtained from wood ashes. From this point on, Northern European and Mediterranean glassworks were distinguishable from each other.

In 11th-century Germany, the techniques for making sheet glass were invented. This led to the modern methods of making the windows we use in all houses and buildings. By the 14th century, Venice was the center for fine glassworks. In that city, all sorts of luxury items, such as mirrors, dinnerware, and vases, were made.

Hand-blown glass is still considered a commodity to this day. Some of the most famous fine glass artists are Dale Chihuly, Rene Lalique, and Louis Comfort Tiffany. Their works are in museums such as the Smithsonian. Some of their works sell for many thousands of dollars.

Cold work techniques are used for turning glass into fine crystal. Crystal manufacturers such as Edinburgh Crystal and Waterford Crystal used diamond saws to cut and polish glass into beautiful designs.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. Many people enrich themselves by taking educational classes.
   (A) damage (B) improve (C) help (D) research

2. His business specialized in manufacturing vacuum cleaners.
   (A) selling (B) buying (C) making (D) fixing

3. The filmmaker tried to depict the lives of the early colonists in his movie.
   (A) laugh at (B) destroy (C) name (D) show

4. He spent many months working on his car to modify its fuel injection system.
   (A) change (B) remove (C) transfer (D) resell

5. She was disappointed that her garden couldn't grow vegetables because it was so arid.
   (A) dry (B) flooded (C) fertile (D) ugly

6. He hoped to inherit his father's successful business.
   (A) buy (B) receive (C) find (D) take

7. Anybody who has seen him play the game chess has seen him dominate the board.
   (A) lose (B) win (C) control (D) tie

8. Their first encounter was at the birthday party of a mutual friend.
   (A) meeting (B) argument (C) disagreement (D) formal introduction

B Match each word with the correct definition.

1. evaporation	•	• **a.** a disease of the nervous system that causes victims to shake violently
2. migrant	•	• **b.** a place where one or more species of living organisms thrives
3. scroll	•	• **c.** a small piece
4. epilepsy	•	• **d.** one who improves pre-existing objects or solves problems practically
5. lifespan	•	• **e.** the process by which water is turned into gas by heat
6. advent	•	• **f.** one who goes to a new country for an extended period of time
7. habitat	•	• **g.** an old form of paper that writings were kept on
8. fragment	•	• **h.** the bone structure within an organism
9. innovator	•	• **i.** the arrival of an important person or thing
10. skeleton	•	• **j.** the expected length of life for a living organism

Unit 5

Sentence Simplification

Unit 5

Sentence Simplification

Overview

■ Introduction

Sentence Simplification questions ask you to choose a sentence that best paraphrases the original sentence in the passage. The correct answer uses different vocabulary and different grammar to restate the essential meaning of the original sentence in a simpler way. This type of question does not appear in every reading passage. Also, there is never more than one Sentence Simplification question in a passage.

■ Question Type

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.

■ Useful Tips

- Figure out what essential information is in the original sentence.
- Don't focus on minor information such as details and examples.
- Keep in mind that incorrect answers contradict something in the original sentence or leave out important information from the original sentence.
- Make sure that your answer agrees with the main argument of the paragraph or the passage as a whole.

Sample iBT Question

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.

Ⓐ Blue mussels use special bodily structures to stay on objects.

Ⓑ Blue mussels have strong thread-like appendages growing out of their bodies.

Ⓒ Blue mussels live on rocks and other things that grow strong thread-like strings.

Ⓓ Blue mussels eat thread-like substances on rocks and other objects to survive.

The Blue Mussel

The blue mussel is an edible bivalve. It is commonly farmed and harvested for food around the world. They attach themselves to rocks and other objects by strong, thread-like structures called byssal threads. The shell of the blue mussel is smooth, with a sculpting of concentric lines but no radiating ribs. They are purple, blue, or sometimes brown in color. Blue mussels are preyed upon by starfish. They are also eaten by the Dogwhelk, a carnivorous, rocky-shore mollusk. Blue mussels are part of a long-term environmental monitoring program in Prince William Sound, Alaska. The study examines how the blue mussel's hydrocarbon signature helps with ecosystem recovery.

Correct Answer The essential information in the original sentence is that the blue mussel has special bodily structures and uses them to cling to objects. So the correct answer is (A).

In order to answer Sentence Simplification questions, you should choose the sentence that best paraphrases the essential information in the highlighted sentence. A good paraphrase has different words and sentence structure from the original sentence. It does not focus on minor information such as details and examples.

Folk Medicine

Folk medicine refers to traditional methods of healing. It is used to deal with illness and injury. It is also used to aid with childbirth and to maintain wellness. It is a body of knowledge distinct from scientific medicine. But both types of medicine may coexist in the same culture. It is usually unwritten and transmitted orally until someone collects it. Within a culture, elements of folk medicine may be known by many adults. It is gathered and applied by healers and shamans. Midwives, witches, and dealers in herbs also use it. This medicine is not always collected into a system. Many treatments may seem to contradict each other.

1. Which of the following best expresses the essential information in the highlighted sentence?

(A) Many people in cultural groups think folk medicine is good.
(B) Folk medicine is part of a culture known to many grown-ups.
(C) Within some cultures, only adults can practice folk medicine.
(D) Adults treat themselves with folk medicine in some cultures.

Jury Selection

In the United States, the criminal justice system and some civil cases require a jury. These people are selected at random from the adult population in the same district served by the court concerned. A person who is serving on a jury is known as a juror. The number of jurors is usually six or twelve. They are chosen based on their ability to consider the trial fairly. There is always the possibility of jurors not completing the trial for health or other reasons. So, some alternate jurors are often nominated. They also follow the trial but do not take part in deciding the verdict.

2. Which of the following best expresses the essential information in the highlighted sentence?

(A) The people on a jury are randomly chosen from the same jurisdiction.
(B) The adult population in the same area randomly selects the people on the court.
(C) The jury is made up of the entire adult population in the same jurisdiction.
(D) There is a random selection of courts by the adult population.

Oaks

The term *oak* can be used to name hundreds of species of trees and shrubs. Oaks are native to the northern hemisphere. They include deciduous and evergreen species, extending from cold latitudes to tropical Asia and the Americas.

Oaks have spirally arranged leaves with a lobbed margin in many species. Some have serrated leaves or entire leaves with a smooth margin. The flowers are catkins, produced in spring. The fruit is a nut called an acorn, borne in a cup-like structure. Each acorn contains one seed and takes 6~18 months to mature. The length depends on the species. Oaks with evergreen leaves are called "live oaks," but they are not a distinct group. Their members are scattered among other sections.

3. Which of the following best expresses the essential information in the highlighted sentence?

(A) All the deciduous and evergreen trees in Asia and the Americas are oaks.
(B) Deciduous and evergreen oaks are found in cold and hot Asia and the Americas.
(C) Oaks are deciduous or evergreen trees found in both cold and hot regions.
(D) Deciduous and evergreen species of oaks survive best at cold or hot latitudes.

The Lumber Industry

Trees felled to make wood are called timber, and wood cut into boards is called lumber. Lumber is supplied either rough or finished. Rough lumber is the raw material for furniture making. It is available in many species, but usually hardwoods. Finished lumber is supplied in standard sizes and is used mostly by the construction industry. Lumber was one of the first industries in the United States. Maine and New York were early leaders in production. Later expansion led to Michigan, Oregon, Washington, and California. The men who cut the trees down to make lumber are known as lumberjacks. These men are often characters in early American folklore.

4. Which of the following best expresses the essential information in the highlighted sentence?

(A) The construction industry accounts for most of the use of standardized lumber.
(B) Lumber comes in standard sizes provided by the construction industry.
(C) The construction industry provides most of the lumber in standard sizes.
(D) Standard sizes in the construction industry are important for finished lumber.

Practice with Long Passages

A Read the following passage, and answer the questions.

Wheat Production

Time Limit: 2 min. 50 sec.

Wheat is cultivated worldwide. Globally it is the most important human food grain. It ranks second in total production as a cereal crop behind maize. The third is rice. Wheat is a staple food used to make flour for leavened, flat, and steamed breads. It is also used for cookies, cakes, pasta, noodles, and couscous. In addition, it is used to make forms of alcohol such as beer and vodka. These days it is even being used in biofuel. The husk of the grain, separated when milling white flour, is bran. Wheat is planted to a limited extent as a forage crop for livestock. The straw can be used as fodder for livestock or as a construction material for roofing hatch.

Harvested wheat grain is classified according to grain properties for the purposes of the commodities market. Wheat buyers use the classifications to help decide which wheat to purchase. Each class has special uses. Wheat producers determine which classes of wheat are most profitable to cultivate with this system.

Wheat is widely cultivated as a cash crop because it produces a good yield per unit area. It also grows well in a temperate climate, even with a moderately short growing season. It yields high-quality flour that is widely used in baking. Most bread is made with wheat flour, including many breads named for the other grains they contain, like rye and oat breads. Many other popular foods are made from wheat flour as well. This results in a large demand for the grain, even in economies with a significant food surplus.

There are six classes of wheat grown in the United States. Durum wheat is very hard with light colored grain. Hard Red Spring wheat is brownish and contains a lot of protein. Hard Red Winter wheat is similar and is primarily grown in Kansas. Soft Red Winter wheat is soft and low in protein. Hard White wheat is light colored and chalky. Soft White wheat has very little protein and is grown in temperate, moist areas.

General Comprehension

1. **According to the passage, which of the following is true about wheat?**

   (A) It has a low yield per unit area.
   (B) It has a long growing season.
   (C) It is the most important cereal crop to humans.
   (D) It is primarily grown in Kansas.

2. **According to paragraph 4, the six classes of wheat include all of the following EXCEPT:**

   (A) Durum
   (B) Soft Red Winter
   (C) Hard White
   (D) Blue Sweet

- **cultivate (v)** to grow; to farm
- **rank (v)** to achieve a level or place on a list
- **maize (n)** corn
- **staple (n)** something that is used every day
- **profitable (a)** able to be sold for money
- **yield (n)** the amount of something that is produced

On the TOEFL Test

3. 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.

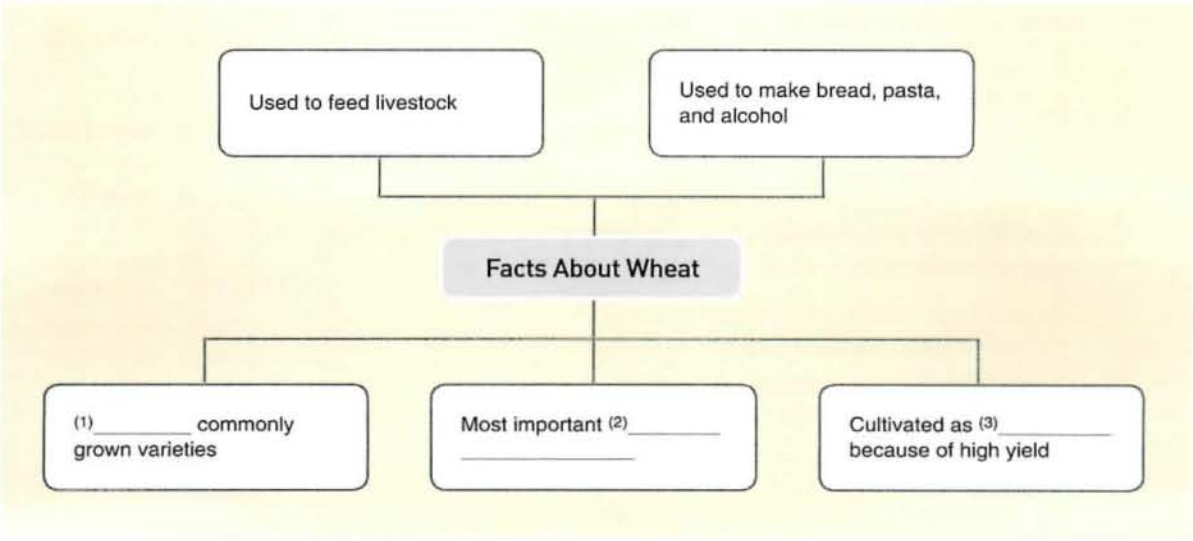
Wheat is planted to a limited extent as a forage crop for livestock.

(A) Wheat is planted to increase crops and livestock.
(B) Some wheat is planted for farm animals to eat.
(C) Wheat can be found planted on farms with animals.
(D) Many farms plant less wheat if they have animals.

4. 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.

Wheat is widely cultivated as a cash crop because it produces a good yield per unit area.

(A) High productivity of wheat makes people grow a lot of it for profit.
(B) Wheat is widely grown in places where people need lots of cash.
(C) Wheat must be grown over a wide space, which costs a lot.
(D) Wheat is the most abundant cash crop in the world.



B Read the following passage, and answer the questions.

Cryonics

Time Limit: 2 min. 40 sec.

Cryonics is the practice of cooling dead organic tissue. This is used on humans or animals that have recently died. The hope is to bring them back to life in the near future. By law, it can only be performed on humans after they are legally dead. Many scientists and doctors think cryonics is totally unethical. However, there are also many who support cryonics.

Supporters of cryonics hope that future technology will improve. Molecular technology is especially hoped to reverse the early stages of clinical death. It is hoped that this will enable the repair of tissue on a very tiny level. It could also allow damaged tissues and organs to be regenerated. They also assume that disease and aging will one day be reversible.

These supporters want to store the memory and identity from the brain of people who have recently died. Cryonics attempts to do this by using fluid that preserves the brain. If this is done before cooling, it will prevent injury. This cooling fluid saves the fine cell structures of the brain where memory and identity reside.

Critics of cryonics think this process is a waste of time and money. They base their opinions on the current level of science. It is true that cells, tissues, blood vessels, and some small animal organs can be reversibly preserved. Some frogs can even survive for a few months in a partially frozen state if they are kept a few degrees above freezing. But this is not true cryo-preservation. There is no proof that the identity and memory of a person can be restored after death has occurred.

Critics also think that if it were possible to bring dead people back to life, it would cause many social problems. Critics worry it would cause a huge overpopulation problem. Many also think trying to reverse death is immoral because it goes against the will of their God.

General Comprehension

1. According to paragraph 2, all of the following statements about advancements in molecular technology are true EXCEPT:

(A) It is hoped to enable the repair of tissue.
(B) It can cool and preserve the fine cell structures of the brain.
(C) It will make the early stages of clinical death reversible.
(D) It will allow damaged tissue and organs to be restored.

2. According to the passage, many critics think bringing dead people back to life would

(A) cause a serious overpopulation problem
(B) make their memories lost
(C) help to reverse disease and aging
(D) go along with the will of God

- **tissue (n)** the material that life forms are made of
- **unethical (a)** not morally acceptable; immoral
- **regenerate (v)** to grow again
- **reside (v)** to live somewhere
- **partially (ad)** not completely
- **immoral (a)** not considered to be good or honest by most people

On the TOEFL Test

3. 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.

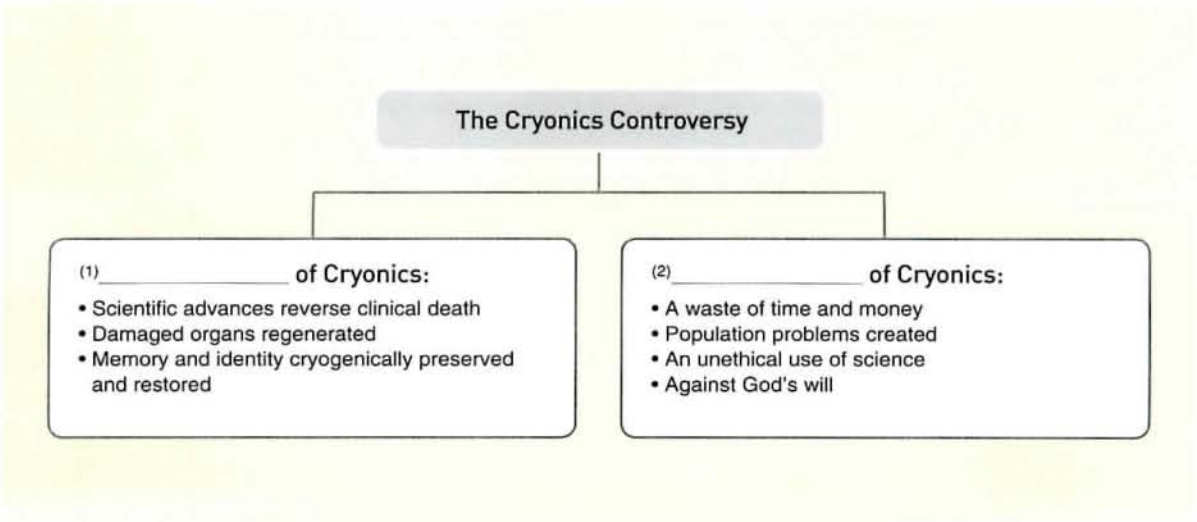
By law, it can only be performed on humans after they are legally dead.

(A) Laws forbid the use of cryonics on dead people.
(B) Cryonics is legally used to bring dead people back to life.
(C) By law, cryonics should be used prior to people's death.
(D) Laws limit the use of cryonics to legally dead people.

4. 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.

There is no proof that the identity and memory of a person can be restored after death has occurred.

(A) Human memory and identity can be saved by the process of cryonics.
(B) A person should prove that his identity and memory can be restored after death.
(C) Nobody knows if a person's memory and identity can be brought back after death.
(D) Death is the first stage of proving that memory and identity can be restored.



C Read the following passage, and answer the questions.

Road Law in Rome

Time Limit: 2 min. 50 sec.

Roads were essential for the growth of the Roman Empire. These roads enabled them to move armies quickly and efficiently. There is even a proverb that says, "All roads lead to Rome." At its peak, the Roman road system spanned 53,000 miles and contained about 372 links. The Romans were adept at constructing these roads, which were called *viae*.

Prepared *viae* began in history as the streets of Rome. The laws of the Twelve Tables, dated to approximately 450 B.C., specify that a road shall be 8 feet wide where straight and 16 where curved. The tables command Romans to build roads and give wayfarers the right to pass over private land where the road is in disrepair. Therefore, building roads that would not need frequent repair became an ideological objective.

Roman law defined the right to use a road as a *servitus*, or claim. The right of going established a claim to use a footpath across private land. The right of driving allowed for a carriage. A road combined both types of claims as long as it was of the proper width, which was determined by an arbiter. The default width was 8 feet. In these rather dry laws, the prevalence of public domain over private can be seen, which characterized the republic.

The Romans had a preference for standardization whenever they could. After being made permanent commissioner of roads in 20 B.C., Augustus set up a golden milestone near the temple of Saturn. On this were listed all of the cities in the empire and the distance to them. This was later called the navel of Rome.

Roman roads were very important in maintaining both the stability and the expansion of the empire. The legions made good time on them. These roads are still used a thousand years later. During the fall of the Roman Empire, the same roads offered avenues of invasion to the barbarians. This contributed to Roman military reverses.

General Comprehension

1. According to the passage, roads were important to the Roman Empire because

(A) they were the symbol of the Roman republic
(B) they had signs that listed the distance from cities around the world to Rome
(C) they allowed quick and efficient movement of armies
(D) they showed the Romans' eagerness for standardization

2. According to the passage, all of the following statements about Roman road law are true EXCEPT:

(A) The right to use roads was defined as a *servitus*.
(B) Roads were required to be eight feet wide where straight.
(C) Roads were called *viae*.
(D) The right of driving did not allow for carriages.

- **adept (a)** highly skilled at something
- **wayfarer (n)** a traveler
- **in disrepair (phr)** in a state of poor condition
- **arbiter (n)** a judge or decision maker
- **prevalence (n)** commonness
- **permanent (a)** everlasting; constant
- **stability (n)** steadiness; firmness

On the TOEFL Test

3. **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.**

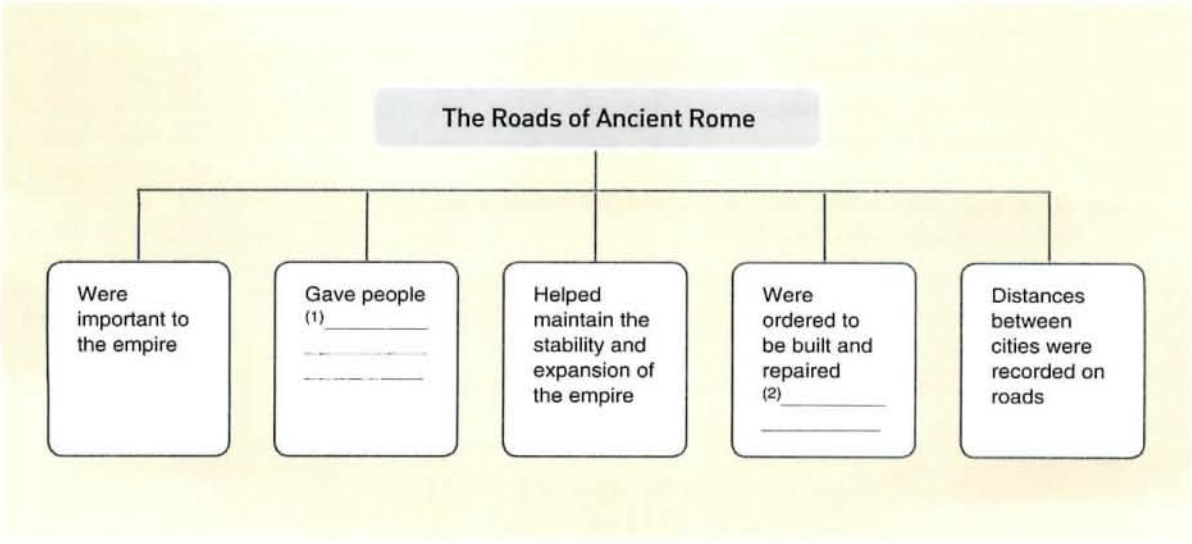
In these rather dry laws, the prevalence of public domain over private can be seen, which characterized the republic.

(A) Roman republicans believed privacy was more important than public life.
(B) The Romans separated public life from private life by law.
(C) One characteristic of the Roman republic was the strict enactment of public law.
(D) The laws of the Roman republic tended to put public life before private.

4. **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.**

During the fall of the Roman Empire, the same roads offered avenues of invasion to the barbarians.

(A) The Roman Empire built roads to allow the barbarians to invade.
(B) The barbarians invaded Rome on those roads, leading to its downfall.
(C) The barbarians preferred to invade the Roman Empire on roads and avenues.
(D) The Roman Empire offered the barbarians a chance to invade on different avenues.



D Read the following passage, and answer the questions.

Animal Territoriality

Time Limit: 2 min. 40 sec.

The term *territory* refers to any area that an animal defends. Animals that defend territories are territorial. The idea of animal territories was first introduced by Eliot Howard. He wrote of this concept in a book published in 1920. In the 1930s the concept was developed further by Margaret Morse Nice, who elaborated on it through her studies on the song sparrow. Later, it was widely popularized by Robert Ardrey in his book *The Territorial Imperative*. The popularity of the book led to an exaggerated idea of the importance of territory. This concept was thought to be part of the field of social ecology. In fact, however, only a small number of species have territories with clear boundaries. Within these boundaries, they live and find all the resources they need.

The most obvious examples of territory are with birds and fish. These animals often develop bright colors to warn others away from their territories. The European robin and the Siamese fighting fish adopt these kinds of colors to defend their territories. These areas usually contain their nest sites and offer sufficient food for them and their young.

Defense rarely takes the form of overt fights. More frequently there is a highly noticeable display. This display may be visual. An example of this is the red breast of the robin. Or it may be auditory. Many bird songs or the calls of gibbons are made for this reason. Or it can be olfactory. This is carried out through the deposit of scent marks. These marks may be deposited by urination or by defecation. Dogs mark their scent in these ways. Or scent marks can be placed by rubbing parts of the bodies that bear specialized scent glands against the objects in a territory. Cats mark their scent by rubbing their faces and flanks against objects.

General Comprehension

1. According to paragraph 2, animals often develop bright colors in order to

(A) attract the opposite sex
(B) mark clear territorial boundaries
(C) provide food for their young in the nest
(D) send a warning to other animals

2. According to the passage, all of the following about animal territories are true EXCEPT:

(A) The concept of animal territories was first created by Eliot Howard.
(B) Many species create territories with clearly marked boundaries.
(C) Animals rarely fight overtly to defend territory.
(D) Defecation or urine scent markers mark territories.

- **exaggerate (v)** to overstate
- **overt (a)** done or shown in an open and obvious way
- **auditory (a)** related to sound
- **olfactory (a)** related to smell
- **urination (n)** the act of getting rid of liquid waste from the body
- **defecation (n)** the act of getting rid of solid waste from the body

On the TOEFL Test

3. 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.

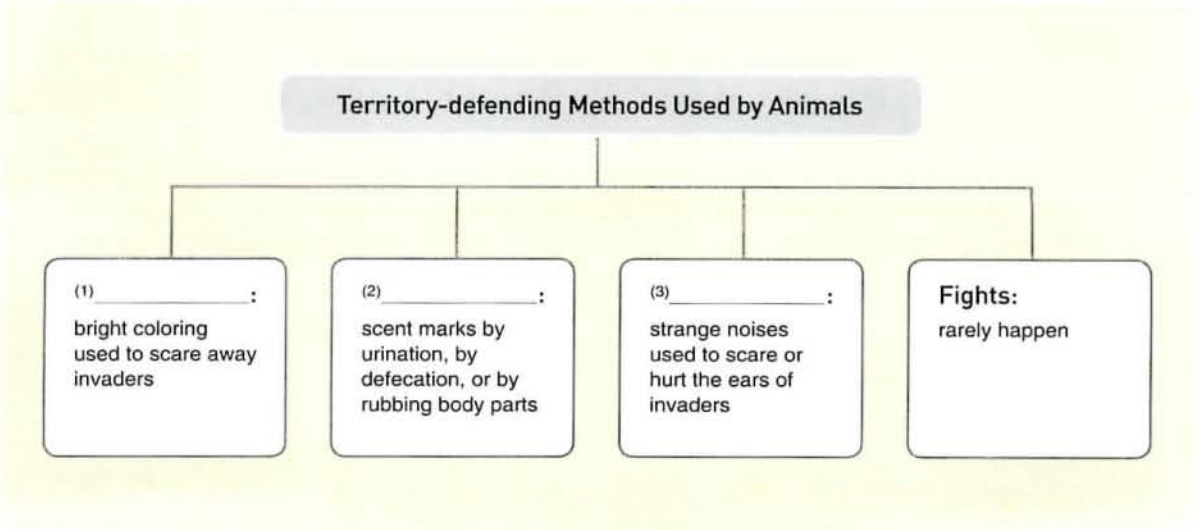
In the 1930s the concept was developed further by Margaret Morse Nice, who elaborated on it through her studies on the song sparrow.

(A) In the 1930s, Margaret Morse Nice began to study the song sparrow.
(B) The concept of the song sparrow territories was suggested by Margaret Morse Nice in the 1930s.
(C) Margaret Morse Nice furthered the concept of animal territories by studying song sparrows in the 1930s.
(D) Studies on the song sparrow were popularized by Margaret Morse Nice in the 1930s.

4. 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.

Or scent marks can be placed by rubbing parts of the bodies that bear specialized scent glands against the objects in a territory.

(A) Rubbing particular body parts against the objects in a territory is a way of leaving scent marks.
(B) Some animals have scent glands that are marked by different objects in their territories.
(C) The objects in a territory contain specialized scent marks from different body parts of different animals.
(D) With scent marks left by rubbing, animals claim different objects in their territories.



E Read the following passage, and answer the questions.

The Flow of Activity in the U.S. Economy

Time Limit: 2 min. 50 sec.

The United States has the largest economy in the world. But since the early 1980s, the United States has changed. It once was the world's largest creditor, but now it has a substantial current account deficit. It has also taken on a large national debt. The national debt is now about 64% of the current GDP and is the highest since the 1950s.

The federal government guides the economic pace to maintain steady growth. Not only does it attempt to maintain steady growth, but it also works for high employment and price stability. Adjusting spending and taxes can slow down or speed up economic growth. Managing the money supply and controlling credit can also affect this rate. This process also affects the level of prices and employment.

In the past, the Great Depression of the 1930s had a great effect on the U.S. economy. Periods of slow economic growth and high unemployment were seen as the greatest economic threats. The danger of recession was serious. The government tried to make the economy stronger by spending more money. It also cut taxes so that consumers would spend more. It fostered rapid growth in the money supply.

Also, in the 1970s there were major price increases, particularly for energy. This created a strong fear of inflation, which led to an overall increase in the level of prices. As a result, government leaders began to focus more on holding back inflation.

Many changes took place between the 1960s and the 1990s. In the 1960s, the government had faith in fiscal policy. The president and the U.S. Congress played a large role in directing the economy. But periods of high inflation and joblessness weakened the public's faith in them. The overall slow pace also damaged their image. Now, monetary policy is used to control the flow of economic activity. This policy is directed by the nation's central bank, known as the Federal Reserve Board (FRB). It has much independence from the president and Congress.

General Comprehension

1. According to paragraph 3, all of the following are true of the Great Depression EXCEPT:

(A) It did not have a very strong impact on the U.S. economy.
(B) It was marked by slow economic growth and high unemployment.
(C) It was considered a serious danger to the economy by the government.
(D) The government spent more money trying to strengthen the economy.

2. According to the passage, loss of public faith in the president and Congress was caused by

(A) the Federal Reserve Board
(B) high inflation and unemployment
(C) monetary policy
(D) high employment and price stability

- **creditor (n)** one who extends credit, usually by loaning money
- **substantial (a)** considerable; ample
- **deficit (n)** a situation in which more money is spent than made
- **adjust (v)** to change; to become accustomed to; to adapt
- **foster (v)** to promote; to encourage
- **inflation (n)** a period that marks a rise in prices

On the TOEFL Test

3. 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.

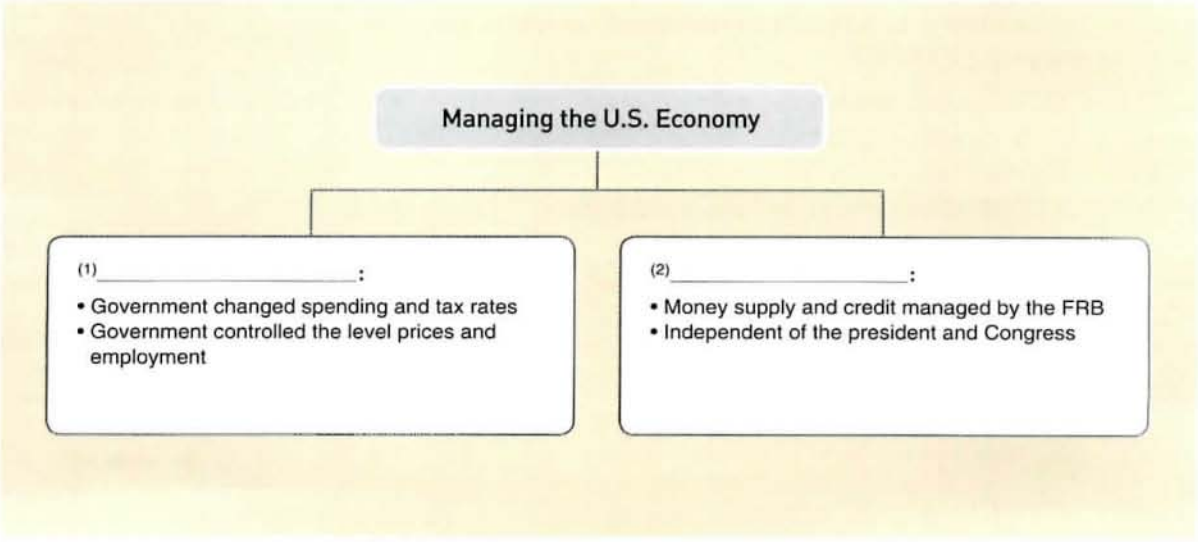
Not only does it attempt to maintain steady growth, but it also works for high employment and price stability.

(A) The federal government keeps growth steady but cannot maintain high employment and stable prices.
(B) Because it needs high employment and stable prices, the federal government needs steady growth.
(C) Without constant growth, the federal government cannot have high employment and stable prices.
(D) The federal government tries to achieve growth, high employment, and unchanging prices.

4. 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.

This created a strong fear of inflation, which led to an overall increase in the level of prices.

(A) Worries about inflation caused by increasing energy prices raised overall prices.
(B) The high increase in prices caused a strong fear of inflation of energy prices.
(C) People were afraid of inflation and also worried about increasing prices of energy.
(D) The overall increase in prices caused inflation in fuel and energy prices.



F Read the following passage, and answer the questions.

Evolution of the Elephant

Time Limit: 2 min. 50 sec.

Elephants are the only remaining family in their biological order. There are three living species of elephants. These are the African bush and forest elephants and the Asian. Other species have been extinct since the last ice age.

Elephants are the largest land mammals alive today. Their pregnancy period is 22 months. It is the longest of any land animal. At birth, it is common for an elephant calf to weigh 120kg. An elephant may live as long as 70 years, and some even live longer. The largest elephant ever recorded was shot in Angola in 1956. It was male and weighed about 12,000kg. The smallest elephants were about the size of a calf or a large pig. They were a prehistoric variant that lived on the island of Crete. They existed until between 3,000 and 5,000 B.C.

Elephants are increasingly threatened by humans. Human-elephant conflicts are often deadly. They kill 150 elephants and up to 100 people per year in Asia. The African elephant population has gone from 3 million in 1970 to about 600,000 in 1989. The numbers of this beast then dropped even further. By 2,000 the number was down to 272,000. In recent years, efforts to save these animals have helped it rise. The elephant is now protected around the world. Many restrictions have been enacted for their benefit, strictly limiting their capture and domestic use. Trade in products such as ivory is also controlled.

Some scientists believe the elephant family is distantly related to sea cows. They also think there is a link between elephants and hyraxes. The fossil evidence does not offer certain proof while many believe the genetic evidence shows this. One theory suggests that these animals spent most of their time underwater. They would have used their trunks like snorkels for breathing. Modern elephants still have this ability, and they are known to swim like that. They can swim for up to 6 hours and 50km.

General Comprehension

1. **The author's description of elephants mentions all of the following EXCEPT:**
   - (A) Three different species exist today.
   - (B) They are pregnant for a period of 22 months.
   - (C) They can swim for less than 6 hours.
   - (D) They can live to be 120 years or longer.

2. **According to paragraph 4, which of the following is true about modern elephants?**
   - (A) They can spend most of their time underwater.
   - (B) They are the size of a calf or large pig.
   - (C) They use their trunks like snorkels.
   - (D) They can run up to 50km per hour.

- **mammal (n)** animals that give birth to babies and feed their young with milk
- **prehistoric (a)** from the time before recorded human history
- **variant (n)** something that slightly differs from something else
- **conflict (n)** disagreement; argument
- **restriction (n)** a rule that limits something
- **enact (v)** to make or pass a law

On the TOEFL Test

3. 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.

Many restrictions have been enacted for their benefit, strictly limiting their capture and domestic use.

(A) Laws have been passed to help protect elephants from people.
(B) Laws allowing elephants to be captured and raised domestically have been passed.
(C) Without laws, elephants would be captured and put in zoos.
(D) The laws benefit people by allowing elephants to be captured.

4. 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.

The fossil evidence does not offer certain proof while many believe the genetic evidence shows this.

(A) People believe what the fossil and genetic evidence shows about the link between elephants and hyraxes.
(B) The fossil and genetic evidence clearly shows the link between elephants and hydraxes.
(C) The genetic evidence is believed to show the link between elephants and hydraxes by supporters of the fossil evidence.
(D) Unlike the fossil evidence, the genetic evidence seems to show a clear link between elephants and hydraxes.

The Elephant

- Three species in existence – (1)_____ & one Asian type
- The largest land mammals
- Pregnancy period – 22 months
- Life span – up to 70 years
- Weight – (2)_____
- The largest elephant ever weighed – 12,000 kg
- A long nose – breathing underwater for up to (3)_____

Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Wheat Production

classification system	the quality and price	six classes
profitable crop	widely grown	

Wheat is one of the most (1)_____ and important crops in the world. It has many important uses by humans. Wheat grain is harvested according to a (2)_____ that determines (3)_____. Wheat is a very (4)_____ because it is used so widely in products that are consumed daily. There are (5)_____ of wheat grown in the United States.

2. Cryonics

not possible	preserve the memory	unethical
cryonics	freezing animals or humans	

(1)_____ is the controversial process of (2)_____ immediately after death in hopes of reviving them at a later date. Although reversing death is (3)_____ through current scientific methods, practitioners of cryonics hope future advances will make it possible. Their current goal is to (4)_____ and identity of those who die. Critics of cryonics think it is (5)_____ as well as a waste of time.

3. Road Law in Rome

invade and conquer	building and administering laws	Roman roads
the golden milestone	in disrepair	

Roads were a very important part of the Roman Empire, and the Romans were very advanced at (1)_____ to control them. (2)_____ were built to very strict measurements, and laws protected travelers when roads were not available or (3)_____. There was even a point from which all roads to Rome led, called (4)_____. Roman roads eventually enabled barbarians to (5)_____ Rome, but its roads still exist today.

4. Animal Territoriality

territories	bright colors or strong smells	mark their territory
few animals	in the early 20th century	

Animals defend areas called (1)_____, which are important to them. This concept was introduced (2)_____ although it was greatly exaggerated. Many animals develop (3)_____ to protect their territories. (4)_____ fight over territory. Many common animals (5)_____ with their own smell.

5. The Flow of Activity in the U.S. Economy

the direction of the economy	the U.S. economy	the nation's central bank
the president and Congress's role	the Great Depression	

(1)_____ was once the most powerful in the world, but it is now the most indebted. The federal government controls many factors that change (2)_____. During (3)_____, the federal government shifted its economic philosophy from creating growth to holding back prices. Because of these changes, the public has lost faith in (4)_____ in influencing the economy. (5)_____ now independently attempts to guide the economy.

6. The Evolution of the Elephant

by humans	the longest pregnancy period	increase their numbers
three species	sea cows and possibly hyraxes	

There are only (1)_____ of elephants still living today. They are the largest of all land mammals and have (2)_____. These days, elephants have been endangered (3)_____, but efforts are being made to (4)_____. Scientists think elephants are genetically related to (5)_____ although there is not enough evidence to prove this.

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

   (A) John Deere
   (B) steel plow
   (C) farming
   (D) soil

2. **According to paragraph 1, the U.S. economy became the largest and most modern in the world because**

   (A) the U.S. won the American Revolution
   (B) there were many new inventions
   (C) America imported many European products
   (D) the economy grew steadily for more than 150 years

3. **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.**

   (A) New England grew more rapidly than European countries.
   (B) There was rapid growth everywhere in the United States, including New England.
   (C) Only one area besides New England in America experienced fast growth.
   (D) Fast growth occurred in New England first in America.

4. **Which of the following can be inferred about Pennsylvania's industry?**

   (A) It had a textile industry similar to Massachusetts'.
   (B) It often competed against Massachusetts and other states.
   (C) Its iron industry was stronger than in other states.
   (D) It was the richest state in the country.

5. **Why does the author mention practical inventions in paragraph 4?**

   (A) To exemplify the reasons for the development of industry in America
   (B) To show how America became so rich by selling new products
   (C) To illustrate how intelligent American inventors were
   (D) To prove that most useful inventions came from America

6. **The word boomed in the passage is closest in meaning to**

   (A) imploded
   (B) increased
   (C) shrank
   (D) continued

The Development of Industry in America

After the American Revolution, industry in the U.S. was behind Europe. But it was not very far behind. Several waves of inventions and growth soon hit. This happened over a period of 150 years. These advances made the U.S. economy the largest and most modern in the world.

During the American Revolution, America had not yet entered its industrial age. Most manufacturing was done in people's homes. Whereas Britain was industrialized, America had not caught on yet. Then Francis Cabot Lowell went to Britain in 1811. He memorized the secrets to constructing a power loom. After he and his associates returned to America, they founded some textile plants in Boston. The most famous was in Lowell, Massachusetts. It was built in 1822. The Lowell system employed many "mill girls." They lived in dormitories in order to run the factory.

New England was the home of a growing textile industry. It was the first area of the United States to experience such rapid growth. This growth also occurred in Pennsylvania. The iron industry pushed that state along and helped it to grow even faster.

Then the direction of progress began to change. This new period took place between 1810 and the 1860s. Factories continued to expand. But greater strides were being taken in inventing. American manufacturing and agriculture was greatly improved. These improvements came from practical inventions. Richard Chenaworth invented the cast-iron plow. It was useful because it had replaceable parts. John Deere created the steel plow, which made farming faster because the soil did not stick to it. Eli Whitney invented the cotton gin and the jig. This began a huge cotton industry in the south. Samuel Morse invented the telegraph, which began the age of long-range communication. Elisha Otis invented the passenger elevator. This led to modern-day skyscrapers. Finally, George Pullman created the sleeping car for trains. This allowed for long-distance travel.

From the 1850s on, industry in the United States boomed. The Civil War was over. With the victory of the North, Northern business entrepreneurs flourished. Government was eager to see business expand. The innovations listed above caused swift and dramatic changes. Railroads were now needed to carry goods across the country. People in the south traded cotton. They sold their product to the north and to Britain.

By the early 1900s, cars were needed by many people. The auto industry introduced a new dimension of growth to America. By the 1920s, Henry Ford introduced his Model-T. With it came the modern assembly line.

7. **The word specialize in the passage is closest in meaning to**

(A) focus
(B) prefer
(C) examine
(D) discuss

8. **Which of the following best expresses the essential information in the highlighted sentence in paragraph 1? *Incorrect* answer choices change the meaning in important ways or leave out essential information.**

(A) Small living creatures that people cannot see are always in food.
(B) No one realized that our foods consisted of small, living organisms.
(C) People did not realize that our foods held invisible, tiny, living creatures.
(D) Nobody thought organisms living in food were too tiny to see.

9. **The word reproduce in the passage is closest in meaning to**

(A) become pregnant
(B) fertilize
(C) duplicate
(D) combine

10. **Why does the author mention the first single-celled microbes formed around 4 billion years ago?**

(A) To show how basic they are
(B) To indicate how long they have been on Earth
(C) To show how much they have mutated over the years
(D) To explain why they are still in existence

11. **The author mentions all of the following as places where extremophiles have been found EXCEPT:**

(A) the Arctic area
(B) oceans
(C) volcanoes
(D) deserts

12. **Which of the following can be inferred about extremophiles?**

(A) Scientists have discovered simple ways to kill them.
(B) They are less resistant to influences than microbes.
(C) There are more of them in existence than microbes.
(D) Scientists will possibly find them in outer space in the future.

Microbes

Before the discovery of microbes, the changes that took place in foods as they aged were a mystery. Nobody knew why grapes turned into wine and milk turned into cheese. No one even thought that there were living organisms too small to be seen by the naked eye at work on our foods. Then, in 1676, a Dutch scientist discovered these microscopic creatures.

We now know much more about microbes. Scientists who specialize in their study look at the various forms of these tiny creatures. These microbes can take the forms of bacteria, fungi, archaea, or eukaryotes. Viruses are not considered to be microbes since they are not alive. Microbes can be single or have multiple cells. A few single-celled microbes, known as protists, are visible to the naked eye.

Microbes are usually found in water or other liquids that are below the boiling point. Scientists have taken samples of microbes from hot springs, on the ocean floor, and even from deep within the Earth's crust. These microbes are important parts of the Earth's many ecosystems. They are responsible for recycling nutrients and are also an important part of the nitrogen cycle.

Scientists believe the first single-celled microbes formed around 4 billion years ago. These were the first life forms on Earth and were the only ones for 3 billion years. Microbes reproduce quickly and vastly. They are able freely to exchange genes between different species. They also mutate at an accelerated rate, which allows them to evolve swiftly in order to adapt to new environments. A problem associated with the ability of microbes to evolve so rapidly is the development of 'super bugs' that are able to resist modern antibiotic drugs.

The simplest microbes are bacteria. They are also among the most common group of living things on Earth. They can be found in all environments where the temperature is below 140 degrees Celsius. They are present in sea water, soil, and even within the human stomach and intestines. The genome of bacteria is a single strand of DNA. Bacteria are surrounded by a cell wall. They are known to reproduce by a process called binary fission. By this process they split again and again. Some bacteria are able to double every ten minutes under prime conditions.

Another variety of microbes is archaea. These are single-celled creatures with no nuclei. These microbes are common in all types of habitats, including extreme environments. Eukaryotes are different from bacteria and archaea. They have multi-celled structures called organelles within them. The eukaryote DNA is housed within the nucleus organelle.

One of the most interesting kinds of microbes is the extremophile. These are microbes that have adapted to highly hostile environments. These robust creatures can be found at the North and South Poles, in deserts, and in the deep sea. These microbes have even been found as far as 7km below the Earth's surface. Some extremophiles have survived in a vacuum and are resistant to radiation. This leads scientists to believe that it is possible for them to survive in space.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. They wanted to **cultivate** tomatoes in their backyard.
   (A) eat (B) find (C) use (D) grow

2. She hoped to **prevent** an accident by checking the brakes on her car.
   (A) help (B) encourage (C) stop (D) need

3. The scientists were experts at tissue and organ **regeneration**.
   (A) removal (B) repair (C) damage (D) replacement

4. He wanted to increase the **pace** of our walking.
   (A) difficulty (B) ease (C) style (D) speed

5. He was known to help **wayfarers** in need.
   (A) people (B) travelers (C) stray animals (D) vegetables

6. The popular new product was based on the designer's **concept**.
   (A) idea (B) work (C) promise (D) design

7. A mother moose will always **defend** her young children.
   (A) hurt (B) help (C) protect (D) enjoy

8. We were fascinated to view so many exotic **creatures** at the nature park.
   (A) people (B) scenes (C) plants (D) animals

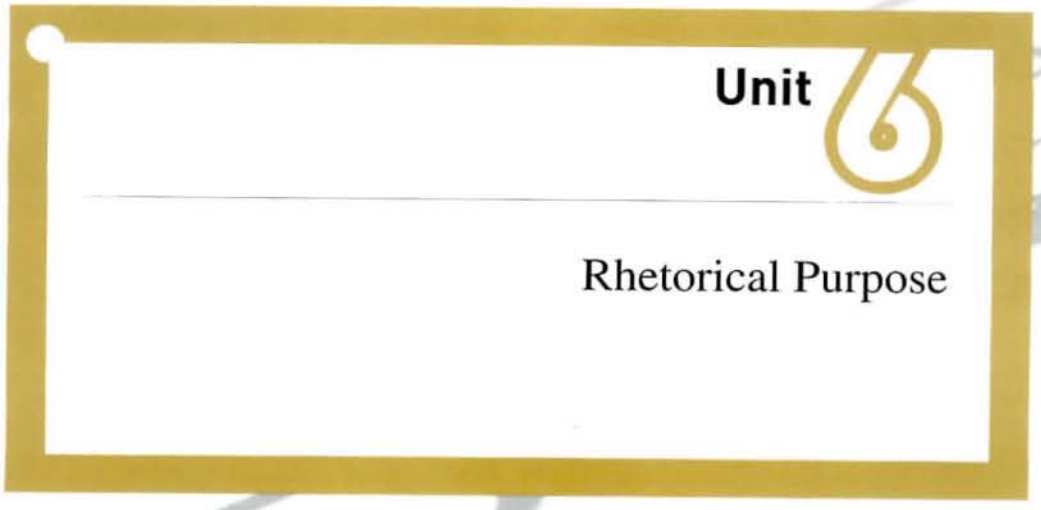
B Match each word with the correct definition.

1. prevalence	•	• **a.** not morally acceptable; immoral
2. creditor	•	• **b.** a line that marks an area
3. staple	•	• **c.** from the time before recorded human history
4. olfactory	•	• **d.** a period that marks a rise in prices
5. unethical	•	• **e.** the amount of something that is produced
6. inflation	•	• **f.** one who extends credit, usually by loaning money
7. prehistoric	•	• **g.** a situation in which more money is spent than made
8. deficit	•	• **h.** something that is used every day
9. yield	•	• **i.** commonness
10. boundary	•	• **j.** related to smell

PART 2 Making Inferences

In this part, the reading comprehension questions include: rhetorical purpose, inference, and insert text. The learning objectives of these comprehension questions are to understand the rhetorical function of a statement or paragraph, the logic of the passage, and strongly implied ideas in the text.

- Unit 6 **Rhetorical Purpose**
  Astronomy / History / Zoology / Physics
- Unit 7 **Inference**
  Biology / Music / History / Geology
- Unit 8 **Insert Text**
  Culture / Astronomy / Literature / Chemistry


Unit 6
Rhetorical Purpose

Unit 6

Rhetorical Purpose

Overview

■ Introduction

Rhetorical Purpose questions ask you to understand why and how the author uses a particular piece of information in the passage. This information can be used to argue, define, explain, or compare ideas. Because this type of question usually focuses on the logical development of the passage, you need to figure out how one sentence or paragraph relates to another.

■ Question Types

1. The author discusses X in paragraph _____ in order to ~

2. Why does the author mention X?

3. The author uses X as an example of ~

4. Why does the author quote X in the passage?

5. In paragraph _____, why does the author give details about X?

6. In paragraph _____, the author explains X by ~

7. How does the author explain the idea of X in paragraph _____?

■ Useful Tips

- Read the question first, and then recognize the author's purpose immediately by scanning the specific phrases or paragraphs.
- Focus on the logical links between sentences and paragraphs, not on the overall organization of the passage.
- Familiarize yourself with the words or phrases for rhetorical functions like *to illustrate, to criticize, to explain, to contrast, to compare, to note,* etc.

Sample iBT Question

Why does the author mention It is much different from the physical activity of observing the stars?

(A) To support why astrophysics is difficult to study
(B) To explain why astrophysicists study objects in space
(C) To show how different astrophysics is from other sciences
(D) To explain how astrophysicists solve theoretical problems

Astrophysics

Astrophysics looks at the makeup of outer space as a branch of astronomy. Scientists in this field consider the brightness and density of objects in space. They examine the fabric of all celestial objects. This is a difficult science because it is purely theoretical. It is much different from the physical activity of observing the stars. None of the events that astrophysicists study can be created on Earth. These scientists must create theoretical models from real observations. Then, they solve the problems that arise. Astrophysics is said to be the only branch of science that has never been able to obtain a single specimen.

Correct Answer The highlighted sentence elaborates on the fact that astrophysics is purely theoretical by contrasting it with the visible activity of stargazing. This is to provide a supporting detail as to why astrophysics is difficult to study. So the correct answer is (A).

Rhetorical Purpose questions ask you why the author uses particular words, phrases, or sentences in particular paragraphs. These expressions can be used to define, argue, explain, illustrate, or contrast ideas. So you need to look at the logical links between ideas rather than focusing on the overall organization of the whole passage.

Comb Jelly

The comb jelly is a sea creature but not a true jellyfish. This is because it lacks poison stingers. There are more than 100 kinds of comb jelly living in the world's oceans. They make up a large amount of plankton biomass. One species is the sea gooseberry, which is native to the North Sea. It has reached a very high population. Its numbers are so high that it often clogs fishermen's nets. Few other species are known to do this. The fragile makeup of comb jelly makes it very difficult to research, so data on its lifespan is not available. But it is known that comb jelly reproduces even before adulthood. So it is assumed that their generational cycle is short.

1. Why does the author mention that it lacks poison stingers?

(A) To explain how comb jelly is not fully understood by scientists
(B) To note that comb jelly often clogs the nets of fishermen
(C) To contrast comb jelly with species of true jellyfish
(D) To discuss how comb jelly make up a large amount of plankton biomass

White and Brown Dwarfs

A low or medium mass star goes into the white dwarf stage when it dies. They reach this stage after entering the red giant stage and shedding their outer material. A white dwarf is the size of the Earth but has the density of the sun. It is the densest mass in the universe except for black holes and neutron or quark stars. On the other hand, the brown dwarf is different from the white dwarf because it has a very low density. It is made mostly of gas and is often difficult to tell apart from a large planet.

2. Why does the author mention that A white dwarf is the size of the Earth but has the density of the sun?

(A) To show that white dwarfs are made mostly of gas
(B) To illustrate that white dwarfs have very high density
(C) To explain that white dwarfs were once red giants
(D) To highlight that a white dwarf is often hard to tell apart from a large planet

Spider Sociality

Spiders are predatory animals. In many cases, the female will eat the male after mating. Some types of female spiders are also known to eat their own babies. Most spiders are solitary creatures, but a few species of spiders that build webs live together in large colonies. Although they show social behavior, they are not as well evolved as social insects such as bees and ants. The most social species are probably Anelosimus eximius. They can form colonies of up to fifty thousand individuals. Many spiders only live one or two years. But it is common for tarantulas to live around twenty years.

3. The author uses tarantulas as an example of

(A) spiders that eat their young
(B) solitary spiders
(C) socially evolved spiders
(D) spiders that live relatively long

Handicrafts

Handicrafts are useful and attractive devices. They are usually made by hand, but sometimes simple tools are used. The term is usually applied to traditional ways of making goods. The unique style of the items is important. Such items often have cultural and religious meanings. Items made by mass production or machines are not handicrafts. Handicrafted items are intended to be used and worn. This is what makes them different from decorative arts and crafts. They have a purpose beyond simple decoration. Handicrafts are usually thought of as more traditional works. They are created as a part of daily life.

4. Why does the author mention that Items made by mass production or machines are not handicrafts?

(A) To highlight that the author does not like these types of items
(B) To explain that handicrafts cannot be produced in large quantities
(C) To show that handicrafts must be produced by hand
(D) To demonstrate that handicrafts are better than machine-produced items

Practice with Long Passages

A Read the following passage, and answer the questions.

Neptune

Time Limit: 2 min. 50 sec.

Neptune is the solar system's eighth and outermost planet. It has the fourth largest diameter of the planets, and its mass is the third largest. In fact, it is 17 times the mass of Earth. Although Uranus is the near twin of Neptune, Neptune is slightly more massive. Neptune is named after the Roman god of the sea.

Neptune's atmosphere is mostly made up of hydrogen and helium. There are also traces of methane. These cause the planet's blue appearance. It is more vivid than that of Uranus, which has similar amounts of methane. Therefore, it is assumed that an unknown component causes Neptune's intense color.

This planet has many strange aspects that make it interesting to scientists. One such aspect is that Neptune has the strongest winds of any planet in the solar system. They blow as fast as 2,500km per hour. Also, there are thirteen confirmed moons orbiting Neptune. Notable for its retrograde orbit is Triton. This moon has a nitrogen/methane atmosphere and is very cold.

The temperature at the top of Neptune's clouds stays around –210 degrees Celsius. This makes it one of the coldest planets in the solar system. This coldness is caused by Neptune's great distance from the sun. The temperature at the center of the planet is about 7,000 degrees Celsius due to extremely hot gases and rock in the center. This is hotter than the surface of the sun. But the planet's outermost layers are extremely cold.

The Voyager 2 probe flew by Neptune in 1989 and discovered a region called the Great Dark Spot. This spot was viewed on its southern hemisphere. This is comparable to the Great Red Spot on Jupiter. Also, faint rings have been detected around the planet. These are much smaller than Saturn's rings. These rings were discovered by Edward Guinan's research team. They were at first thought to be incomplete, fading out before they rounded the planet. But Voyager 2 disproved this belief with photos of complete rings.

General Comprehension

1. According to the author's description of Neptune, which of the following is true?

(A) It has the fifth largest diameter of the planets in the solar system.
(B) It was discovered by Edward Guinan and his team.
(C) It is about 9,000 degrees Celsius at its center.
(D) It has a very cold atmosphere containing hydrogen, helium, and methane.

2. According to paragraph 3, all of the following about Neptune are true EXCEPT:

(A) No other planet in the solar system has stronger winds than Neptune.
(B) Triton has a very cold, oxygen/methane atmosphere.
(C) The moon Triton has a retrograde orbit.
(D) Neptune has 13 moons orbiting it.

- **outermost (a)** furthest from the center
- **component (n)** a part of a whole of something
- **vivid (a)** very bright
- **notable (a)** important or interesting; noteworthy
- **retrograde (a)** moving backwards
- **region (n)** an area
- **detect (v)** to discover; to notice

On the TOEFL Test

3. Why does the author mention that Neptune is 17 times the mass of Earth?

(A) To give an idea of Neptune's massive size
(B) To show that we could have much more space if we lived on Neptune
(C) To show that Neptune is a better planet than Earth
(D) To give an idea of how tiny and insignificant Earth is

4. Why does the author say that an unknown component causes Neptune's intense color?

(A) To show that Neptune is much larger than Earth
(B) To tell that Neptune is named after the Roman god of the sea
(C) To explain that Neptune is more vivid than Uranus
(D) To indicate that Neptune's atmosphere has some amounts of methane

NEPTUNE

- Core temperature: (1)_____
- Eighth and outermost planet in solar system
- Fourth largest diameter of all planets in solar system
- Atmosphere of (2)_____
- Strongest winds of any planet in solar system
- Orbited by (3)_____

B Read the following passage, and answer the questions.

The Metaphysics of Aristotle

Time Limit: 2 min. 50 sec.

Aristotle was one of the most influential thinkers of all time. In an age before science and technology existed, he created many fields of study. One of these was metaphysics. He argued that the causes of all things could be understood by studying their beginnings. He claimed that we have scientific knowledge when we know the cause of something. To know a thing's existence is to know the reason for its existence. He was the first to set the guidelines for all later causal theories. According to Aristotle's theory, all the causes may fall into several groups.

He defined causes by placing them in four major divisions. The Material Cause is the way a thing comes into existence from the combination of its parts. An example of this is a cheeseburger. It is assembled from meat, bread, and cheese. Alone, these do not make a cheeseburger, but together they are the cause of its existence. The Formal Cause tells us what a thing is. The Formal Cause of a flood is an overabundance of water. The Efficient Cause describes the reason for a change. An example of this is that a fire was burning, but it was put out by rain, which caused it to end. The Final Cause is the reason that something is done. For instance, a country may go to war to protect its borders, which is the cause for the war.

The concept of substance is also examined in the metaphysics of Aristotle. He concludes that a particular substance is a combination of both matter and form. He went on to define the five major elements. He named Fire, which is hot and dry. Earth, he said, is cold and dry. Air he claimed to be hot and wet. Water was cold and wet to him. Finally, he named Aether, the divine substance that makes up the heavenly spheres and bodies.

These classifications recorded by Aristotle paved the way for the modern physical sciences. One can imagine his work as the concrete foundation upon which the building of modern physics is built.

General Comprehension

1. According to the passage, which of the following is true of Aristotle?

(A) He determined the parameters for later causal theories.
(B) His classifications were rejected by modern science.
(C) He claimed that the element Fire was hot and wet.
(D) He said the Final Cause describes the reason for a change.

2. According to paragraph 3, all of the following are true about the concept of substance EXCEPT:

(A) Matter and form combine to make something.
(B) Aristotle classified the elements of substance into five categories.
(C) The elements Earth and Air were defined as having opposite characteristics.
(D) Aether is the divine substance that makes clouds.

- **influential (a)** important; authoritative
- **metaphysics (n)** the theoretical philosophy of being and knowing
- **causal (a)** relating to the cause of something
- **overabundance (n)** an excess
- **border (n)** a line that separates two distinct areas

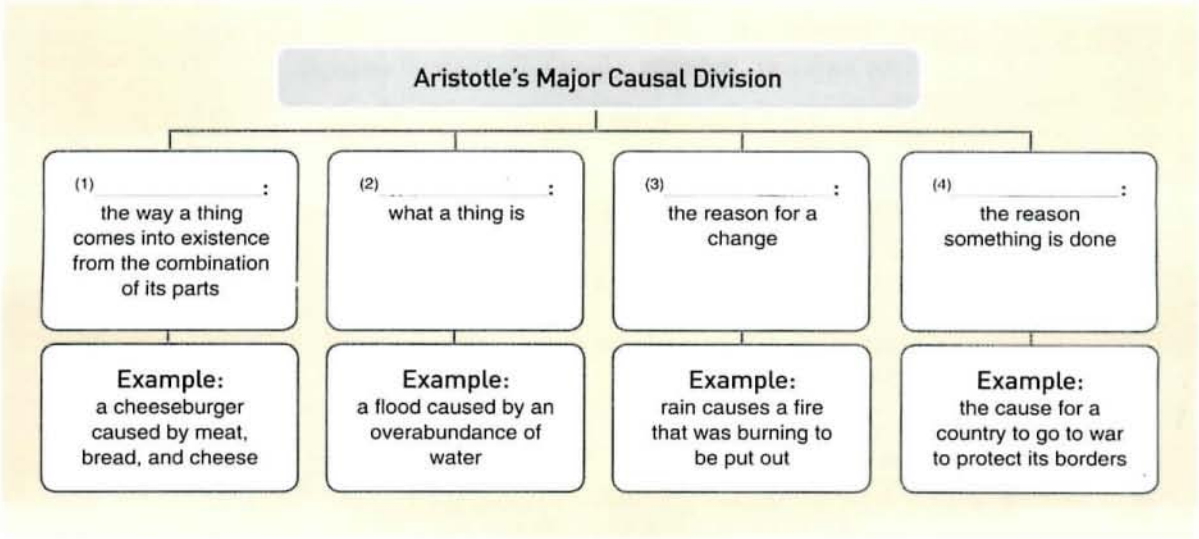
On the TOEFL Test

3. Why does the author mention a cheeseburger?

(A) To explain the Formal Cause
(B) To exemplify the Material Cause
(C) To illustrate the Efficient Cause
(D) To introduce the Final Cause

4. Why does the author mention Aether?

(A) To prove it was used to make up the heavenly spheres and bodies
(B) To exemplify an element that is hot and wet
(C) To show that Aristotle thought it was a useful substance
(D) To list a major element named by Aristotle



C Read the following passage, and answer the questions.

Sequoyah

Time Limit: 2 min. 40 sec.

Sequoyah was a Cherokee Native American. He was also known as George Gist. His main skill was as a silversmith. But he is famous for inventing the Cherokee written language. This earned him a place of honor on the list of those who invented writing systems.

Sequoyah's place and exact date of birth are unknown. This is because no written records exist. Guesswork by historians places his birth somewhere between 1760 and 1776. Places in Tennessee, Georgia, North Carolina, Alabama, or South Carolina are suspected to be the location. James Mooney, a prominent historian of the Cherokee people, quotes a cousin who said that Sequoyah and his mother spent his early years in the village of Tuskegee, Tennessee.

The name Sequoyah comes from the Cherokee word meaning "hog." This nickname may be a reference to a childhood deformity. Or it could refer to later injury that left him disabled.

Sequoyah's father was either white or part-white and part Native American. But Sequoyah could not speak English. This may be proof that he and his mother were abandoned by his white father. Sequoyah moved to Willstown, Alabama, at some point in 1809. He established his trade as a silversmith there.

The white settler's writing often impressed Sequoyah. He called papers with English written on them "talking leaves." Sequoyah began work on creating a system of writing for the Cherokee language around 1809. He created 85 characters to represent various syllables. It took Sequoyah 12 years to complete this work.

Sequoyah then taught his daughter to read and write in the new system he had created. The locals were amazed by this. But the medicine men of the tribe said he was being controlled by evil spirits. So Sequoyah taught his system to a group of warriors. Then the other people of the tribe accepted it. The Cherokee nation fully embraced the new system by 1823. It gave them a way to record their history for future generations.

General Comprehension

1. According to the passage, which of the following is true about Sequoyah's name?

(A) Sequoyah was a reference to a deformity from his childhood.
(B) The name Sequoyah means "tree" in the Cherokee language.
(C) Sequoyah's real name was George Gist.
(D) The name Sequoyah was given to him by his mother.

2. According to paragraph 5, all of the following are true about Sequoyah EXCEPT:

(A) He was very interested in the English writing system.
(B) He wrote the Cherokee language on "talking leaves."
(C) His writing system has 85 characters.
(D) He spent 12 years creating his writing system.

- **prominent (a)** well known
- **reference (n)** mention; allusion
- **deformity (n)** an irregularity in the body of a living thing
- **disabled (a)** not having full use of one's body
- **represent (v)** to show; to describe
- **embrace (v)** to accept; to adopt

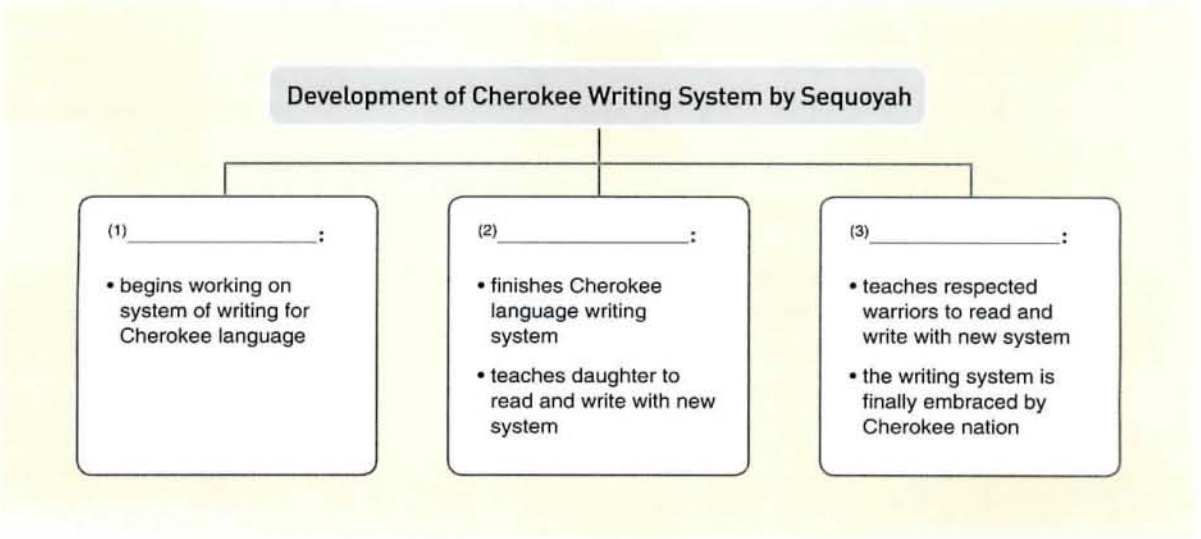
On the TOEFL Test

3. Why does the author mention no written records exist?

(A) To state the fact that Sequoyah was also known as George Gist
(B) To illustrate the reason Sequoyah was famous
(C) To preface the fact that Sequoyah's main skill was as a silversmith
(D) To explain why Sequoyah's exact date and place of birth are unknown

4. Why does the author mention that Sequoyah taught his system to a group of warriors?

(A) To show how Sequoyah got his tribe to accept his writing system
(B) To illustrate Sequoyah's intelligence
(C) To show that even warriors could become literate
(D) To define this as the event that made Sequoyah famous



D Read the following passage, and answer the questions.

The First Transcontinental Railroad

Time Limit: 2 min. 40 sec.

The first transcontinental railroad was built in the United States. It ran across North America. It was begun and completed in the 1860s. This linked the railway network of the eastern United States with California. The famous Golden Spike event was held on May 9, 1869. It was a ceremony to open the railway. This railway created a nationwide mode of travel. It changed the population and economy of the American West. It also completed the move away from wagon trains.

This railroad was agreed to be built by the Pacific Railway Act of 1862. It was heavily backed by the federal government. It was the victory of a decades-long effort to build such a line. It was one of the great achievements by Abraham Lincoln. It was completed four years after his death. Building the railway took huge feats of engineering and labor. The tracks run across the plains and high mountains. The railway is comprised of the Union Pacific Railroad and the Central Pacific Railroad. The two were privately built, but both were backed by the federal government. They lead westward and eastward.

The building of the railroad was meant to bind the Union together during the strife of the American Civil War. It filled the West with white settlers. This contributed to the decline of the Native Americans in these areas.

Most of the Union Pacific track was built by Irish laborers. Veterans of the Union and Confederate armies and Mormons also helped build the tracks. Most of the Central Pacific was built by Chinese laborers. At first, Chinese people were thought to be too fragile to do this type of work. But later, more people were brought over from China. Most workers were paid between one and three dollars per day. But the Chinese workers received much less. Eventually, they went on strike. This gained them a small increase in salary.

General Comprehension

1. According to paragraph 1, which of the following is true about the Golden Spike event?

(A) It was the name of the first transcontinental railroad.
(B) It took place in California to celebrate the opening of the local railway.
(C) It required great amounts of engineering and labor.
(D) It was a ceremony held in 1869.

2. According to paragraph 4, all of the following are true of the transcontinental railroad EXCEPT:

(A) Irish laborers laid much of the Union Pacific track.
(B) People thought the Chinese lacked the strength for hard work.
(C) Soldiers in the Confederate army helped build the track.
(D) Workers typically got three dollars or less each day.

- **transcontinental (a)** crossing a continent
- **ceremony (n)** an event held to mark a special occasion
- **mode (n)** a method or type
- **decade (n)** ten years
- **feat (n)** an effort
- **strike (n)** an event in which workers do not work to express their dissatisfaction

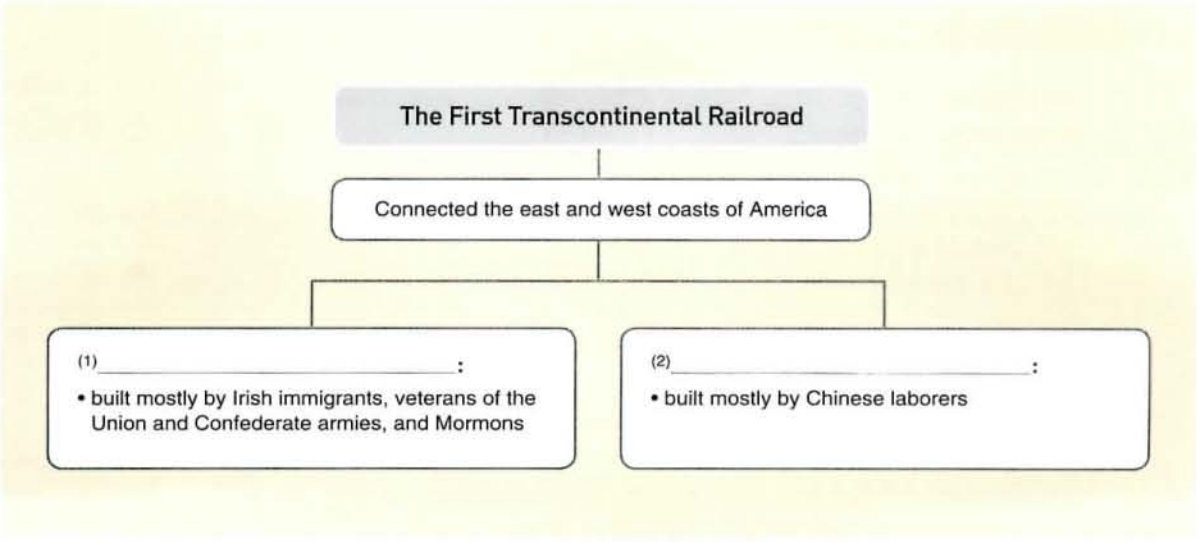
On the TOEFL Test

3. How does the author explain the idea that the railroad contributed to the decline of the Native Americans in paragraph 3?

(A) By saying the railroad increased the number of whites in the West
(B) By saying the railroad brought guns to the settlers
(C) By saying the railroad bound the Union together
(D) By saying the railroad carried troops to fight the Native Americans from the Atlantic to Pacific

4. Why does the author mention Chinese people?

(A) To explain that they were not paid as much as other laborers
(B) To show that they were too weak to build the railroad
(C) To describe their actions while they were striking
(D) To mention that they were the most responsible for the Central Pacific line



E Read the following passage, and answer the questions.

Mechanization

Time Limit: 2 min. 50 sec.

The shift from human labor to machines is called mechanization. It has changed human history forever. Machines enable people to do much more work while using much less strength. Humans have been making machines in simple and complex forms since before the time of recorded history.

The simplest kind of machine is a lever. This can be a stick that is placed under an object and over a stone or other object. The object underneath the stick acts as a fulcrum. This gives the stick leverage. When the person presses down on the stick with force, it pushes off the fulcrum and lifts the object on top of the stick. In this act, the person's strength is amplified by the lever. They can use less force to lift more weight. This is one of the guiding principles for the development of all machines. The machine does the work for the human, who exerts a minimal amount of force.

One important machine was the steam-powered lathe. This device increased the speed and accuracy at which metal and woodwork could be done. Another helpful machine was the steam engine, which made steamboats and steam-powered trains possible. This led to a revolution in transportation. The Colt revolver was the first machine pistol that was able to fire repeated shots. This device made warfare more deadly. The early 20th century saw the mechanization of car assembly lines with the Ford system. This changed the way people worked and traveled.

The term *mechanization* is also used by military forces. This term refers to the use of tracked armored vehicles. The armored personnel carrier is one of these vehicles. It is used to move large amounts of troops around a battlefield very quickly. It also protects them so that as few soldiers as possible are killed on the way into battle. In the past, many soldiers died before even reaching a battle. The mobility and fighting capability is greatly increased by mechanization. In modern countries, all armed forces are supported by mechanized infantry.

General Comprehension

1. According to the passage, which of the following machines is the most primitive?

(A) a steam lathe
(B) a lever
(C) a steam engine
(D) an armored vehicle

2. According to paragraph 3, all of the following are true about important machines EXCEPT:

(A) The steam-powered lathe made metal and woodwork much faster.
(B) The steam engine completely changed transportation.
(C) The Colt revolver helped armies kill more soldiers.
(D) Car assembly lines relied on steam engines.

- **shift (n)** a noticeable change
- **fulcrum (n)** the point against which a lever is placed
- **leverage (n)** the action of a lever
- **amplify (v)** to make something or someone stronger
- **exert (v)** to use force
- **lathe (n)** a machine used in wood and metalworking
- **infantry (n)** soldiers who fight on the ground

On the TOEFL Test

3. Why does the author mention the shift from human labor to machines?

(A) To explain how humans discovered mechanization
(B) To explain what mechanization is
(C) To show that machines replaced human labor
(D) To prove machines are more efficient than human labor

4. The author mentions that in the past, many soldiers died before even reaching a battle in paragraph 4 in order to

(A) explain the usefulness of the Colt revolver
(B) show that the steam powered lathe was useful
(C) emphasize the value of the armored personnel carrier
(D) describe mechanized infantry

Mechanization

- the shift from human labor to machines → more work with less strength
- (1)_____ → the simplest machine
- steam-powered lathe → speedier and more accurate metal and woodwork
- steam engine → steamboats and steam-powered trains
- (2)_____ → deadlier warfare
- (3)_____ → changed the way people work and live

F Read the following passage, and answer the questions.

The Mammoth

Time Limit: 2 min. 50 sec.

The most commonly found prehistoric fossil is that of the mammoth. It was a variety of elephant that is now extinct. Mammoths had long, curved teeth called tusks. The northern species were covered in thick, woolly hair. They roamed the earth during the Pleistocene epoch. This time period spanned from 1.6 million to around 10,000 years ago.

The mammoth blood line is related most closely to the modern Asian elephant. The genes of the two African elephant varieties do not resemble those of the mammoth as closely. The Asian elephant and mammoth's common ancestor split off from the African elephant's line. This divergence took place about 6 to 7.3 million years ago. Asian elephants and mammoths diverged from one another a half million years later.

Scientists believe that the mammoth originally evolved in North Africa. Its origins stretch back some 4.8 million years ago. Bones that date back this far have been found in Chad, Libya, Morocco, and Tunisia. Sites in South Africa and Kenya have also revealed the ancient remains that are thought to be the oldest of the species.

The African mammoth then migrated. The fossil record shows that it eventually reached north to Europe. A new species, which is termed the southern mammoth, soon came about. This was the species that lived throughout Asia and Europe. Studies deduce that it then crossed the now-sunken Bering Strait Land Bridge. This was the frozen land structure that linked Asia and North America through present-day Siberia and Alaska. This brought the mammoth onto the North American continent.

Then around 700,000 years ago, the warm climate began to change. In Europe, Asia, and North America, the savannah plains became steppes that were colder and less fertile. The southern mammoths were the first variety of the species to die off. A new variety, the woolly mammoth, evolved 300,000 years ago. This beast was covered in a thick coat of woolly hair. It was able to cope with the extreme cold of the ice ages.

epoch (n)
a period of history marked by notable events

diverge (v)
to separate; to split

reveal (v)
to uncover; to disclose

deduce (v)
to infer

cope with (phr)
to deal with; to survive

General Comprehension

1. **According to the passage, which of the following is true of the mammoth?**
   - (A) Its bones have been found in New York City.
   - (B) Scientists find its fossils more than any other animal.
   - (C) It became extinct 10,000 years ago.
   - (D) Its blood line is not related to the modern Asian elephant.

2. **According to paragraph 4, all of the following about the mammoth are true EXCEPT:**
   - (A) The southern mammoth wandered the lands of Europe.
   - (B) The southern mammoth evolved from the African mammoth.
   - (C) The southern mammoth came to North America over a land bridge.
   - (D) The fossil record shows the African mammoth was related to the dinosaurs.

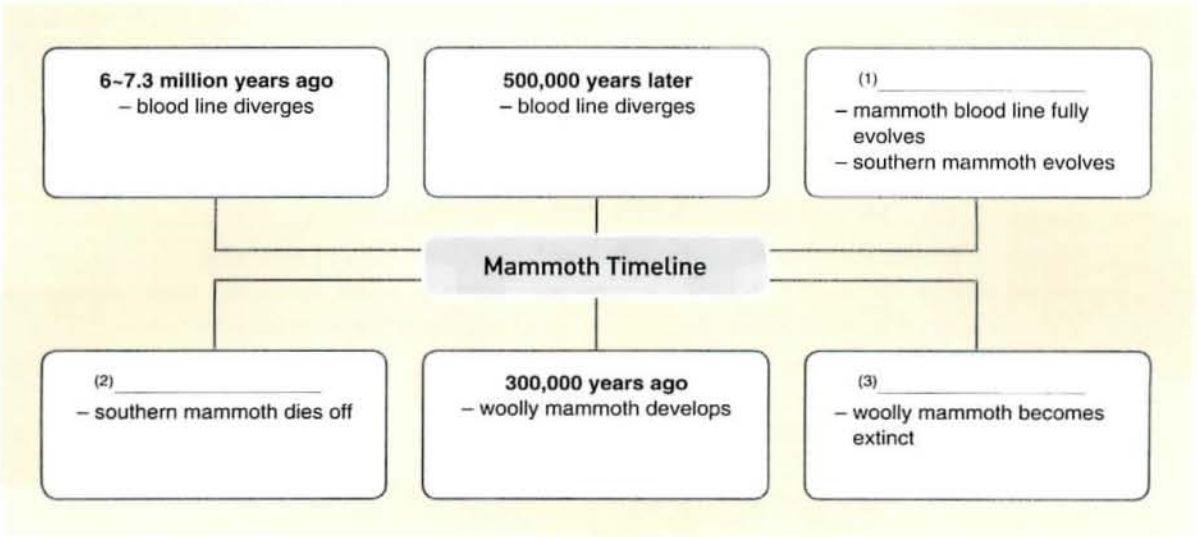
On the TOEFL Test

3. Why does the author mention the modern Asian elephant?

(A) To support the belief that it became extinct at the same time as the mammoth
(B) To compare its physical features to the woolly mammoth
(C) To define it as the closest genetic relative of the mammoth
(D) To portray it as a common enemy of the mammoth

4. The author uses Chad, Libya, Morocco, and Tunisia as examples of

(A) places where the mammoth never existed
(B) places where remains of mammoths have been found
(C) places that were too hot for the woolly mammoth
(D) places where the oldest mammoths were lived



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Neptune

a vivid blue appearance	Voyager 2	hot core temperature
the fourth largest	the outermost planet	

Neptune is (1)_____ of the solar system and is (2)_____ in diameter and the third largest in mass. Its atmosphere is composed mostly of gas, and it has (3)_____. There are many strange facts about the planet, such as its high winds, 13 moons, and (4)_____ that make it interesting to scientists. The only human probe ever to visit and collect information on Neptune was (5)_____.

2. The Metaphysics of Aristotle

the causes of things	the substance of matter and form	modern science
metaphysics	four major categories	

Aristotle was one of the most important thinkers of all time because he created many fields of study, one of which is (1)_____. He created the guidelines for understanding (2)_____, of which there are (3)_____. He made many conclusions about (4)_____ as well as defining five major elements. His classifications laid important foundations for (5)_____ that are used today.

3. Sequoyah

85 characters	a group of respected warriors	a system of writing
record their history	Cherokee Native American	

Sequoyah was a (1)_____ who is famous for creating the first system of writing for the Cherokee people. His exact place and date of birth are unknown because his people lacked (2)_____ for recording historical data. After 12 years of work, Sequoyah created a writing system for the Cherokee language that used (3)_____ to represent the sounds of the language. This system was at first rejected by the Cherokee people, but they later accepted it after Sequoyah taught it to (4)_____. This system gave the Cherokee people a way to (5)_____ for future generations.

4. The First Transcontinental Railroad

the federal government	Ireland and China	Native Americans
President Abraham Lincoln	run across North America	

The first transcontinental railroad to (1)_____ was completed in 1869 and commemorated with the famous Golden Spike event. The railroad was heavily backed by (2)_____ and stands as one of the great achievements of (3)_____. The building had many effects, such as bringing the Union states together during the Civil War as well as leading to the decline of (4)_____ in the West by populating it with white settlers. Much of the railroad was built by immigrant laborers from (5)_____ as well as by veterans of the Union and Confederate armies and Mormons.

5. Mechanization

the steam-powered lathe	warfare	mechanization
human history	the lever	

(1)_____ has been changed by the shift from human labor to (2)_____. A good example of a simple machine that relieves a human of labor is (3)_____. Some very important machines were (4)_____, steam-powered trains, the Colt revolver, and the mechanization of car assembly lines. Military forces have also mechanized their forces, which results in many advantages in (5)_____.

6. The Mammoth

North Africa	over 7 million years ago	climate changes
a prehistoric variety	the Asian variety of elephant	

The mammoth was (1)_____ that is now extinct and whose fossil remains are the most commonly found. Mammoths are most closely related to (2)_____, having genetically split off from the African varieties of elephant (3)_____. Due to fossil evidence, scientists believe the mammoth originally evolved in (4)_____ and then migrated around the world, ending up in North America. Mammoths began to die off due to (5)_____ that began 700,000 years ago.

1. **The word inhibited in the passage is closest in meaning to**
   - (A) strengthened
   - (B) weakened
   - (C) destroyed
   - (D) increased

2. **The word it in the passage refers to**
   - (A) Central Asia
   - (B) the West
   - (C) a large sunspot
   - (D) the mystery

3. **According to paragraph 1, which of the following is true of sunspots?**
   - (A) Galileo saw them through filtered dust.
   - (B) Astronomers have puzzled over them for a long time.
   - (C) They were first observed during the Middle Ages.
   - (D) They are regions of the sun that have stopped burning.

4. **According to the passage, which of the following is NOT true?**
   - (A) Dark spots on the surface of the sun are called sunspots.
   - (B) Scientists have succeeded in estimating how often sunspots appeared as far back as 11,000.
   - (C) Starspots are sunspots that appear on other stars.
   - (D) Sunspot activity was at its lowest 8,000 years ago.

5. **Which of the following can be inferred about the normal convection of the sun?**
   - (A) It is not inhibited by areas with low levels of magnetism.
   - (B) It is more inhibited by areas with low levels of magnetism.
   - (C) It is not affected by the level of magnetism at all.
   - (D) It makes sunspots larger due to low levels of magnetism.

6. **The author discusses magnetic flux tubes in paragraph 4 in order to**
   - (A) show that scientists do not fully understand sunspots
   - (B) support the theory that sunspots are areas of low magnetism
   - (C) explain that they are closely connected with sunspots
   - (D) prove that scientists fully understand sunspots

Sunspots

Sunspots are dark regions on the surface of the sun. They have been a mystery to astronomers for thousands of years. Chinese astronomers made references to them in 28 B.C. They could see the largest spot groups. These were visible to them when the sun's glare was filtered by dust blown by the wind from the deserts of Central Asia. In the West, a large sunspot was viewed during the Middle Ages. But the mystery of this observation was not clearly understood until 1612 when Galileo explained it.

Sunspots have been recorded by astronomers since the year 1700 A.D. Current scientists have been able to estimate the cycle of appearance of these sunspots back to 11,000 B.C. The most recent trend of sunspots rises upward from 1900 to the 1960s. The sun was similarly active over 8,000 years ago.

The sunspot areas have lower temperatures than the areas around them. They also show heightened magnetic activity. The normal convection of the sun is inhibited by this high level of magnetism. The result is formation of low surface temperature areas. But these areas are still too bright to look at directly. These sunspots burn at temperatures as low as 4,000 degrees Kelvin. Meanwhile, the rest of the sun burns at 5,700 degrees Kelvin. This difference is the cause of the clearly visible dark spots. Similar spots observed on stars other than the sun are called starspots.

It is not fully understood how sunspots come into being. But quite clear is the fact that they are the visible counterparts of magnetic flux tubes in the convective zone of the sun. The magnetic flux tubes get "wound up" by differential rotation. When the stress on the flux tubes reaches a certain limit, they curl up like a rubber band and puncture the sun's surface. At the puncture points, convection is inhibited. Then energy flux from the sun's interior decreases, which drops the surface temperature.

The number of spots is connected to the intensity of solar radiation. This connection has been recorded since 1979, when satellite measurements of radiation became available. Since sunspots are dark, it would be natural to assume that more spots means less solar radiation. However, the areas surrounding sunspots are brighter. The overall effect is that more spots cause the sun to burn brighter. But this variation is too small to notice with the naked eye. A period called the Maunder Minimum marked a time when there were hardly any sunspots on the sun. At this time, the Earth was believed to have cooled by up to 1 degree Celsius.

7. **The word severity in the passage is closest in meaning to**

(A) electricity
(B) intensity
(C) frequency
(D) danger

8. **According to paragraph 1, which of the following is true of thunderstorms?**

(A) They are created by thundersnow.
(B) They are produced by heavy rain and hail.
(C) They often cause snow to fall.
(D) A cumulonimbus cloud causes them.

9. **According to paragraph 2, the author's description of the formation of thunderstorms mentions all of the following EXCEPT:**

(A) They form only when the atmosphere is unstable.
(B) They produce a large amount of condensation.
(C) It is characterized by moisture in the lower atmosphere.
(D) The temperature of the air often rises.

10. **According to paragraph 3, which of the following can be inferred about thunderstorms?**

(A) Thunderstorms occur in Europe.
(B) Thunderstorms never occur in Australia.
(C) Thunderstorms mostly occur in Uganda.
(D) Florida has more thunderstorms than Bogor.

11. **Why does the author mention Florida?**

(A) To show that it is in a temperate region
(B) To describe a place that receives few thunderstorms
(C) To say it gets more thunderstorms than most places
(D) To prove that there are daily thunderstorms there all year long

12. **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.**

(A) The Romans thought Jupiter and Vulcan were fighting each other with lightning bolts.
(B) The Romans thought thunderstorms were caused by Jupiter throwing lightning bolts.
(C) The Romans wanted to fight against gods such as Jupiter and Vulcan.
(D) The Romans thought Vulcan created thunderstorms with which to battle Jupiter.

The Frequency of Thunderstorms

Thunderstorms are called electrical storms due to the presence of lightning and thunder. These violent storms are produced by a cumulonimbus cloud, which can make heavy rain or hail. On rare occasions the cloud can bring snow. This snow usually happens during the winter months and is called thundersnow.

When heavy condensation occurs in an unstable atmosphere, thunderstorms form. This event produces a wide range of water droplets and ice crystals. A deep, upward motion supports it. It is often marked by the presence of three conditions. Sufficient moisture in the lower atmosphere is the first. This is reflected by high dewpoint temperatures. A large drop in air temperature and increasing height are the second. This is termed adiabatic lapse rate. A force such as mechanical convergence is the third. This force occurs along the cold front and focuses its lift.

Thunderstorms happen all over the world. They even hit the polar regions. The areas with the most storms are tropical rainforest areas. Here they may occur on a daily basis. Kampala and Tororo in Uganda are said to have more thunderstorms than any other region on Earth. Bogor on the Indonesian island of Java is also said to be very thunderous. In temperate regions, thunderstorms happen mostly in spring. However, they can hit along with cold fronts at any time of year. Florida is the most thunderous region outside the tropics. The violent storms hit over the south and central regions of this state. They often happen daily in the summer.

The USA gets the most powerful and dangerous storms. The most severe storms touch down in the Midwest and the southern states. These storms yield very large hail. They also turn out powerful tornadoes. Thunderstorms are uncommon on the West Coast of the United States. But they do hit inland areas. Sacramento and the San Joaquin Valley of California get hit with thunderstorms. Storms in the Northwest take on similar patterns as those in the Midwest. But their frequency and severity are much less.

Early human civilizations were powerfully influenced by the frequency of thunderstorms. The Romans thought they were battles waged by Jupiter, who hurled lightning bolts forged by Vulcan. Increased frequency of thunderstorms made the Romans anxious to the point that they would sacrifice many animals to appease this angry god. Native Americans believed these thunderstorms to be linked to servants of the Great Spirit. They also felt the frequency was linked to the spirit's anger. Nowadays, storm chasers head to the Great Plains of the United States and Canadian prairies every spring. They explore storms and tornadoes visually and scientifically in the summer. For these thrill seekers, more frequent storms satisfy their desire for adventure.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. He gave a very **vivid** description of the accident.
   (A) graphic (B) dim (C) beautiful (D) ugly

2. They were unable to **detect** the problem with the airplane's engine.
   (A) fix (B) hear (C) find (D) cause

3. He was a very **prominent** politician in the town.
   (A) beloved (B) famous (C) disliked (D) problematic

4. The teacher thought that it was an extraordinary **feat** for the student to come to class on time.
   (A) action (B) foot (C) trick (D) hope

5. There was a **shift** in the mood of everybody in the room once the baby began to cry.
   (A) change (B) emergency (C) break (D) trouble

6. After running the marathon, he was unable to **exert** any strength.
   (A) make (B) find (C) use (D) have

7. From the available evidence, the detective was able to **deduce** that he had committed the crime.
   (A) know (B) infer (C) imply (D) decide

8. She was unable to **cope with** the cold weather and had to go inside.
   (A) enjoy (B) deal with (C) accept (D) block

B Match each word with the correct definition.

1. spike	•	• **a.** an amount that is too much of something
2. retrograde	•	• **b.** to make something or someone stronger
3. deformity	•	• **c.** a period of history marked by notable events
4. epoch	•	• **d.** a large, metal nail that is driven through something to fasten or hold it down
5. amplify	•	• **e.** furthest from the center
6. infantry	•	• **f.** a grassy plain in a tropical or sub-tropical region
7. savannah	•	• **g.** soldiers who fight on the ground
8. metaphysics	•	• **h.** moving backwards
9. outermost	•	• **i.** the theoretical philosophy of being and knowing
10. overabundance	•	• **j.** an irregularity in the body of a living thing

Unit 7

Inference

Unit 7

Inference

Overview

■ Introduction

Inference questions ask you to understand an argument or an idea that is strongly suggested but not clearly mentioned in the passage. So you should use logical thinking in order to make an inference based on some information in the passage. You need to figure out the logical implications of the author's words as well as the surface meaning of those words.

■ Question Types

1. Which of the following can be inferred about X?

2. Which of the following can be inferred from paragraph _____ about X?

3. According to the passage, it can be inferred that ~

4. The author of the passage implies that ~

5. It can be inferred from the passage that the author most likely believes which of the following about X?

6. Which of the following statements most accurately reflects the author's opinion about X?

■ Useful Tips

- Think logically to draw a reasonable conclusion from what is implied in the passage.
- Remember that the correct answer doesn't contradict the main idea of the passage.
- Don't choose an answer just because it is mentioned in the passage.

Sample iBT Question

Which of the following can be inferred about the American women's suffrage movement?

(A) Alice Paul led all of the major groups.
(B) Its leading groups did not agree with each other's methods.
(C) Most of the women in it used nonviolent methods.
(D) Suffragists were unsuccessful at achieving most of their goals.

The American Women's Suffrage Movement

Suffrage is the civil right to vote. It was the goal of many women's groups. In many western democracies, suffrage was a major movement of the late 19th and early 20th century. Suffragists protested strongly for many years, demanding equality with men and the right to vote. Alice Paul was a well-known suffragist. She was also the leader of the American National Women's Party. There were two suffrage parties in America around this time. One was largely peaceful. They tried to advance their cause in a peaceful manner. But the other was willing to commit acts of violence. This party once released 100 rats at a polling station in New Hampshire.

Correct Answer The passage mentions two leading suffrage parties in America. One of them was peaceful while the other group was aggressive. Each group adopted different methods to gain women's voting right. Therefore, the correct answer is (B).

Inference questions ask you to understand an idea that is not explicitly stated in the passage. You need to use logical thinking to draw a correct conclusion from the author's words in the passage. Your conclusion must agree with the main idea of the passage.

Sponges

Sponges are animals. They are members of the phylum Porifera. They are primitive filter feeders that dwell underwater. They are able to pump water through their bodies to filter out particles of food matter. Sponges are among the simplest of animals. They have no true tissue. They also lack muscles, nerves, and internal organs. There are over 5,000 known species of sponges. They can be found attached to surfaces of rocks and live in intertidal zones. They can be found at depths of 8,500 meters and deeper. The fossil record of sponges dates back to the Precambrian Era. But new species are still commonly discovered.

1. The author of the passage implies that

(A) most sponges live in the deep sea
(B) sponges are more complicated than people think
(C) sponges have been evolving since the Precambrian Era
(D) more species of sponges will be discovered in the future

Tenochtitlan

Tenochtitlan was the capital city of the ancient Aztec Empire. This is now the site of modern-day Mexico City. This ancient city was constructed over a series of islets in Lake Texcoco. The city plan was based on a symmetrical layout. Four sections divide the city into areas called campans. Canals interlaced the city and were useful for transportation. The city was built according to a fixed plan that centered on the ritual precinct. Here the Great Pyramid of Tenochtitlan rose 60 meters above the city. Houses were made of wood and loam. Their roofs were made of reed. But pyramids, temples, and palaces were generally made of stone.

2. According to the passage, it can be inferred that

(A) Tenochtitlan had an important role in the Aztec's religion
(B) the Aztecs constructed many large pyramids
(C) Tenochtitlan was built completely on the water
(D) many buildings from Tenochtitlan still exist today

Electronic Music

Electronic music is created through the use of devices. All of these run on electricity. They are systems that use low levels of power. Before electronic music, many composers wanted to use new technology. They tried to use this technology to make music. Several instruments were created that employed new electronic and mechanical designs. The Moog keyboard was one such instrument. It was used to record the music of Beethoven for the film *A Clockwork Orange* in the 1970s. This was one of the first electronic music recordings. In the late 1990s, electronic music split off into many genres. Its styles and sub-styles are too many to list. There are no strict rules for this kind of music.

3. It can be inferred from the passage that the author most likely believes which of the following about electronic music?

(A) It is not as good as music created by real instruments.
(B) It has greatly increased in popularity.
(C) It should be used more often in movie soundtracks.
(D) It needs to have strict rules.

Ocean Current

The constant motion of water flowing into Earth's oceans creates ocean currents. Ocean currents can flow for thousands of kilometers. This happens more often in regions bordering an ocean. The Gulf Stream is the best example. This current makes northwest Europe much more temperate than other regions at the same latitude. The Hawaiian Islands are another example. The climate there is somewhat cooler than on other islands that occupy the same tropical latitudes. This is because of the California Current. Knowledge of surface ocean currents is important. The costs of shipping can be greatly reduced with such information. This is because the current motion carries ships along. Fuel costs can be greatly reduced this way.

4. Which of the following can be inferred about ocean currents?

(A) They are typically found in the middle of the ocean.
(B) They always make places cooler when they pass through.
(C) They tend to move slower than other parts of the ocean.
(D) They can change the temperature of areas they flow through.

Practice with Long Passages

A Read the following passage, and answer the questions.

Bats and Echolocation

Time Limit: 2 min. 40 sec.

Bats are mammals whose forelimbs have developed as wings. This makes them the only mammal in the world that is capable of flight. There are about 1,100 species of bats around the world.

Bats can be separated into two suborders: megabats and microbats. Not all megabats are larger than microbats. There are two major differences between the two kinds of bats. Microbats use echolocation to direct themselves. They also use this ability to find food. Megabats do not have this ability. Instead, they have a claw on their second toe and forelimb. Microbats do not have this claw.

Megabats are known to eat fruit, nectar, and pollen. Microbats eat insects, blood from larger animals, small mammals, and fish. The echolocation used by microbats is a form of biological sonar. It is also used by dolphins and whales.

Echolocation is a process by which animals emit calls out to the area around them. They listen to the echoes that return from various objects in the area. They use these echoes to locate, range, and identify objects. Ranging is done by measuring the time delay between the animal's vocals and the echo's return. Microbats use their ears to perform this task.

In 1794, a scientist conducted a series of experiments on bats. He concluded that they navigated through their sense of hearing. But the scientific community rejected his findings. In 1938, another scientist described the ultrasound echolocation used by bats.

Microbats use echolocation to navigate and forage in total darkness. They emerge from their caves or roosts as the sun sets. They forage for insects during the night. Their ability allows them to occupy a special niche. This is the time where there are often many insects. These insects come out at night since there are often fewer predators. There is much less competition for food at this time and fewer species that may prey on the bats themselves.

General Comprehension

1. According to the passage, which of the following is true about bats?

(A) Scientists know that bats navigate with their eyes.
(B) There are more than 1,200 kinds of bats around the world.
(C) Bats are the only mammal in the world that can fly.
(D) All species of bats use biological sonar to locate objects.

2. According to the passage, all of the following are true about microbats EXCEPT:

(A) They use their ears to perform echolocation.
(B) They feed on fruit, nectar, and pollen.
(C) Their ability to live in the dark is advantageous for them.
(D) They hunt at night because there is more prey then.

- **separated (a)** divided
- **emit (v)** to send out
- **range (v)** to determine how far away something is
- **forage (v)** to search for food
- **predator (n)** an animal that hunts another animal

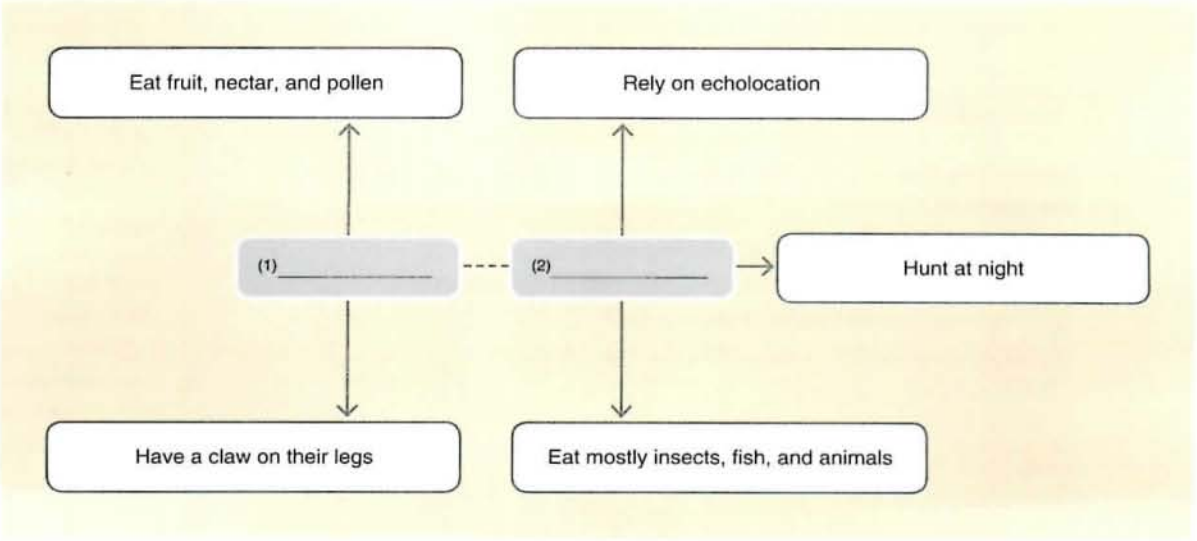
On the TOEFL Test

3. Which of the following can be inferred from paragraph 2 about bats?

(A) There are a number of kinds of bats.
(B) The wings of microbats and megabats look the same.
(C) They all rely upon echolocation to find their food.
(D) Some microbats are larger than megabats.

4. Which of the following can be inferred about research on bats?

(A) It has gone on for a long time.
(B) It must always be done at night.
(C) Scientists need to conduct more experiments.
(D) It is mostly incorrect.



B Read the following passage, and answer the questions.

Modernism

Time Limit: 3 min.

Modernism was a movement that strove for progress. It swept through every aspect of culture in the 20th century. It emphasized the power of human beings. It also encouraged the overthrow of traditional ways. Modernists believed they could make, improve, and reshape their own lives and the world. They thought they could do this through the use of science and technology.

Modernism was very important because it signified a change in thought. It expressed the effects of the Industrial Revolution on the human mind. It also served as a meeting point between art, philosophy, and technology.

The history of modernism consists of a series of movements. The members of these groups wanted to create progress. This began with painters in France in the mid-1800s. Some of the first were Impressionist painters such as Eduard Manet and Claude Monet. These painters showed that humans do not see the subject of a painting but rather the light and shading that carries the image to their eyes. Another early modernist was Gustave Eiffel. His Eiffel Tower changed people's ideas of architecture and its possibilities.

However, one major problem of modernists is that they often disclaimed the authenticity of other modernists. These conflicts often occurred over very relative issues. They would argue over who used a style first or whose style was more derivative of another popular modernist. These arguments often had no resolution. They only served to waste time and energy.

Some historians divide the 20th century into modern and post-modern periods. They claim that the post-modernists used modernist styles and principles in consumer products. These styles showed up in many commercial products. Modern styles were used on record album cover art, postcards, and even the graphic design of the signs for the London Underground.

But others see the modernists and post-modernists as parts of the same group. They looked at everything skeptically. The goal is always to find anything that was "holding back" progress. Whatever was found to be the cause was then replaced. It was replaced with a new way of reaching the same end. Since this way was new, it was thought to be better.

General Comprehension

1. According to the passage, which of the following is true of modernists?

(A) They built on tradition to create progress.
(B) They believed in the potential of modern science.
(C) They looked at everything innocently.
(D) They usually got along well with one another.

- **emphasize (v)** to stress the importance of something
- **signify (v)** to represent or symbolize something
- **disclaim (v)** to reject
- **resolution (n)** a solution; an answer
- **skeptically (ad)** doubtfully

2. **According to paragraph 5, all of the following are true about post-modernists EXCEPT:**

(A) They created commercial products with modernist styles and principles.
(B) Record cover art is a common post-modernist product.
(C) The signs for the London Underground are post-modern designs.
(D) The 20th century is divided into pre-modern and post-modern periods.

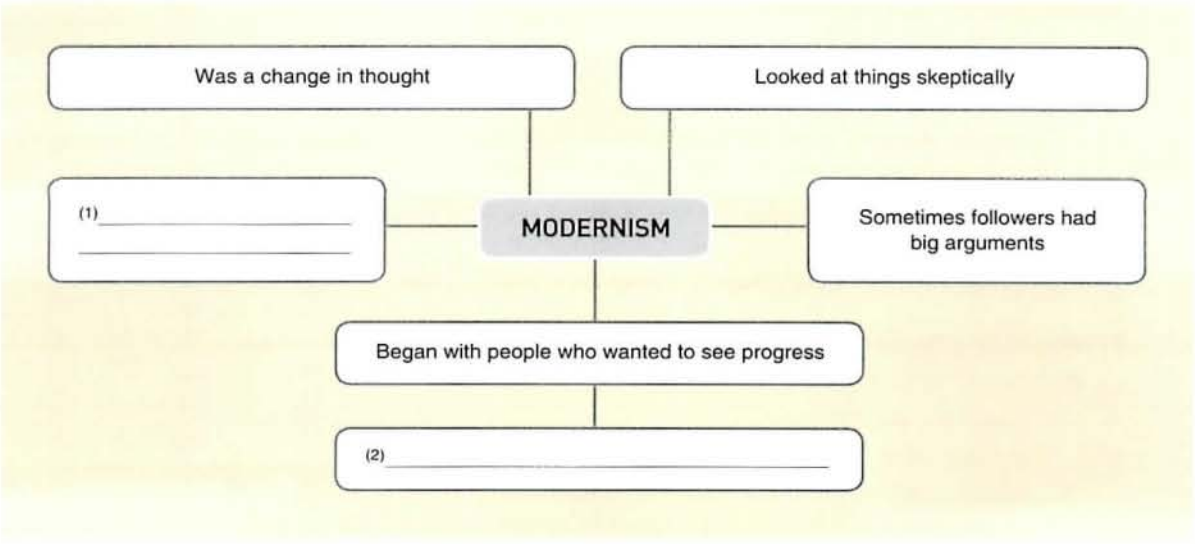
On the TOEFL Test

3. **In paragraph 2, the author of the passage implies that**

(A) modernism was independent of other disciplines
(B) modernism was not particularly important
(C) modernism was a reaction to the Industrial Revolution
(D) modernism relied heavily upon philosophy

4. **According to paragraph 3, what can be inferred about Eduard Manet?**

(A) He preferred architecture to painting.
(B) He recognized the importance of light in painting.
(C) He tried to paint humans as they are seen.
(D) He was friends with Gustave Eiffel.



C Read the following passage, and answer the questions.

Musical Theater

Time Limit: 2 min. 50 sec.

Musical theater is a form of entertainment that tells stories through songs, words, and dancing. The history of this form goes back several thousand years. Some of the first musicals were developed in ancient India and Greece. The Greeks added music and dances to their popular stage plays. Some of the great Greek playwrights were even known to compose their own music to accompany their plays.

Hundreds of years later, in 3 B.C., this form reemerged. The Roman comic writer Plautus added songs, dances, and orchestrations to his plays. In order to make their dance steps loud enough to be heard by audiences in large open theaters, the actors put metal chips on their shoes. These were the earliest form of tap shoes.

During the Middle Ages, plays became a method for the Church to spread its teachings. The liturgy was taught through religious dramas set to chants. These plays were so popular that they became a form of entertainment separate from the Church. In them, prose dialogs and liturgical chants alternated to keep audiences interested.

These forms developed into the time of the Renaissance, forming an Italian tradition. Silly clowns acted their way through stories known by all of the common people. This comic entertainment form was known as Opera Buffa. This new tradition carried over to France in the 1600s. There, the great writer Moliere was able to convert some of his comedies into musicals. These were accompanied by music written by Jean Baptiste Lully.

This form of entertainment spread between countries in Europe and kept changing. In Germany and Britain, the 1700s saw the rise of two different forms of musical theater. The first was the ballad opera. The writers of this dramatic form of theater borrowed popular songs of the day and rewrote the lyrics to fit their needs. But comic operas were different in that they had original scores and plot lines that were full of romance.

General Comprehension

1. According to the passage, which of the following is true about musical theater?

(A) Musical theater has existed only for hundreds of years in history.
(B) The Romans were the first to use tap shoes.
(C) During the Middle Ages, the church used musical theater to entertain followers.
(D) Musical theater disappeared during the Renaissance.

2. According to paragraph 5, all of the following are true about musical theater EXCEPT:

(A) Germany and Britain developed numerous types of musical theater in the 1700s.
(B) Writers for the ballad opera used songs popular at the time.
(C) Comic operas had original scores and romantic plots.
(D) Musical theater changed as it moved from country to country.

- **playwright (n)** a person who creates or writes plays
- **liturgy (n)** a kind of religious ceremony
- **convert (v)** to change
- **lyric (n)** the words of a song
- **plot (n)** a story

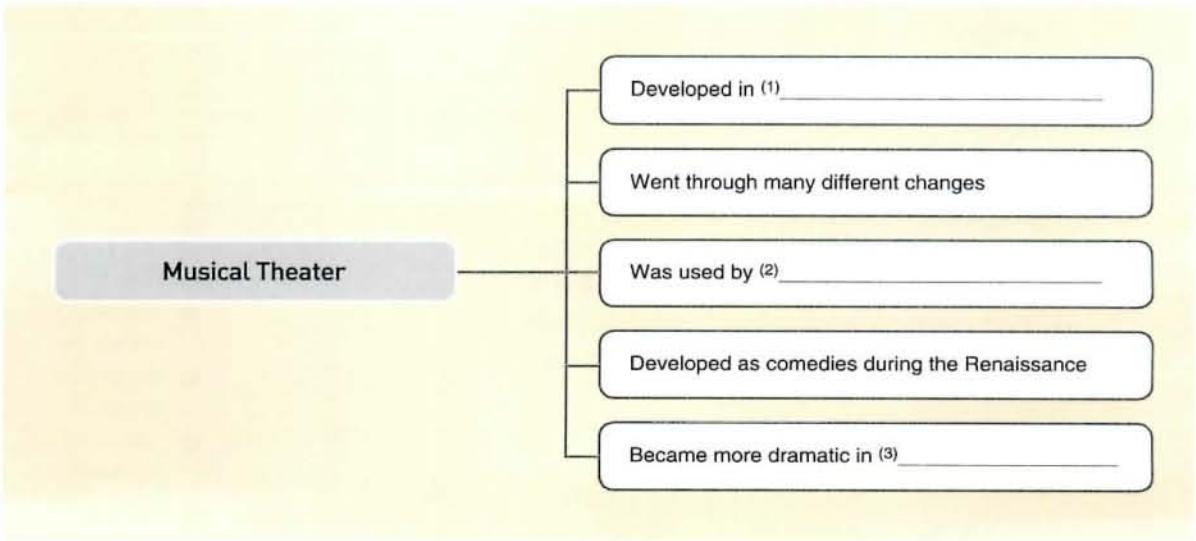
On the TOEFL Test

3. According to paragraphs 1 and 2, which of the following can be inferred about musical theater?

(A) People were enthusiastic about musical theater in ancient India.
(B) Roman theater had tap dancing as its main component.
(C) People did not perform musical theater for a long time in history.
(D) There were typically small audiences for Roman theater performances.

4. The author of the passage implies that

(A) every written story was changed into a musical
(B) Opera Buffa was enjoyed by ordinary people
(C) Germany and Britain were the last countries to develop musical theater
(D) comic operas were first played in India



D Read the following passage, and answer the questions.

The Fins of Fish

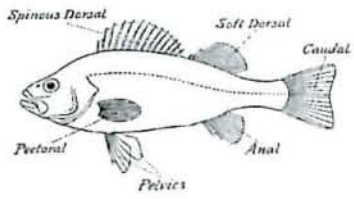
Time Limit: 3 min.

All fish have streamlined bodies that allow them to pass through water with ease. Part of their evolutionary design are fins, which are flat appendages made of cartilage and covered in scales. All fish have several different types of fins on their bodies that give them control as they pass through the water. Fins allow them to turn, to slow down and speed up, and to stop and hold a single position in the water.

The dorsal fins are located in the center of the back of a fish and can be pointed or blunt. A pointed dorsal fin increases the fish's speed while the blunt-shaped fin offers more control to small fish in strong waters. Fish can have up to three of these fins on their backs. They are supported by two kinds of cartilage rays, spiny and soft. A fin can contain either or both types of rays. The spiny rays sometimes also act as defensive weapons, having sharp points or even poison tips.

The anal, pectoral, and pelvic fins of fish are also supported by rays. These small fins give a fish control over fine movements, allowing it to dart quickly with flashes of motion. By using these, fish can position themselves for feeding or in a school formation with other fish. The anal fin is located on the bottom part of the fish behind its anus.

The pectoral fins are located on the sides of the fish, like wings on a bird. Their cartilage structure is parallel in design with the forelimbs of land creatures. The paired pelvic fins are located below and behind the pectoral fins. These are parallel to the hindlimbs of land creatures. By flapping these fins, a fish gains momentum to move itself through the water.



The tail fins are also referred to as caudal fins. These allow for turning and thrusting through the water. Some fish that are able to swim very swiftly have a horizontal caudal keel fin just in front of the tail fin. This forms a kind of ridge on the tail. It adds speed and stability to the fish.

General Comprehension

1. According to paragraph 2, all of the following are true about dorsal fins EXCEPT:

(A) Dorsal fins are found on the back of a fish.
(B) Small fish may have the blunt dorsal fins.
(C) Fish can have a maximum of three dorsal fins.
(D) Dorsal fins are supported mainly by spiny rays.

- **appendage (n)** an external organ or part
- **cartilage (n)** a substance in the body similar to bone but not as hard
- **dart (v)** to move very quickly
- **thrust (v)** to propel
- **horizontal (a)** flat; level
- **school (n)** a large group of fish

2. According to the passage, which of the following is true about fish fins?

Ⓐ Fins are made of bones and covered in scales.
Ⓑ Pelvic fins are to a fish as forelimbs are to a land animal.
Ⓒ Pectoral fins add speed and stability to the fish.
Ⓓ Caudal fins enable a fish to turn while swimming.

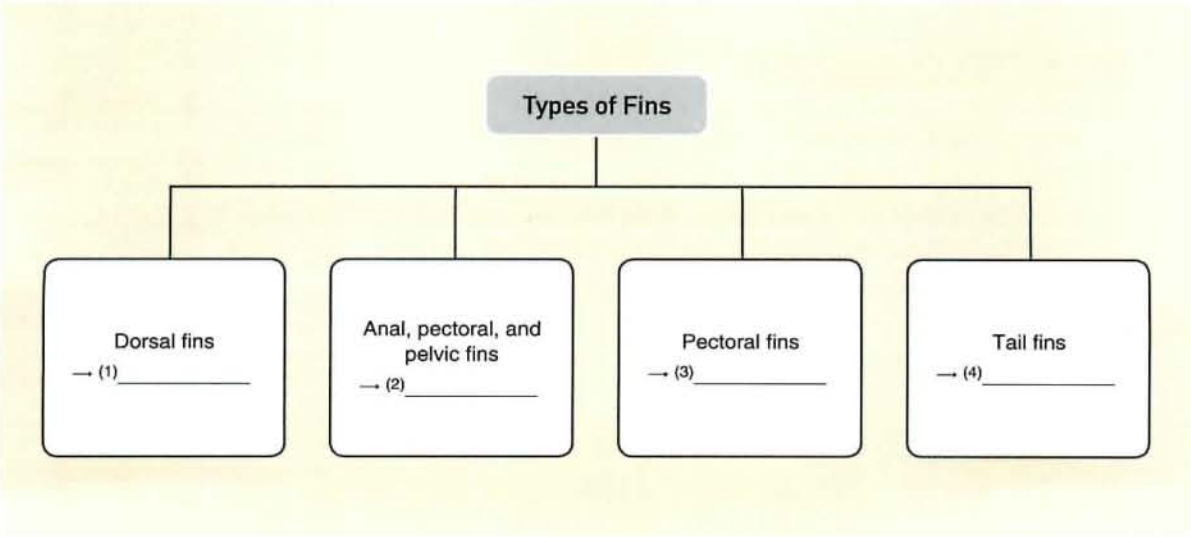
On the TOEFL Test

3. Which of the following can be inferred from paragraph 1 about fish?

Ⓐ They have at least ten fins on their bodies.
Ⓑ They would drown without fins.
Ⓒ They are not constantly moving.
Ⓓ Every part of their bodies has fins.

4. The author of the passage implies that fish

Ⓐ need all of their fins for different roles
Ⓑ can do without their dorsal fins
Ⓒ used to walk on land
Ⓓ have too many fins in some cases



E Read the following passage, and answer the questions.

The Functions of the Human Brain

Time Limit: 3 min.

The human brain is separated into two distinct sides by a fissure. Every structure in each side of the brain is mirrored on the other side. But each side takes on different main functions. This has led to the myth that people only use the right or left side of their brain. But this is a misconception since a fully functioning human must use both sides of his or her brain to perform the full range of skills and functions.

The human brain consists of five sections. These are the parietal, frontal, occipital, and temporal lobes, as well as the cerebellum. The parietal lobe is the part of the brain that combines sensory information from all of the body parts. It is also used to judge space through vision. This is the least understood region of the brain.

The brain's frontal lobe contains the body's gyrus and motor cortex tissue. This is the material through which the brain can control the body's voluntary movements. The frontal lobe has also been found to govern impulse control, judgment, memory, language, motor functions, problem solving, sexual behavior, socialization, and spontaneity. A large number of the body's activities are managed through this lobe.

The occipital lobe is the part of the brain that processes vision. It is the smallest of the four lobes, located in the rear area of the brain. Regions of this lobe process color, aspects of space, and motion perception. If this lobe is damaged, the ability of sight can be diminished or lost.

The temporal lobes rest low on either sides of the brain. This lobe contains the auditory cortex. This controls the body's ability to hear and process sound. It also controls high-level processing such as speech. It manages such functions as comprehension, verbal memory, naming, and language.

The cerebellum lies at the base of the brain at the point where it connects to the spinal cord. This region functions as the meeting point of sensory perception and muscle control through the nervous system.

General Comprehension

1. According to paragraph 1, which of the following is true of the brain?

(A) Humans cannot fully function without both sides of the brain.
(B) One side of the brain makes up for any damage to the other side.
(C) The right and left side are asymmetrical in appearance.
(D) Normal people use only one side of their brain.

- **fissure (n)** a crack; a break
- **misconception (n)** misunderstanding
- **voluntary (a)** on purpose; willful
- **auditory (a)** of or related to hearing
- **spontaneity (n)** unplanned, natural behavior
- **diminish (v)** to decrease

2. **According to the passage, all of the following are true about the lobes of the brain EXCEPT:**

   (A) The parietal lobe processes sensory information from other body parts.
   (B) The frontal lobe controls impulse and problem solving skills.
   (C) The occipital lobe is the largest part of the brain.
   (D) The temporal lobe is connected to sound processing ability.

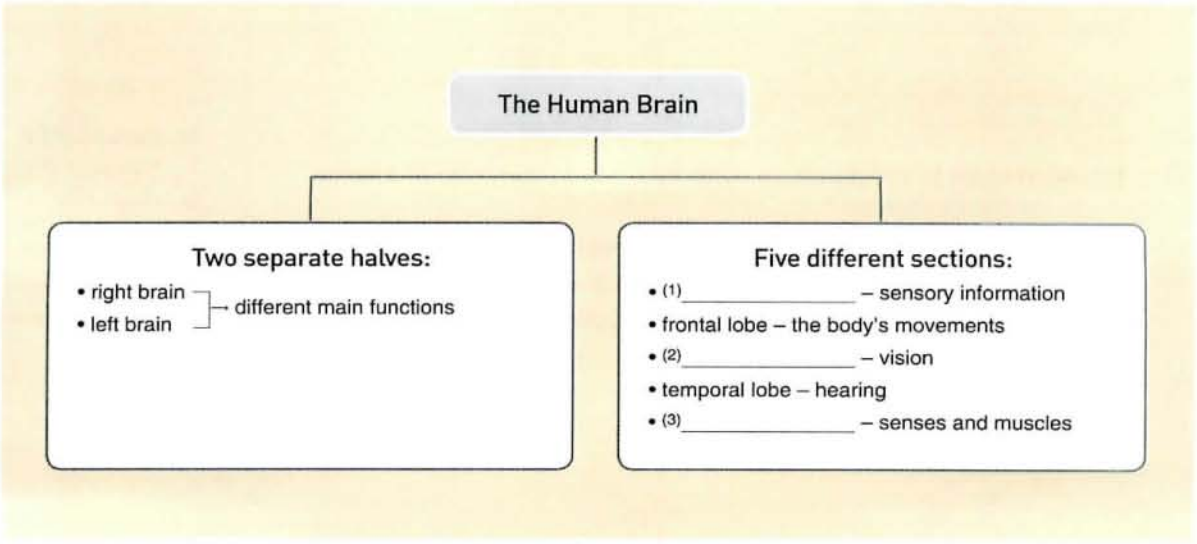
On the TOEFL Test

3. **The author of the passage implies that**

   (A) scientists should learn more about the parietal lobe
   (B) the parietal lobe is not particularly important
   (C) the brain is the largest organ in the body
   (D) the cerebellum is the least interesting part

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

   (A) people with good judgment have large frontal lobes
   (B) people can function properly without their frontal lobes
   (C) a blind person may have damaged his or her occipital lobe
   (D) the occipital lobe has many different colors



F Read the following passage, and answer the questions.

Agriculture in America

Time Limit: 3 min.

America's foundation rests on its agriculture industry. This industry feeds all of the citizens of the country. It also exports food to other countries around the world. However, this industry did not develop instantly. It took centuries of refinement to create an agricultural base that is capable of sustaining the entire population.

The westward movement of colonies spread farms across the U.S. Settlers traveled to new areas and built their farms. Their efforts created new towns and cities. The supply chains that led to these new areas became the roads that run throughout the nation.

Wheat was often the crop of choice in northern regions. The reason for this is that wheat crops are easily grown in cool regions. This crop was usually planted in newly settled lands. These new areas were known as the "wheat frontier." This zone of newly settled wheat farms moved west over the years. After these wheat farms moved on, more diversified farms took their place.

In the Midwest, the farming of corn and raising of hogs was a common agricultural combination. Hogs and corn complement each other. This is because in the time before canals and railroads, it was difficult to get grain to market. So the grain could be fed to the hogs, which were much easier to transport.

In the warm southern regions, cotton and herds of beef cattle were the most popular products. The reason behind this was that both flourish in the heat. Tobacco farming was also common in the South. Until the Civil War, this was done through the use of slave labor. Slaves were also used in agriculture in the Northeast. They were used there up to the early 1800s. But slavery was prohibited in the Midwest. The Freedom Ordinance of 1787 outlawed it.

During the time of the Great Depression, huge areas of the Midwest were abandoned. This was due to the Dust Bowl storms that swept through the region and rendered the soil useless for farming. These regions were then made into national forests. But in the 1940s, efforts to use these areas for farmland resumed in support of the World War II effort.

General Comprehension

1. According to the passage, why was wheat the crop of choice in northern regions?

(A) It was complementary to hog farming.
(B) It could be easily grown without much labor.
(C) It was an ideal crop for newly settled land.
(D) It grew well in regions with lower temperatures.

- **agriculture (n)** farming
- **diversified (a)** having many different qualities
- **complement (v)** to go well together
- **flourish (v)** to grow well
- **render (v)** to make

2. According to the passage, which of the following is NOT true about American agriculture?

(A) Corn and hogs were often grown together in the Midwest.
(B) The farming of beef cattle was widely performed in the South.
(C) Tobacco farming was done through the use of slave labor in the Northeast.
(D) Many Midwestern people had to give up farming due to the Dust Bowl.

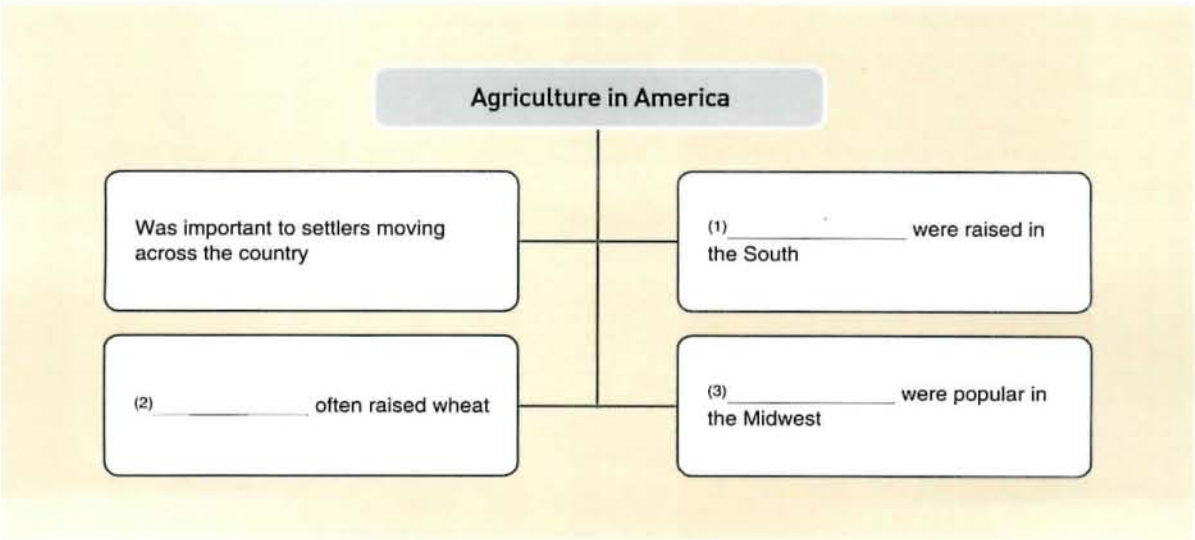
On the TOEFL Test

3. The author of the passage implies that

(A) it takes a long time to build up a country's agricultural base
(B) agriculture is the most important industry in a country
(C) American agriculture cannot yet support the entire country
(D) America's economy is based on agriculture

4. Which of the following can be inferred about the Midwest?

(A) Hogs were the only animals raised there.
(B) It did not have good transportation systems.
(C) Many people grew wheat instead of corn.
(D) Trains were built there to transport the hogs.



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Bats and Echolocation

herbivorous	megabats and microbats	hunt at night
the only mammals	ultrasound echolocation	

Bats are (1)_____ that can fly. There are two suborders of bats: (2)_____ _____. These bats are different from each other. Megabats have a claw on their legs and are typically (3)_____. Microbats use (4)_____ to get around and hunt insects, small animals, and fish. They usually (5)_____ when there are a lot of insects, much less competition for food, and fewer enemies.

2. Modernism

improve their lives	Eduard Manet and Gustave Eiffel	modernism
useless arguments	the twentieth century	

(1)_____ was an important movement in (2)_____. It encouraged people to forget about traditional ways and to try to (3)_____. Its members, like (4)_____, wanted to create progress. But sometimes they got into (5)_____. Still, the effects of modernism can be seen everywhere today.

3. Musical Theater

religious stories	ancient India and Greece	entertainment
comedies or dramas	musical theater productions	

The musical theater is a kind of (1)_____ that is very old. It goes back to (2)_____ _____. Over the years, it has undergone a number of different changes. The church in the Middle Ages used it to tell (3)_____. Other cultures created (4)_____ _____ that were (5)_____.

4. The Fins of Fish

dart quickly through the water	dorsal fins	control its speed
on the side of fish	turn in the water	

An important evolutionary development in fish is their fins. (1)_____ are located on the back and help the fish (2)_____. The anal, pectoral, and pelvic fins let the fish (3)_____. The pectoral fins (4)_____ help give them momentum. And the tail fins let the fish (5)_____.

5. The Functions of the Human Brain

the body's movements	the occipital lobe	the left and right
the senses and muscles	the parietal lobe	

The human brain is divided into two separate halves, (1)_____. There are five different sections: the parietal, frontal, occipital, and temporal lobes and the cerebellum. (2)_____ controls sensory information, while the frontal lobe controls (3)_____. (4)_____ controls vision, and the temporal lobe controls hearing. The cerebellum controls (5)_____.

6. Agriculture in America

moved west	crops and animals	farmed and unfarmed
agriculture	farming the land	

(1)_____ has long been important in America for a number of reasons. As people (2)_____ across the country, they lived by (3)_____. Various regions in the country raised different (4)_____, including cotton, wheat, corn, hogs, and cattle. Some parts of the country have gone back and forth between being (5)_____.

1. **The word confirmed is closest in meaning to**

   (A) verified (B) requested (C) assumed (D) denied

2. **The author of the passage implies that**

   (A) parasites can prosper while living alone
   (B) all parasitic relationships involve one form harming another
   (C) many hunters have parasites
   (D) mosquitoes and hunters are advanced parasites

3. **The word they in the passage refers to**

   (A) ectoparasites (B) hosts (C) leeches (D) chemical cues

4. **The phrase fend for is closest in meaning to**

   (A) hatch (B) live amongst (C) suffer (D) take care of

5. **According to the passage, all of the following are parasites EXCEPT:**

   (A) hookworms
   (B) termites
   (C) human fetuses
   (D) Cuckoo birds

6. **Directions:** Complete the table below to summarize information about parasites. Match the appropriate statements to the characteristics of the parasites with which they are associated. ***This question is worth 3 points.***

Answer Choices	Endoparasites
(A) They find new hosts in complex ways.	•
(B) They find their host by passive means.	•
(C) They feed off their host until it dies.	•
(D) They live in the intestines of their host.	
(E) Leeches are one example of them.	**Ectoparasites**
(F) The hookworm is a member of this group.	•
(G) All free-living animals are this kind of parasite.	•

Parasitism

Parasitism describes a relationship between two life forms of different species. It occurs when one life form harms another. In order to be described as parasitism, the two life forms must live together for long periods of time. This does not include animals that hunt and eat their prey or the times when a mosquito feeds off its host.

There are two major kinds of parasites: endo- and ecto-parasites. Endoparasites live inside the body of a host. An example is the hookworm, which lives in the stomach of a human or animal. Many of these parasites find their hosts by passive means. They live in the intestines. There they lay eggs, which are passed through waste products into the outer environment. Once outside the host, they are picked up by other people or animals in unclean areas.

Ectoparasites develop complex ways of finding new hosts. Some aquatic leeches locate their hosts through their motion sensors. They learn their host's identity through the temperature of the skin and chemical cues. Once they have confirmed that it is a desirable host, they use hook-like teeth to attach themselves. After they are attached, they dig through the skin and begin to suck blood.

The way a parasite feeds off its host is also separated into two major distinctions, that of necrotrophs and biotrophs. Necrotrophs are parasites that consume their host's tissue until the host dies. In this relationship, the host usually dies from loss of tissue or nutrients. Biotrophic parasites cannot survive on a host once it has died. They must keep their hosts alive to survive themselves. Many viruses are biotrophic. They use their host's genetic and cellular processes to multiply.

Biotrophic parasitism is a very common way for life forms to survive. At least half of all animals go through a phase of their life where they are parasitic. This includes human fetuses during the time they live inside their mother's womb. This behavior is also common amongst plants and fungi. All free-living animals are host to one or more types of parasites.

Some parasites are social. They learn how to take advantage of the behavior of a social host species. Some parasitic insects like nematodes join ant or termite colonies. They are able to feed on colony members until the group is so weak that it ceases to exist. Many species of Cuckoo bird steal food caught by their host. They even use other birds as babysitters by depositing their eggs in the nests of other birds. The Cuckoo young are raised by the adults of the other bird species while the adult Cuckoos fend for themselves.

7. **The word controversy is closest in meaning to**

(A) debate (B) anger (C) research (D) interest

8. **According to the passage, what did Pangaea look like?**

(A) It looked like a sphere.
(B) It resembled Africa.
(C) It was shaped like Panthalassa.
(D) It was shaped like a C.

9. **According to the passage, what can be inferred about continental drift?**

(A) It was caused by Alfred Wegener.
(B) It happened recently.
(C) It was unknown before the 1900s.
(D) It is named after a Greek phrase.

10. **The word this in the passage refers to**

(A) the Tethys Ocean (B) Pangaea (C) a rift (D) the east

11. **The word proponents is closest in meaning to**

(A) creators (B) opponents (C) disputers (D) supporters

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

There are various theories about the history of the Pangaea supercontinent.

•
•
•

Answer Choices

(A) Some people believe the Earth was created by God.
(B) Pangaea was an enormous continent that spread out over the equator.
(C) One breakup of Pangaea occurred during the Jurassic Period.
(D) Alfred Wegener was the first to call the giant continent Pangaea.
(E) Pangaea is believed to have split into two smaller continents.
(F) Scientists disagree over when Pangaea was split up.

Pangaea

Scientists in the early 1900s thought of the continental drift theory. They said that a great number of years ago, the seven continents we know today were a single, giant continent. A scientist named Alfred Wegener named it Pangaea. The name Pangaea comes from the Greek phrase for "all Earth."

This theory stirred up great controversy. The theory's timeline went against popular belief that Earth was only a few thousand years old. People wanted to believe that God had created Earth rather than the forces of nature. Wegener argued in favor of the continental drift theory in 1920.

Pangaea was a C-shaped landform that was spread across the equator. The large body of water within the crescent was called the Tethys Sea. The vast ocean that flowed around the continent was called Panthalassa.

The area of Pangaea would have been very vast. Inland regions would have been extremely dry from a lack of water. Animals could migrate freely from the North to the South Poles.

There were three major phases in the breakup of Pangaea. It is believed to have begun breaking up about 180 million years ago (mya). This happened in the Jurassic Period. Over many millions of years, it broke into the seven continents as we know them today.

The first phase of the breakup began about 180 mya. This change started when a large fault line ruptured. Activity would have been initiated through earthquakes and volcanic eruptions. A rift was created through Pangaea that stretched from the Tethys Ocean to the east. This took place between what is now North America and Africa. The first split created two smaller continents. The southern one is known as Gondwana and the northern one Laurasia.

The second major phase in the breakup began about 150 to 140 mya. At this time, the minor continent of Gondwana broke into four continents. These became Africa, South America, India, and Australia.

The third major and final phase of the breakup was about 60 to 55 mya. North America broke free from Eurasia. This opened up the Norwegian Sea.

But the proponents of this theory also say that Pangaea was not the first giant continent. They have reconstructed several other continental phases by tracing back the Earth's geological history. The most recent continent before Pangea is named Pannotia. Scientists think it would have formed about 600 mya. They believe it divided again about 50 million years later. An even earlier continent has been named Rodinia. Scientists think it would have formed about 1,100 mya and then divided 750 million years later. The earliest possible giant continent is Columbia. Scientists think it existed between 1.8 and 1.5 billion years ago.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. The small community began to **flourish** and became bigger.
   (A) thrive (B) build (C) improve (D) shrink

2. The workers **abandoned** the factory because it was too old and dangerous.
   (A) repaired (B) sold (C) left (D) fixed

3. The two parties came to a **resolution** on the contract.
   (A) disagreement (B) solution (C) promise (D) problem

4. The earthquake caused a **fissure** to appear in the earth.
   (A) hole (B) crack (C) weakness (D) ditch

5. The politician tried to **convert** people to think the same way as he.
   (A) change (B) direct (C) frighten (D) encourage

6. Mary looked at John **skeptically** when he told her about the news.
   (A) happily (B) angrily (C) sadly (D) doubtfully

7. Lions are some of the top **predators** in Africa.
   (A) animals (B) hunters (C) insects (D) killers

8. The professor's explanation was beyond our **comprehension**.
   (A) ability (B) experience (C) memories (D) understanding

B Match each word with the correct definition.

1. mammal	•	• **a.** person who creates or writes plays
2. cartilage	•	• **b.** of or related to hearing
3. school	•	• **c.** to stress the importance of something
4. emphasize	•	• **d.** a warm-blooded species of animal
5. conclude	•	• **e.** to move very quickly or suddenly
6. diversified	•	• **f.** a substance in the body similar to bone but not as hard
7. dart	•	• **g.** a kind of religious ceremony
8. auditory	•	• **h.** having many different qualities
9. playwright	•	• **i.** a large group of fish
10. liturgy	•	• **j.** to determine; to reach an opinion about something

Unit 8

Insert Text

Unit 8

Insert Text

Overview

■ Introduction

Insert Text questions ask you to determine where the best place for a given sentence would be in the passage. In this type of question, you will see four black squares appearing in one paragraph or spreading across the end of one paragraph and the beginning of the next. In either case, you need to understand the logical stream of the passage and focus on any grammatical connections between sentences, such as conjunctions, pronouns, demonstratives, and repeated words or phrases.

■ Question Type

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

[a sentence to be inserted into the passage]

Where would the sentence best fit?

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

■ Useful Tips

- Put the sentence in each place next to the squares.
- Try to pay attention to the logical connection between sentences.
- Be familiar with connecting words such as *on the other hand, for example, on the contrary, similarly, in contrast, furthermore, therefore, in other words, as a result, finally,* etc.

Sample iBT Question

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

The only spacecraft to have visited the planet is NASA's Voyager 2.

Where would the sentence best fit?

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

Uranus

Uranus is the seventh farthest planet from the sun. Its orbit is between that of Saturn and Neptune. It is the third largest planet by diameter. It has the fourth largest mass of any planet in the solar system. Uranus is named after the Greek god of the sky. This god also created all of the other gods. **A** Currently, no other visits are planned. **B** Voyager 2 was launched in 1977. **C** This unmanned probe made its closest approach to Uranus on January 24, 1986. **D** It then continued to Neptune. Uranus is the first planet discovered in modern times. It is also the first planet to be found using the technology of a telescope. Before this, all of the other planets were discovered by the naked eye.

Correct Answer The new sentence is about Voyager 2's visit to Uranus. And the sentence after the first square mentions 'no other visits,' which means that there was already a visit to Uranus. So the new sentence should go in the place where **A** is.

Insert Text questions ask you where the best place for a given sentence would be in the passage. You should understand the logical flow of the information in the passage. It is helpful to check out pronouns, linking words, demonstratives, and repeated words or phrases.

Molecules

A molecule is a group of two or more atoms. This group is held together by bonds. These substances are not always divisible into smaller fractions of the same substance. A molecule is considered the smallest particle of a substance. **A** In this state it still holds its composition and chemical properties. **B** It is better to consider that many substances are composed of networks of atoms or ions. **C** Scientists think of them this way instead of as molecular units. **D** A molecule is a stable entity which consists of two or more atoms. The idea of molecules was first stated in 1811. It was thought up by a scientist named Avogadro.

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

   This makes the concept easier to understand.

   Where would the sentence best fit?

Eclipse

The word *eclipse* comes from the Greek phrase "to vanish." It is an astronomical event. It takes place when one celestial object enters the shadow of another. **A** The term is most often used to describe a solar eclipse, which is when the moon's shadow passes over Earth's surface. **B** There is also a lunar eclipse, which is when the moon enters Earth's shadow. **C** It also refers to events outside of the Earth-moon system and can be used to describe a planet passing through the shadow cast by one of its moons. **D** It could be a moon passing into the shadow cast by the planet it orbits, or it could even be a moon going into the shadow of another moon.

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

   However, there are eclipses throughout the solar system.

   Where would the sentence best fit?

Jazz

Jazz is a musical art form that comes from America. It was first played in New Orleans around the start of the 20th century. Its roots come from African American music. **A** *It was later* combined with Western music technique and theory. **B** Jazz employs blue notes, swing, call and response, and improvisation. **C** After beginning in African-American communities, these styles spread in the 1920s. **D** They influenced many other musical styles. The instruments used in marching and dance bands at the turn of the century became the basic instruments of jazz. Bass, reeds, and drums were used with the Western 12-tone scale. Where or who the word *jazz* came from is uncertain.

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

But it has many other influences.

Where would the sentence best fit?

Sophocles

Sophocles was one of the three great tragic playwrights in ancient Greece. One document recorded that he wrote 123 plays. He won more first prizes in dramatic competitions than any other playwright. Submissions to dramatic festivals included four plays. **A** Three were tragedies. The final one was called a satyr play. **B** He also placed second in all the other competitions he entered. **C** He won his first victory in 468 B.C. although scholars now think this may not have been the first time he competed. **D** Only seven of Sophocles' tragedies have survived in their complete form. The most famous of these are the three plays concerning Oedipus and Antigone. These are well known as the *Oedipus Cycle*.

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

It was a more comical entry and not a drama.

Where would the sentence best fit?

Practice with Long Passages

A Read the following passage, and answer the questions.

The Observatories at Mauna Kea

Time Limit: 3 min. 10 sec.

Eleven research stations sit atop Mauna Kea. This is the best place to look at stars in the world. *Mauna Kea* means "white mountain" in Hawaiian. This mountain is a dormant volcano on the island of Hawaii. It is the highest point in the Pacific Basin. It is also the highest island-mountain in the world. Mauna Kea rises 9,750m from the ocean floor. It reaches an altitude of 4,205m above sea level. Its summit is above 40% of the Earth's atmosphere.

The atmosphere above Mauna Kea is extremely dry and clear. This is due to a cloud layer that floats below the summit. These clouds isolate the upper atmosphere from the lower moist maritime air. This ensures that the summit skies are pure and dry. The clouds keep the air around the summit free from pollutants.

This clarity makes Mauna Kea an ideal place for studying the stars. The number of clear nights is the highest in the world. The seeing factor is also very high here. Another factor that makes the stars so clear is the mountain's distance from city lights. A strong island-wide lighting law ensures an extremely dark sky.

The Astronomy Precinct on Mauna Kea was established in 1967. 1A The Astronomy Precinct is located on protected land. 1B This land is protected because of its sacred place in Hawaiian culture. 1C This precinct was built to be an international center for astronomers to come and study stars. 1D

The dorms for scientists are located below the summit. They are at about 3,000m above sea level. A visitor information station is located a hundred meters further below. Scientists and other visitors are told to stay at the lower level for 30 minutes. They do this to acclimate themselves before reaching the summit. This prevents altitude sickness.

Twelve telescopes are located at the summit. They are funded by companies and agencies of various nations. The University of Hawaii controls two telescopes. Two twin telescopes are run by the Keck Observatory. Subaru owns and administers another telescope. 2A The United Kingdom has an infrared telescope while Canada and France have a joint-effort telescope. 2B Another is owned and operated by California Technical University. 2C The groups that make up this effort help mankind better understand outer space. 2D

General Comprehension

1. According to the passage, which of the following is true of Mauna Kea?

(A) It is the highest point in the Atlantic Basin.
(B) The moist sea air makes it a good place for studying the stars.
(C) There are 15 telescopes located at the summit.
(D) Its summit skies are dry and pollutant-free.

- **dormant (a)** not active
- **isolate (v)** to be alone
- **seeing factor (phr)** the ability to see something in a certain place
- **sacred (a)** holy
- **acclimate (v)** to become used to something

2. **According to paragraph 6, all of the following are true of the telescopes at Mauna Kea EXCEPT:**

   (A) Two telescopes are run by the University of Hawaii.
   (B) There is a telescope that is owned jointly by Canada and France.
   (C) An infrared telescope is owned and administrated by Subaru.
   (D) The Keck Observatory controls a couple of twin telescopes.

On the TOEFL Test

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

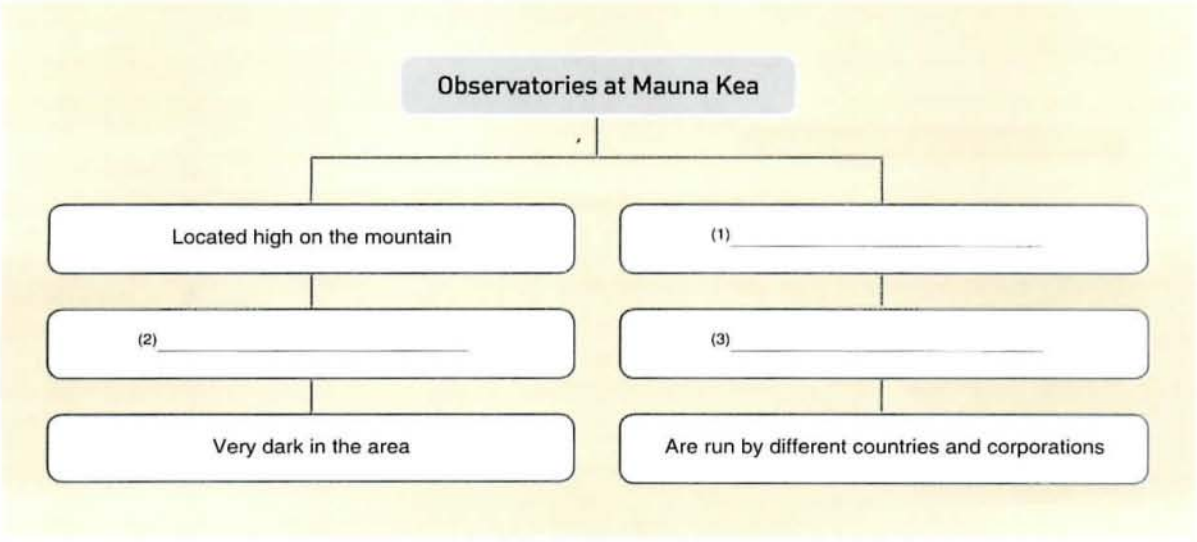
   It has been in existence for almost forty years.

   Where would the sentence best fit?

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

   The rest are operated by other various entities.

   Where would the sentence best fit?



B Read the following passage, and answer the questions.

The Element Naming Controversy

Time Limit: 3 min. 20 sec.

The 1960s was a very tense time between the USA and the Soviet Union. 1A Even the scientists from these countries were arguing. 1B Around this time, many scientists were in a race to be the first to synthesize elements. 1C They wanted to be the first in order to earn the naming rights. 1D A major controversy arose and was not resolved until 1997. This problem came about when a few groups of scientists claimed to have made the same elements at the same time. The main research labs involved in this crisis were the American lab in Berkeley and the Soviet lab in Dubna.

When Soviet scientists synthesized element 104, they named it after Igor Kurchatov. He was the father of the Soviet atomic bomb. The Americans strongly objected to this. They did not want to refer to an element named after an enemy who invented a weapon to destroy their country. But they were called hypocrites since they had named an element after Einstein, who also worked on atomic weapons.

Then, members of the international element naming board objected to the American name for 106, seaborgium. This was because the scientist Glenn T. Seaborg was still alive. 2A He was handing out periodic tables signed with his name. 2B This went against the board's rules. 2C In 1994, the commission proposed a new set of names. 2D They attempted to resolve the dispute. They tried to do this by replacing the name for 104 with a name after the Soviet Dubna Research Center. They proposed not to name 106 after Seaborg.

This solution was objected to by the American Chemical Society. They felt they should have the right to propose the name for 106. It should be whatever they wanted. The international board decided that credit for element 106 should be shared between Berkeley and Dubna. But the Dubna group had not yet offered a name. In addition, many American books already used the earlier names.

Finally in 1997, the names were agreed on. But in 1999, Seaborg was still disputing the name change for 105. It had been changed from hahnium to dubnium. He said they had not really discovered the element for which they had been credited. But the Dubna group refused to remove their claim. Some scientists in Berkeley still refer to 105 as hahnium.

General Comprehension

1. According to the passage, Igor Kurchatov was

(A) a coworker of Einstein
(B) the discoverer of elements 104 and 106
(C) the creator of the Soviet atomic weapon
(D) an opponent of the name change for element 105

- **tense (a)** worrisome; nervous
- **synthesize (v)** to create; to make
- **controversy (n)** argument; dispute
- **hypocrite (n)** a person who says one thing but does the opposite

2. **According to the passage, all of the following are true of the element naming controversy between the USA and the Soviet Union EXCEPT:**

   (A) The Americans did not want element 106 named after the Dubna Research Center.
   (B) Soviet scientists objected to the American name for element 106.
   (C) The American and Soviet labs were recommended to share credit for element 106.
   (D) The Soviet group from Dubna offered many alternative names to elements 104 and 106.

On the TOEFL Test

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

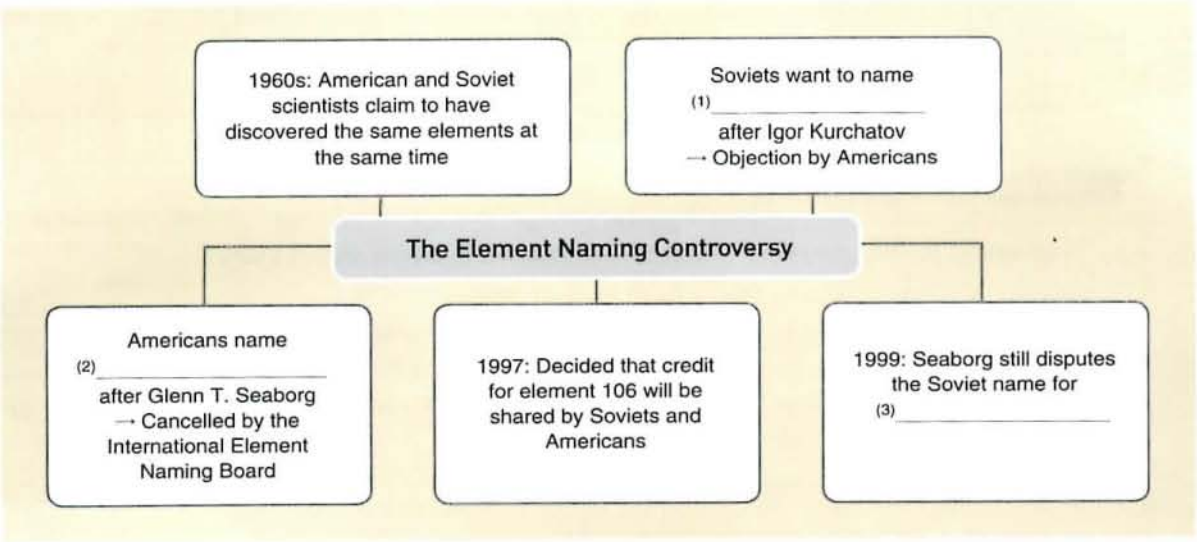
   This was in the middle of the Cold War.

   Where would the sentence best fit?

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

   So they refused to allow this to be the element's name.

   Where would the sentence best fit?



C Read the following passage, and answer the questions.

Plato

Time Limit: 3 min. 20 sec.

Plato was born in the golden age of ancient Greece. His real name was Aristocles. But historians think he was given the nickname Plato because of his broad stature. In Greek, *plato* means "broad." It is also said that Plato had a wide, broad forehead. His parents were influential citizens in Athens. 1A Plato began his career as a student of Socrates. 1B When his master died, Plato studied in Egypt and Italy. 1C He then returned to Athens and started his own school. 1D There Plato tried to pass on the Socratic style of thinking. He guided his students towards the discovery of truth.

Plato tried to convey Socrates' teachings. He did this by writing down his master's conversations. These dialogues are the primary source of historical information about Socrates. Early dialogues look at a single issue. But they rarely come to conclusions about these issues. The *Euthyphro*, one of Plato's dialogues, points out a dilemma about any appeal to authority in defense of moral judgments. The *Apology* offers a description of the philosophical life. This description is presented as Socrates presents his own in defense before an Athenian jury.

The dialogues of Plato use Socrates as a fictional character. But the middle dialogues express Plato's own views about philosophical issues. 2A In the *Meno*, Plato reports the Socratic notion that no one knowingly does wrong. 2B He also introduces the doctrine of recollection. 2C This is done in an attempt to discover whether or not virtue can be taught. 2D The *Phaedo* continues the development of Platonic notions. It presents the doctrine of the forms. These arguments claim to show the immortality of the human soul.

The masterpiece among the middle dialogues is the *Republic*. It begins with a conversation about the nature of justice. It then proceeds directly to an extended discussion of justice, wisdom, courage, and moderation. He looks at the ways in which these appear to individual human beings and in society as a whole. The allegory of the cave captures the powerful image of the possibilities for human life. The dialogue concludes with a review of various forms of government. In it is an explicit description of the ideal state. It is one in which only philosophers are fit to rule. There is also an attempt to show that justice is better than injustice.

General Comprehension

1. According to the passage, which of the following is true about Plato?

(A) He was born in the Golden Age of ancient Rome.
(B) He started his own school to separate from Socrates' teachings.
(C) He used Socrates as a fictional character in many of his dialogues.
(D) He began to speak in his own voice in the *Euthyphro* and *Apology*.

- **influential (a)** able to affect many things
- **convey (v)** to transmit; to teach
- **doctrine (n)** a form of teaching
- **immortality (n)** everlasting life; eternity
- **allegory (n)** a story that uses symbols to convey meaning

2. **The word one in the passage refers to**

   (A) human life
   (B) dialogue
   (C) government
   (D) ideal state

On the TOEFL Test

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

   He was greatly influenced by his master's thoughts and ideas.

   Where would the sentence best fit?

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

   They do not depict Socrates as a main character.

   Where would the sentence best fit?

PLATO

- real name – (1)_____
- a student of Socrates'
- founded his own school
- wrote many works of philosophy
- used Socrates as a character in (2)_____
  – the *Euthyphro & Apology*
- middle dialogues didn't use Socrates
  – the *Meno & Phaedo*
- (3)_____ – the greatest middle dialogue

D Read the following passage, and answer the questions.

Loie Fuller

Time Limit: 2 min. 40 sec.

Loie Fuller pioneered the field of modern dance. She was also an innovator in the field of lighting techniques. She was born in Chicago, and she began her career as a child actress. She later performed dances in burlesque, vaudeville, and circus shows. She was an early practitioner of the free dance method. She danced with natural movements that she developed herself. She also created improvisation techniques, combining her dance moves with flowing silk costumes. These were lit up by colored lighting that she designed.

Fuller became famous in America. She was known for works such as "Serpentine Dance." 1A But she felt unhappy that she was not taken seriously by the public. 1B She felt they still saw her as an actress. 1C The people of Paris received her warmly. 1D She remained in France to continue her work. She was a regular performer at the Folies Bergere. There she performed such works as the Fire Dance. She became the embodiment of the Art Nouveau movement.

Many French artists and scientists were attracted to Fuller's groundbreaking work. Her fans included greats such as Jules Cheret, Henri de Toulouse-Lautrec, and Marie Curie. 2A Fuller also filed many patents related to stage lighting. 2B This included chemical compounds for creating color gel. 2C She was even a member of the French Astronomical Society. 2D

Fuller arranged many tours of Europe for early modern dancers. She was known as the first American modern dancer to perform in Europe. She also introduced Isadora Duncan to the audiences of Paris. She is famous for causing modern dance to be accepted as a serious art form.

Fuller returned to America once in a while. She came back to stage performances by her students. They were called the "Fullerets" or Muses. But she was in Paris at the end of her life. Breast cancer took her in 1928. She was cremated, and her ashes were buried in Paris.

General Comprehension

1. According to paragraph 1, all of the following about Loie Fuller are true EXCEPT:

(A) She created many techniques for stage lighting.
(B) She danced with unnatural movements.
(C) She used to dance wearing silk outfits.
(D) She started out as a child actress.

2. According to the passage, Loie Fuller was not happy because

(A) she felt unappreciated as a dancer in America
(B) not so many French people were attracted to her work
(C) she had to perform dances in vaudeville
(D) her "Serpentine Dance" was severely criticized

- **pioneer (v)** to be the leader in something
- **improvisation (n)** creativeness; the act of creating new things
- **embodiment (n)** the ideal; the perfect model
- **groundbreaking (a)** new; innovative
- **cremate (v)** to burn a dead body to turn it into ashes

On the TOEFL Test

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

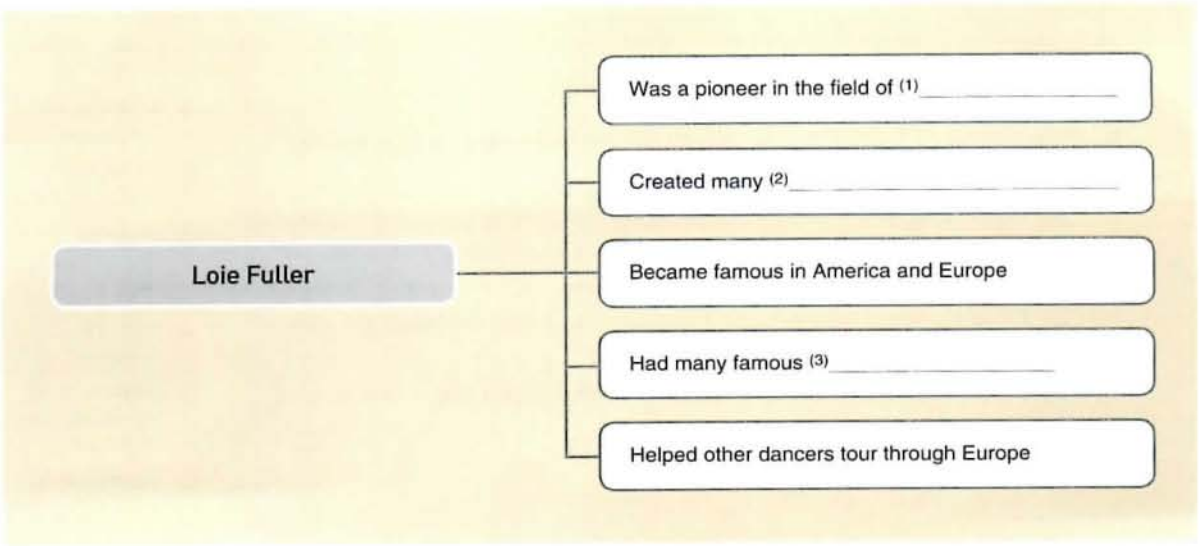
However, she felt different in Europe.

Where would the sentence best fit?

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

But she also had many fans who were just regular people.

Where would the sentence best fit?



E Read the following passage, and answer the questions.

Ancient Astronomy

Time Limit: 2 min. 50 sec.

Many ancient societies studied the stars. Now, many scientists study the stargazing practices of those societies. They also look at the tools these early societies made to look at stars. This form of archaeology and astronomy is currently studied as a serious branch of science. But in the beginning, it was very controversial. Many people were not willing to believe that primitive humans could understand the science of astronomy.

At the end of the 19th century, the astronomer Norman Lockyer was active in this field. 1A His studies covered Stonehenge and the pyramids of Egypt. 1B He tried to bring this field into wide acceptance as a serious branch of science. 1C But on the British Isles, interest in this field waned. 1D Then in the 1960s, there was new interest. It was revived by astronomer Gerald Hawkins. He proposed that Stonehenge was a Stone Age computer. This interesting concept made people interested again.

Around the same time, an engineer named Alexander Thom published the results of a study. His article stated that there was a widespread practice of accurate astronomy in ancient cultures. He said Stonehenge was used on the British Isles during ancient times. 2A Hawkins's claims were widely dismissed. 2B But Thom's analysis posed a problem. 2C This challenged the historical academic beliefs at that time. 2D A re-evaluation of Thom's fieldwork by Clive Ruggles tried to show that his claims were not supportable. But there was evidence of widespread interest in astronomy at these Stone Age sites.

Only one scientist, Euan Mackie, agreed that Thom's theories needed to be tested. This man went to the Kintraw standing stone site in Argyllshire in 1970 and 1971. Here he checked whether Thom's prediction about the accuracy of the observation platform above the stone was correct. He checked the alignment of the platform with the stone. He found that it was correct. Thom's conclusions were accepted. These were published in new prehistoric accounts of Britain. These persistent scientists proved that people from long ago did study the stars with accurate results. History was changed forever.

General Comprehension

1. According to the passage, which of the following is true about theories about Stonehenge?

(A) Gerald Hawkins claimed that Stonehenge was an ancient computer.
(B) Alexander Thom tried to prove a direct connection between Stonehenge and the Egyptian pyramids.
(C) Clive Ruggles agreed with the theories of Gerald Hawkins about Stonehenge.
(D) Euan Mackie proved that Thom's theory about Stonehenge was groundless.

- **primitive (a)** very simple or basic
- **revive (v)** to renew
- **wane (v)** to decrease; to become less
- **pose (v)** to present
- **alignment (n)** the placement of something
- **persistent (a)** constant; unrelenting

2. **According to paragraph 4, all of the following are true about Euan Mackie EXCEPT:**

   (A) In 1970 and 1971 he went to the Kintraw standing stone site.
   (B) He checked on the accuracy of the observation platform above the stone.
   (C) He found that the alignment of the platform was not correct.
   (D) The results of his test helped rewrite early history.

On the TOEFL Test

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

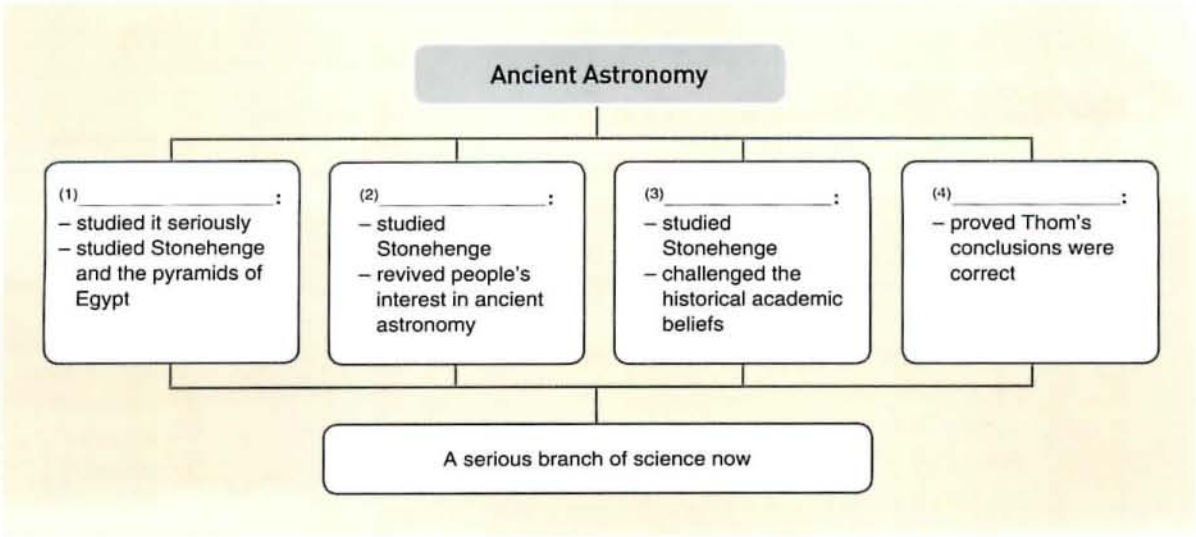
   People simply were not interested in studying it.

   Where would the sentence best fit?

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

   His conclusions startled many people.

   Where would the sentence best fit?



F Read the following passage, and answer the questions.

Melvin Calvin

Time Limit: 3 min. 10 sec.

Melvin Calvin will forever be remembered as a great chemist. He spent his whole life working towards discovery. He and his team discovered the Calvin cycle. This cycle is the route that carbon travels through plants. This discovery is world-famous for "unlocking the secrets of photosynthesis" in plants. For this he was awarded the 1961 Nobel Prize in Chemistry.

Calvin joined the faculty at the University of California at Berkeley in 1937. 1A By 1963, he was named Professor of Molecular Biology. 1B He was the founder and director of the Chemical Biodynamics Lab. 1C He was also the associate director of the Berkeley Radiation Lab at the same time. 1D

According to legend, on the day of the Japanese surrender in World War II, the head of the laboratory came to Calvin. He said, "Now is the time to do something useful with radioactive carbon." He was referring to the isotope of carbon that had been discovered in 1940. This isotope had been used in the atomic bombs that were dropped on Japan. In response, Calvin organized a team of Rad Lab researchers. They began to study the photosynthetic process. This is the process by which green plants convert energy from the sun into chemical energy.

Calvin and his team used the carbon-14 isotope as a tracer. They mapped the complete route that carbon travels through a plant. The path starts from its intake as carbon dioxide from the air to the point where it changes into carbohydrates. 2A In doing so, the Calvin group showed that sunlight acts on the chlorophyll in a plant. 2B It fuels the creation of organic compounds. 2C Before this discovery, sunlight was believed to act only on the carbon dioxide within a plant. 2D

Calvin's work led to a lifelong interest in energy production. He also spent many years testing the chemical evolution of life. He wrote a book on the subject that was published in 1969. Calvin actively pursued scientific research into his old age. He studied the use of oil-producing plants. He looked at them as renewable sources of energy. Calvin even analyzed moon rocks. He was a man who loved science. It was more important to him than the many awards he received.

General Comprehension

1. According to the passage, which of the following is NOT true of Melvin Calvin?

(A) He won the Nobel Prize in 1961 for discovering the Calvin cycle.
(B) He established the Chemical Biodynamics Lab at U.C. Berkeley in 1963.
(C) He studied the photosynthesis process of plants using radioactive carbon.
(D) He was deeply interested in energy production and renewable energy sources.

- **faculty (n)** all the teachers at a school
- **founder (n)** a person who establishes some kind of organization
- **organize (v)** to gather together; to form something
- **convert (v)** to change
- **pursue (v)** to chase after

2. **The word pursued in the passage is closest in meaning to**

   (A) widened
   (B) accomplished
   (C) continued
   (D) followed

On the TOEFL Test

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

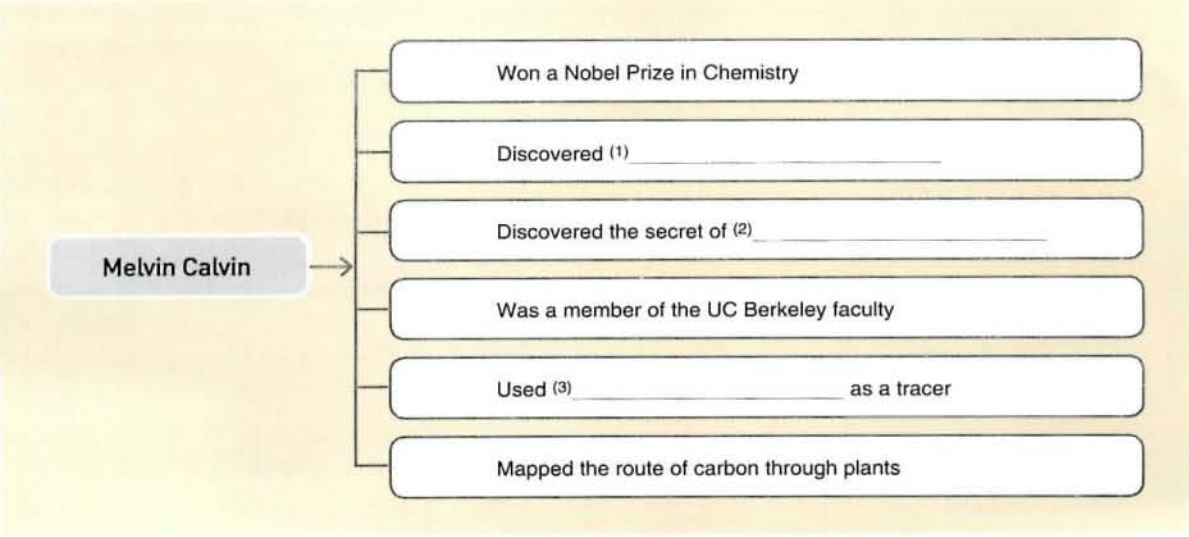
   He quickly became an important professor there.

   Where would the sentence best fit?

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

   But now scientists understand this process much better.

   Where would the sentence best fit?



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. The Observatories at Mauna Kea

Mauna Kea in Hawaii	twelve telescopes	the air quality
very dark and clear	1967	

There are many research stations located on (1)_____. These observatories are located there because of (2)_____ and the fact that the night skies are (3)_____. The Astronomy Precinct there was established in (4)_____. There are (5)_____ located there that are run by different countries or corporations.

2. The Element Naming Controversy

American scientists	in the 1960s	the USA and Soviet Union
naming controversies	the Soviet name	

(1)_____, tensions between (2)_____ even caused problems between scientists. There were (3)_____ over various elements that different laboratories created. The Americans objected to (4)_____, and the Soviets objected to the American name. Finally, an agreement on the name was arrived at, but some (5)_____ still use the old name.

3. Plato

his early dialogues	Greek philosopher	the *Republic*
Plato's own thoughts	the Socratic method of philosophy	

Plato was a great (1)_____ who lived in Athens and studied with Socrates. After Socrates died, Plato opened his own school and tried to imitate (2)_____. Many of (3)_____ looked at single issues but never came up with answers. His middle dialogues stopped using Socrates as a character and expressed (4)_____. (5)_____ was one of Plato's greatest works.

4. Loie Fuller

modern dance	helped other artists	important French fans
improvisation	felt unappreciated	

Loie Fuller was a pioneer in the field of (1)_____. She created many new dance movements through (2)_____. She became famous in America, but she (3)_____, so she moved to France, where she had many fans. She had many (4)_____, including Jules Cheret, Henri de Toulouse-Lautrec, and Marie Curie. She toured Europe and also (5)_____ to do so.

5. Ancient Astronomy

Alexander Thom	Stonehenge	the stargazing practices
Thom's conclusions	Norman Lockyer	

Nowadays, many scientists study (1)_____ of ancient societies. (2)_____ was an early scholar who looked into these practices. Gerald Hawkins also looked at (3)_____ and noticed how it was connected to astronomy. Most people discounted Hawkins's work, but (4)_____ produced new evidence to support it. Euan Mackie went to Stonehenge and proved that (5)_____ were correct.

6. Melvin Calvin

the secrets of photosynthesis	the Calvin cycle	a great chemist
the carbon-14 isotope	UC Berkeley	

Melvin Calvin was (1)_____ who won a Nobel Prize. He discovered (2)_____, which helped to unlock (3)_____. He worked at (4)_____, where he was a professor. He used (5)_____ to trace the route of carbon through the plant. He studied many different things through the course of his life.

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

   (A) the Chinook language
   (B) every group
   (C) potlatch
   (D) a different way

2. **Which of the following Indian tribes is NOT mentioned as practicing the potlatch in the passage?**

   (A) Haida
   (B) Cherokee
   (C) Salish
   (D) Tlingit

3. **The word witnessed is closest in meaning to**

   (A) studied
   (B) practiced
   (C) enjoyed
   (D) viewed

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

   But there were also many other special foods.

   Where would the sentence best fit?

5. **The word influx is closest in meaning to**

   (A) arrival
   (B) export
   (C) possibility
   (D) interest

6. **The author of the passage implies that**

   (A) the potlatch was always a friendly occasion
   (B) missionaries wanted the potlatch to continue
   (C) the potlatch is a tradition that continues today
   (D) potlatching stopped in Canada after 1885

The Potlatch Ceremony

A potlatch was a religious ceremony held by some American Indian tribes. This ceremony was extremely important to their social structure. These tribes were from regions along the Pacific Northwest coast. These regions ranged from the United States to British Columbia, Canada. Some of the tribes were the Haida, Nuxalk, Salish, and Tlingit.

The name *potlatch* is derived from the Chinook language. Every group that participated in the ceremony has a different way of saying it. The Chinook word sounds like the English words "pot" and "latch." But it has nothing to do with these things.

Originally, the potlatch was held to commemorate important events. It could be the death of a highly respected person or a new child being born. Social ranks in American Indian societies were limited. So when a person changed his rank to a higher one, it had to be witnessed in order for people to accept it.

The potlatch took the form of a ceremonial feast. **A** It traditionally featured seal meat or salmon. **B** During the feast, relationships of hierarchy between groups were created and strengthened through the exchange of gifts, dance performances, and other ceremonies. **C** The host family made great efforts to demonstrate their wealth by giving away their possessions. **D** This prompted prominent guests to return the favor by holding their own potlatch ceremonies.

Before the arrival of the Europeans, potlatch gifts might be preserved food, boats, or human slaves. The influx of new sorts of goods such as blankets and copper caused a negative change in the potlatch in the late 18th and 19th centuries. Some groups used the potlatch as an arena for battle. At this arena, highly competitive contests of status took place. In some cases, gifts were destroyed after being received.

Potlatching was made illegal in Canada in 1885 and outlawed in the United States in the late 19th century because missionaries and government agents desired this. They thought it was a foolish custom. In their view, it was wasteful, unproductive, and bad for the people who did it. Despite the ban, potlatching continued secretly for many years.

Years later, numerous tribes begged the government to repeal the ban. They compared the potlatch to Christmas. They said the potlatch was a feast where friends exchanged gifts, like Christmas. Potlatching became less of an issue in the 20th century. So the ban was dropped.

Today, many ethnographers study the potlatch. They are fascinated by this festive event. The sponsors of a potlatch hand out many valuable items. They earn prestige in return. This prestige increases with the richness of the potlatch.

7. **The word ironically in the passage is closest in meaning to**

(A) amusingly
(B) groundlessly
(C) hypocritically
(D) scarily

8. **According to the passage, what format does literary criticism commonly come in?**

(A) television
(B) book
(C) magazine
(D) newspaper

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

So these people were taking a big risk by engaging in criticism.

Where would the sentence best fit?

10. **The author discusses Aristotle's *Poetics* in paragraph 4 in order to**

(A) describe a work of Renaissance era criticism
(B) exemplify ancient criticism
(C) illustrate the restoration efforts of Renaissance-era critics
(D) highlight an important work of criticism

11. **According to the passage, what can be inferred about "The New Criticism"?**

(A) It was founded by one individual.
(B) It was based on the works of Plato and Aristotle.
(C) It was similar to deconstruction.
(D) It did not form in only one place.

12. **The word it in the passage refers to**

(A) philosophy
(B) method
(C) criticism
(D) information

Literary Criticism

Students around the world study great literature in school. But sometimes they need the help of experts to better understand what they have read. It is the job of literary critics to study and discuss the works of authors. They think about and decide what the author meant. This kind of work is based on literary theory. However, it is important to note that not all critics are theorists.

These days, literary criticism often comes in an essay or book format. Academic critics teach classes on this subject. They also write their findings in academic journals. Ironically, their writings are sometimes longer than the books they are writing about. More popular critics have their work printed in magazines. Some popular magazines that print literary criticism are *The New York Times Book Review*, *The Nation*, and *The New Yorker*.

As long as literature has been around, there have been critics to discuss it. Aristotle and Plato wrote works that were highly critical of Greek poetry. **A** In the Middle Ages, classical critics focused on religious texts. **B** But around this time, it was dangerous to criticize the Holy Bible. **C** Critics' comments on holy books such as this were usually made with the official opinions of church leaders in mind. **D**

In the Renaissance, many new ideas about writing were formed. These ideas about form and content led to a new group of critics. These critics claimed that writing was at the center of all culture. They claimed that poets and authors were protectors of a long literary tradition. Some of these noble poets began restoring great works of the past. One classic work that was rescued was Aristotle's *Poetics*.

More new ideas about literature were brought to the field of literary criticism by the British Romantic movement. These critics of the early 19th century thought that the object of writing did not always have to be beautiful. They had no problem with it being common, gritty, or ugly. They thought that the act of creating literature itself could raise a common subject. The highest level a work could attain was that of the "sublime."

Then, in the early 20th century, a new group of critics began to publish their work. These critics, who came from Britain and America, called their work "The New Criticism." These critics thought the most important way to study writing was to read it very closely. They encouraged people to focus "on the words themselves." This method is still a very popular way of reading.

The New Criticism was the most common method of studying writing until the late 1960s. Around this time, university professors became highly influenced by Continental Philosophy. This new way of thinking led to a new style of criticism. Both this philosophy and method of criticism focus on the form of information. They look very closely at the way it is presented. The critic must go through a process of taking a work apart. This process is called "deconstruction."

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. The engineer created a very **primitive** model for his experiment.
   (A) excessive (B) basic (C) advanced (D) complicated

2. The **founder** of the organization finally retired after thirty-five years as president.
   (A) president (B) manager (C) creator (D) discoverer

3. Bill Gates is a **pioneer** in the field of software.
   (A) engineer (B) discoverer (C) opportunist (D) leader

4. Everyone looked **tense** while they were waiting for the results to come in.
   (A) upset (B) disinterested (C) nervous (D) pleased

5. The question **poses** many potential problems for the people.
   (A) presents (B) answers (C) asks (D) manages

6. Jerusalem is a **sacred** city to people of several different religions.
   (A) holy (B) fascinating (C) capital (D) popular

7. We did not **dispute** what the man accused us of doing.
   (A) agree with (B) do (C) argue (D) state

8. Donald made it to the **summit** of the mountain after climbing for several hours.
   (A) base (B) bottom (C) cliff (D) top

B Match each word with the correct definition.

1. alignment	•	• **a.** the ability to see something in a certain place
2. improvisation	•	• **b.** a very big problem
3. seeing factor	•	• **c.** a story from the past that may or may not be true
4. hypocrite	•	• **d.** the placement of something
5. dilemma	•	• **e.** to create; to make
6. allegory	•	• **f.** creativeness; the act of creating new things
7. archaeology	•	• **g.** the science of studying ancient cultures
8. legend	•	• **h.** to become used to something
9. acclimate	•	• **i.** a person who says one thing but does the opposite
10. synthesize	•	• **j.** a story that uses symbols to convey meaning

PART 3 Reading to Learn

In this part, the reading comprehension questions include: prose summary and fill in a table. The learning objectives of these comprehension questions are to recognize the major ideas and the relative importance of information in a passage and to organize the main ideas and other important information in the appropriate categories.

- Unit 9 **Prose Summary**
  Biology / Psychology / Art / Geography
- Unit 10 **Fill in a Table**
  Science / Sociology / Economics / History

Unit 9

Prose Summary

Unit 9

Prose Summary

Overview

■ Introduction

Prose Summary questions are a new type of question on the TOEFL iBT. In this type of question, you will be asked to complete a summary chart by choosing the three most important ideas from six choices. In order to solve Prose Summary questions, you should understand the overall theme of the passage and distinguish important ideas from minor ones in the passage.

■ Question Type

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 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.***

[An introductory sentence]

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Answer Choices

1. XXXXXXXXXXXXXXXXXXXXXXXXXXX
2. XXXXXXXXXXXXXXXXXXXXXXXXXXX
3. XXXXXXXXXXXXXXXXXXXXXXXXXXX
4. XXXXXXXXXXXXXXXXXXXXXXXXXXX
5. XXXXXXXXXXXXXXXXXXXXXXXXXXX
6. XXXXXXXXXXXXXXXXXXXXXXXXXXX

■ Useful Tips

- Try to understand the overall structure of the passage.
- Write down the main idea of each paragraph on your scratch paper.
- Distinguish major points from minor details in the passage.
- Incorrect answer choices usually deal with the minor points of the passage or are not mentioned in the passage.

Sample iBT Question

Pennsylvania's Coal

Coal is a huge source of energy. Countries have spent lots of money getting at the coal they have. The eastern United States has a tradition of mining coal. Pennsylvania is one such place. It is the source of so much coal, but it is the home of a great mining disaster.

There are two ways to get at coal in the ground. The first way is to dig a hole below the surface of the earth. Miners make tunnels that can be miles long. The second way is called open mining. Miners will remove the surface of the earth over a huge area until they reach what they want.

Centralia, Pennsylvania has very high-quality coal. It burns hotter than most other kinds of coal. Many open mines are in that town. Sadly, the town garbage dump was near an old, open mine pit. In 1962, the garbage caught fire. It set the open mine on fire, too. The fire started burning underground, where it was impossible to put out. The fine quality of the coal made the disaster even worse. The fire has been burning underground for over forty years. No one knows how to stop it. They say it will burn for 250 years.

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

Pennsylvania has a great mining tradition and a sad history.

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Answer Choices

1. The town garbage dump was near an old, open mine.
2. The coal near a town caught fire and has been burning for decades.
3. The town of Centralia has many open mines.
4. Pennsylvania uses open mining to get coal from the ground.
5. The fire will burn for 250 years.
6. There is good, quality coal in Pennsylvania.

Correct Answer Choices 2, 4, and 6 are correct because they represent major ideas in the passage: Pennsylvania's open mining and the long-lasting burning fire. Choices 1, 3, and 5 are just minor ideas.

Prose Summary questions ask you to complete a summary chart with the most important ideas from the passage. The topic sentence will be given for the summary. You need to understand the overall theme of the passage first and then distinguish major points from minor ideas in the passage.

Portrait Painting

The painting of portraits is a kind of art. Its intent is to show a visual image of the subject, which is usually a person. The portrait is expected to show the true form of the subject. Portraitists create their portraits for someone who hires and pays them. They are sometimes inspired by strong feelings they have for the subject. A self-portrait is one in which the artists portray themselves. Portraits can show the subject's entire body, half of the person's body, or a bust, which covers from the shoulders to the top of the head. Animals, pets, and even houses are sometimes chosen to be subjects for portraits.

1. **Directions:** Complete the summary by selecting the TWO answer choices that express the most important ideas in the passage.

   This passage discusses the characteristics of portrait painting.

   •

   •

   (A) A portraitist is someone who paints portraits for money.
   (B) Portraits are created to show the true form of the subject.
   (C) Some people prefer self-portraits for the strong feelings they experience.
   (D) The subjects of portraits include humans, animals, and buildings.
   (E) Portraits of the bust show the subject from the shoulders to the top of the head.

Flatworms

Flatworms are a group of simple life forms with very soft bodies. These animals have no spine. They are found in saltwater, freshwater, and moist places. Most of them are free-living forms, but some species are parasitic and live on other animals. There are four classes of flatworm: Tematoda, Cestoda, Monogenea, and Turbellaria. The flatworm's soft body is ribbon-shaped. Flatworms are the simplest animals, with organs formed out of three germ layers. There are outer and inner layers and a middle layer between them. These worms have no true body cavity except for their gut. The inside of their bodies are filled with loosely spaced tissue.

2. **Directions:** Complete the summary by selecting the TWO answer choices that express the most important ideas in the passage.

   Flatworms' bodies are very basic.

   •

   •

   (A) Flatworms live in watery places.
   (B) Flatworms have ribbon-shaped, soft bodies without spines.
   (C) Flatworms have three germ layers to develop their body cavity.
   (D) Flatworms are classified into four different kinds according to their size.
   (E) Flatworms cannot survive without a nutrient supply from other animals.

Deltas

A delta is a landform that occurs where a river flows into an ocean, sea, desert, or lake. This flow builds a deltaic deposit in the outward direction of the flow. A delta is formed by sediment carried by the river. This sediment is deposited as the water current dissipates. Deltaic deposits of larger rivers that are heavy with sediment divide river channels into multiple streams. These streams divide and come together again to form a system of active and inactive channels. A deposit at the mouth of a river forms a shape that is roughly triangular. The blocking of the river mouth by silt causes the shape and increased width at the base of the delta.

3. **Directions:** Complete the summary by selecting the TWO answer choices that express the most important ideas in the passage.

This passage describes how deltas are formed.

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(A) Sediment carried by a river creates deltas.
(B) Rivers are often divided into multiple streams.
(C) Deltas are triangular in shape.
(D) The mouth of a river is blocked by silt deposits.
(E) Deltaic deposits build in the inward direction of a river flow.

Social Psychology

The field of social psychology is an ongoing study of how people behave in groups. It focuses on how they perceive, influence, and relate to others. Gordon Allport is credited with the classic definition of this study. He said it is an attempt to understand and explain how people are influenced by others. This can include their ways of dealing with the imagined or implied presence of other people. Much of the research done in this field is completed through the observation of small groups. These groups are assembled and given tasks to complete. Researchers observe the group interactions as they attempt to complete the assigned tasks.

4. **Directions:** Complete the summary by selecting the TWO answer choices that express the most important ideas in the passage.

Social psychology examines the group dynamics of people.

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(A) Social psychologists publish their research in different journals.
(B) Social psychology explains how people are influenced by others.
(C) Researchers often observe small groups of people doing tasks.
(D) Social psychology was first defined by Gordon Allport.
(E) Social psychology is a subfield of psychology and sociology.

Practice with Long Passages

A Read the following passage, and answer the questions.

Estuaries

Time Limit: 2 min. 40 sec.

An estuary forms at the tidal mouth of a river. It is a coastal body of water that is semi-enclosed. It also has a free flowing connection to the open sea. The main feature of an estuary occurs within this connection when seawater mixes with freshwater. The combining of seawater and freshwater from a stream or river creates a supply of brackish water. A tide must be present to create motion at the point where the two waters meet. In seas without a tide, the rivers naturally form deltas.

The tidal mouth of a river is the usual location of an estuary. Here there is often a lot of sediment deposits that consist of silt carried from runoff from the land. Estuaries occur more frequently on sunken coasts, where the land is situated lower, as the sea level has risen. Valleys are flooded by this process, which creates forms such as rias and fjords. If there is a stream or river flowing into them, they can become estuaries.

Brackish water created in estuaries is not as salty as seawater. But it is saltier than freshwater. This kind of water allows estuaries to harbor thriving ecosystems. One of the most well-known estuaries is the River Thames, which flows through London. It reaches to the town of Teddington, a few miles west of London. This area marks the limit of the tidal part of the Thames. But as far west as Battersea, it is still a freshwater river.

The fauna in this part of the Thames consists mostly of freshwater species. There are many fish found here, such as roach, dace, carp, perch, and pike. Between Battersea and Gravesend, the Thames becomes brackish. A limited number of freshwater and marine species populate this area. The salinity increases a little further east, and marine species completely replace the freshwater fish.

General Comprehension

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

(A) contain
(B) hide
(C) destroy
(D) create

2. According to the passage, a tide must be present at an estuary in order to

(A) build sediment deposits
(B) mix fresh and salty water into brackish water
(C) form a delta naturally
(D) maintain a thriving ecosystem

- **sediment (n)** dirt and silt from the bottom of a river
- **runoff (n)** rainwater that forms a stream rather than going into the ground
- **sunken (a)** beneath the water level
- **brackish (a)** somewhat salty
- **thrive (v)** to become successful or strong; to flourish
- **fauna (n)** animals in a particular area
- **populate (v)** to live in a certain place

On the TOEFL Test

3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

An estuary has many different features.

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Answer Choices

(A) Freshwater species mostly live in estuaries.

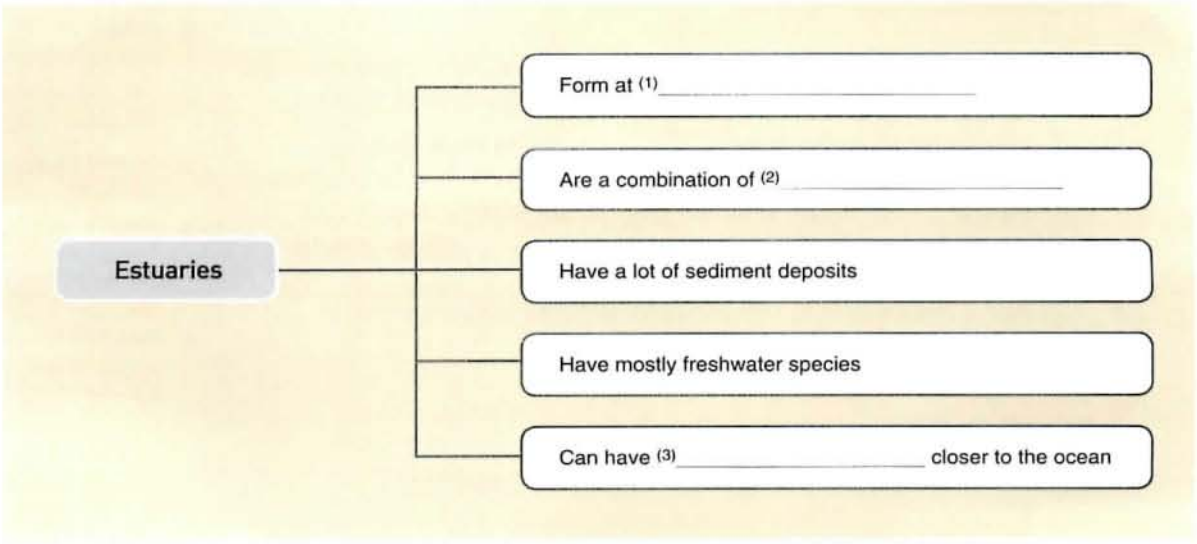
(B) The River Thames is one of the most studied estuaries.

(C) Estuaries have lots of sediment deposits.

(D) Many different fish live in the Thames.

(E) Valleys can flood near sunken coasts.

(F) Estuaries are a combination of freshwater and seawater.



B Read the following passage, and answer the questions.

The Embryo

Time Limit: 3 min.

The embryo is the earliest stage of development for multi-celled life forms. The development of the embryo begins with sexual reproduction. Once this is completed, a sperm fertilizes an egg. The zygote is the cell that results from this process. All the DNA of the two parents is contained within it. In this early stage, the human embryo does not possess consciousness. This point is hotly contested by groups that are for or against abortion rights.

For human embryos there are three major stages of development. From weeks 1 to 4, the embryo will begin to search for a place to attach to the wall of the uterus. It finds the right place and implants itself there. The mother and the embryo will begin to form their connections. The umbilical cord forms during this time.

During weeks 5 to 6, the embryo puts out chemicals. The woman's menstrual cycle is stopped by these. The brain begins to develop. Around the sixth week, brainwave activity begins. The heart begins to beat around this time. Stubs where arms and legs will grow later become visible. All of the main organs begin to grow.

Between weeks 7 and 8, the embryo's blood type is established. The embryo can move, and its eyes form. Most organs are fully developed or are in the process of developing. At the end of the eighth week, the embryonic stage ends. This marks the beginning of the fetal stage.

Much controversy and argumentation have revolved around the topic of human embryos. The question is at which point an embryo becomes a human with a consciousness and a soul. This question is central to the abortion issue in the United States. Many believe that the embryo is a human life and should be protected. They want abortion and scientific testing on embryos to be illegalized as a form of murder. But opponents believe that the embryo is merely undeveloped tissue. They believe women should be able to make their own decisions on whether or not to abort a human embryo before it enters the fetal stage.

General Comprehension

1. **In stating that much controversy and argumentation have revolved around the topic of human embryos, the author means that**
   - (A) human embryos are a much debated topic by many people
   - (B) there is a general consensus among people about human embryos
   - (C) people cannot agree when an embryo becomes a human being
   - (D) discussions about embryos are often enjoyed by many people

2. **The word opponents in the passage is closest in meaning to**
   - (A) allies
   - (B) helpers
   - (C) murderers
   - (D) enemies

- **fertilize (v)** to make pregnant
- **consciousness (n)** awareness; realization
- **contest (v)** to dispute
- **abortion (n)** a surgical process that terminates the life of a fetus
- **illegalize (v)** to make something unlawful

On the TOEFL Test

3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

The human embryo develops over the course of three stages.

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Answer Choices

(A) Main organs, such as limbs and eyes, start developing relatively early.

(B) In the early stage, the embryo attaches itself to the mother's womb.

(C) The question of when a fetus becomes a baby is important to the abortion issue.

(D) The fetal stage begins as soon as the embryonic stage ends.

(E) Before the baby is born, the eyes are fully developed.

(F) The brain and the heart begin to activate in the middle stage.

Development of a Human Embryo

Sexual reproduction: fertilization

(1)_____: attachment to the uterus wall

(2)_____: secretion of chemicals and beginning of brainwave activity

(3)_____: a fetus

C Read the following passage, and answer the questions.

Johannes Gutenberg and Metal Type

Time Limit: 2 min. 40 sec.

Johannes Gutenberg was an inventor. He achieved fame for his invention of a printing press with movable type. His press had a type metal alloy, oil-based inks, and a mold for casting type. This invention led to the book becoming an item of use by the common man.

The exact origin of Gutenberg's first press is unknown. Tradition credits him with inventing movable type in Europe. It was an improvement on the block printing already in use there. By combining these components into a production system, he enabled the rapid printing of written materials. This led to an information explosion in across Renaissance Europe.

Gutenberg moved from his native town of Mainz to Strasbourg around 1430. He began experimenting with metal type after he moved. He knew that wood-block type involved a great deal of time and expense to produce because it had to be hand-carved. Gutenberg concluded that metal type could be reproduced much more quickly since it could be done once a single mold had been fashioned.

In 1455, Gutenberg made a demonstration of his printing press. He did this by selling copies of a two-volume Bible for just 300 German florins each. This was the same amount of money as three year's wages for an average clerk. But it was much cheaper than a handwritten Bible. One of those books normally took a single monk 20 years to write by hand.

Gutenberg had a partner named Johann Fust. The money Gutenberg earned from his press was not enough to repay Fust for his investments. Fust sued Gutenberg in court and won. The court's ruling bankrupted Gutenberg. It also awarded control of the movable type and his printing equipment to Fust. Gutenberg ran a small print shop until shortly before his death. But Fust became the first printer to publish a book with his name on it.

General Comprehension

1. In stating that tradition credits him with inventing movable type in Europe, the author means that

(A) Gutenberg received payment for his invention
(B) Gutenberg was a person who always observed important traditions
(C) in Europe Gutenberg is believed to have invented movable type
(D) Gutenberg invented many of the traditions of Europe

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

(A) planned
(B) shaped
(C) broken
(D) decorated

- **mold (n)** a shape or form
- **fashion (v)** to make or create
- **demonstration (n)** a practical illustration of how something works
- **wage (n)** the money one receives for work; salary
- **ruling (n)** a decision by an authority
- **award (v)** to give on the basis of a legal decision

On the TOEFL Test

3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

Gutenberg's press influenced printing practices and society in important ways.

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Answer Choices

(A) Movable type was invented in 1455.

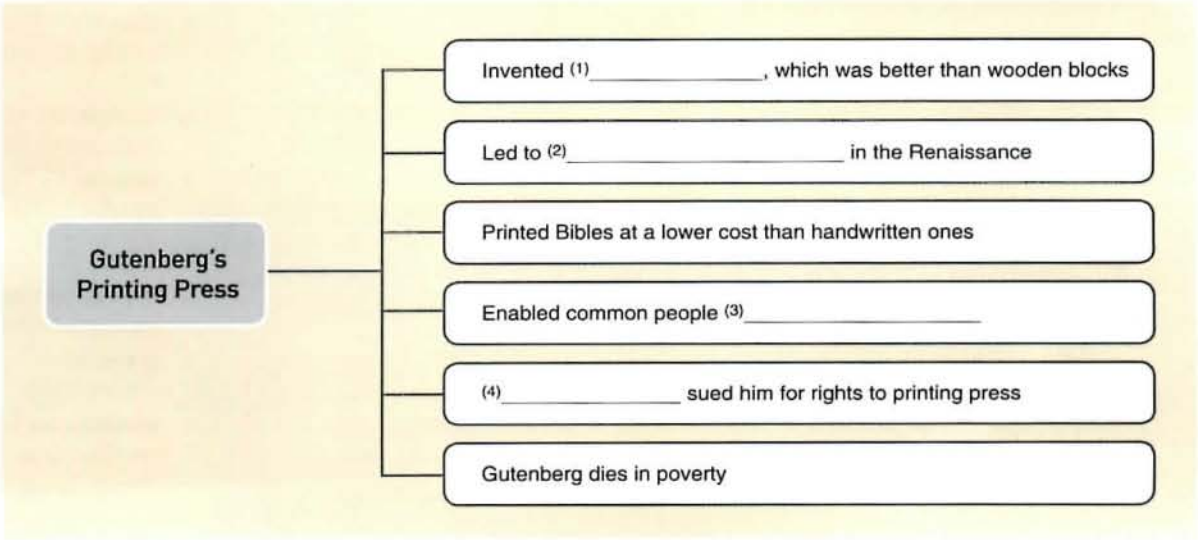
(B) Books became available to common people because of the printing press.

(C) It took a monk twenty years to copy the entire Bible.

(D) Johann Fust was Gutenberg's partner.

(E) Metal type cut down on the amount of time and money spent on printing.

(F) Circulation of information increased rapidly over a short period of time.



D Read the following passage, and answer the questions.

Transgenic Plants

Time Limit: 2 min. 50 sec.

Transgenic plants share genes from different species. In the late 1800s, the first transgenic plant species was recorded. It was a cross between wheat and rye. This crossbreeding of two plant species marked a new era of farming. By moving genes from one plant to another, farmers can raise crops that are more resistant to diseases. These plants are protected from epidemics that can destroy many fields worth of food and income.

In the 1930s, E.S. McFadden bred a variety of wheat that had a transgene from wild grass. This variety was called Hope. It was resistant to a stem rust disease that was threatening to destroy the entire American wheat crop. This new kind of wheat saved farmers from ruin. Many people were also shielded from famine.

The growth of transgenic plants began through normal crossbreeding methods. But by the 1970s, scientists were performing DNA transplants between plant and even animal species. In 1985, a laboratory in Belgium created a genetically engineered tobacco plant that had an insect tolerance. This was done by adding genes encoded with proteins that could kill insects.

This development opened up the field of transgenic recombinant plants. This field has been the subject of controversy between several international bodies. These warring groups promote and oppose genetically modified crops and foods. This battle over the use of plant DNA has resulted in the creation of a new biological class. Members of this class are known as genetically modified organisms (GMOs).

One example of a useful transgenic plant is golden rice. This version of rice was created in a laboratory. It contains 23 times more vitamin A than regular white rice. Vitamin A is an important form of nourishment that is scarce in many parts of the world. This version of rice was created as a humanitarian tool to help people in these areas. But due to the opposition from various groups that are against transgenic foods, this rice is not available.

General Comprehension

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

(A) chased
(B) subjected
(C) needed
(D) protected

2. According to the author's description of transgenic plants, which of the following is true?

(A) Transgenic plants led to a new era of farming.
(B) Hope wheat caused a terrible famine among farmers.
(C) McFadden created an insect-resistant tobacco plant.
(D) Golden rice is enjoyed by many people around the world today.

- **cross (n)** a combination of two things
- **resistant (a)** unaffected by
- **epidemic (n)** a disease that spreads quickly among many people
- **nourishment (n)** sustenance; nutrition
- **scarce (a)** rare; insufficient
- **humanitarian (a)** helpful to humans

On the TOEFL Test

3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

Scientists have developed many different transgenic plants.

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Answer Choices

(A) A Belgian laboratory has made tobacco plants that can resist insects.

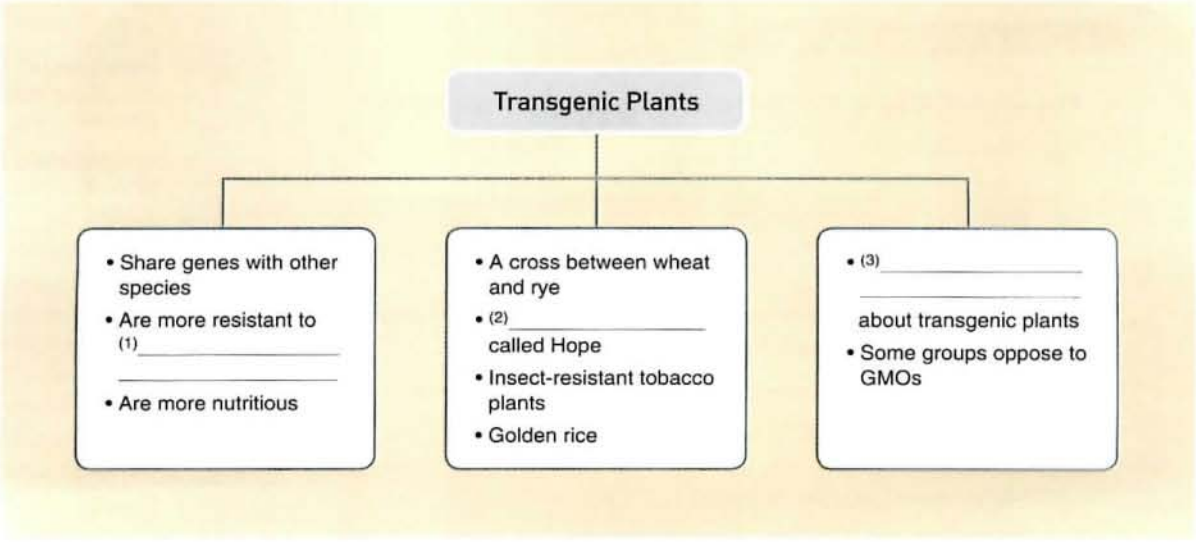
(B) Some transgenic plants are causing controversy with different groups.

(C) Transgenic plants are those that share characteristics with other species.

(D) A strain of wheat called Hope helped save many American farmers.

(E) Golden rice created in the laboratory is more nutritious than regular rice.

(F) Since the 1970s, scientists have been creating transgenic plants.



E Read the following passage, and answer the question.

Sigmund Freud

Time Limit: 2 min. 50 sec.

Sigmund Freud was an Austrian neurologist. He was the founder of a new kind of psychology. He is best known for his theories about sexual desire and dreams. He is also famous for his studies of repression and the unconscious mind. He has been called by many "the father of psychoanalysis."

Freud was born in Freiberg in 1856. His family lived in a crowded apartment. But his parents made an effort to foster his intellect. He ranked first in his class in six of his eight years of schooling. He attended the University of Vienna at the age of 17.

Freud opened his own practice for patients with nervous and brain disorders. He tried using hypnotism with his most hysterical and neurotic patients. But he eventually gave up this practice. He found that he could get his patients to talk by an easier method. He put them on a couch and encouraged them to say whatever came into their minds. This process was termed "free association."

In his forties, Freud felt that he had many mental problems. He began to explore his own dreams. He also examined his own memories and the dynamics of his personality. During this self-analysis, he came to realize the hostility he felt towards his father. He also recalled his childhood feelings for his mother, who was attractive, warm, and protective. Scholars who have studied Freud consider this time of emotional difficulty to be the most creative time in his life.

Freud's theories and research methods were controversial during his life. A paper by Lydiard H. Horton called Freud's dream theory "dangerously inaccurate." Another of Freud's critics was Juliet Mitchell. She suggested that Freud's basic claim that our conscious thoughts are driven by unconscious fears and desires should be rejected. She said this because it challenges the possibility of making universal and objective claims about the world. Many critics think that Freud's ideas were a byproduct of his heavy cocaine use.

General Comprehension

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

(A) promote
(B) destroy
(C) hide
(D) popularize

2. According to the author's description of Sigmund Freud, which of the following is true?

(A) He is best known for his theories about repression.
(B) He was born in Australia in 1856.
(C) He treated his patients with the free association method.
(D) He ignored his own dreams.

- **repression (n)** the stopping of some action or feeling
- **hysterical (a)** frantic; in a panic
- **neurotic (a)** unstable; nervous
- **association (n)** the connecting or combining of ideas
- **hostility (n)** hatred; unfriendliness
- **controversial (a)** divisive; contentious
- **byproduct (n)** a result; an effect

On the TOEFL Test

3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

Sigmund Freud made many advances in the field of psychology.

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Answer Choices

(A) He introduced the free association method.

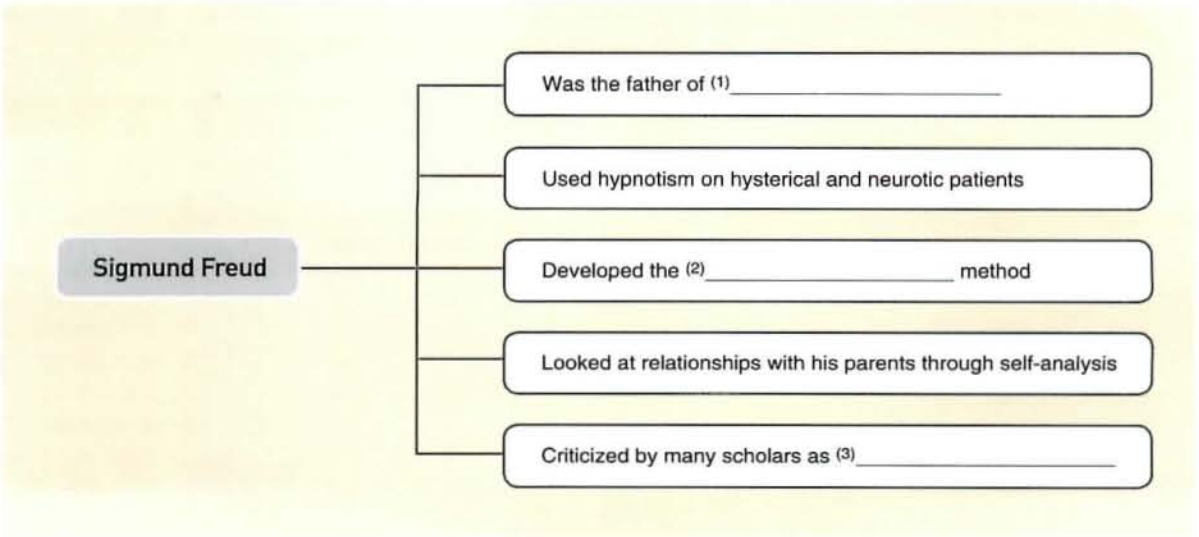
(B) He used drugs to get insight into dreams.

(C) He almost always ranked at the top of his class.

(D) He theorized about sexual desires and unconsciousness.

(E) He opened and pioneered the field of psychoanalysis.

(F) He treated his physical illness through self-analysis.



F Read the following passage, and answer the questions.

The History of Cartography

Time Limit: 2 min. 50 sec.

The study and practice of making maps or globes is called cartography. This has been an important part of human history as far back as can be traced. The first known maps were of the constellations of stars rather than the Earth. The night sky was found mapped out as dots dating to 16,500 B.C. These were found on the walls of the Lascaux Caves in France. Three bright stars, Vega, Deneb, and Altair, were included on these walls. The Pleiades star cluster was also mapped in these cave paintings.

In ancient Babylon, maps were made using very accurate surveying techniques. A clay tablet found in 1930 at Ga-Sur, near today's Kirkuk in northern Iraq, shows a map that is a good example. It is of a river valley between two hills. An inscription on this tablet shows that the plot of land belonged to someone named Azala. Scholars date this tablet to 2300 to 2500 B.C.

In ancient Egypt, maps were quite rare. But those that survived show a focus on geometric calculation and survey technique. The Turin Papyrus, which is dated to 1300 B.C., shows mountains east of the Nile. This was an important area where gold and silver were mined.

An early revolution in mapmaking occurred during the time of Claudius Ptolemy, who lived in the Hellenic Egyptian city of Alexandria from 90 to 168 AD. He began depicting the Earth as a sphere and outlined the concept of parallels of latitude and meridians of longitude that we use today.

Throughout the Middle Ages, mapmaking advanced. By the time of the Renaissance, cartographers from Portugal were making nautical charts for the navigation of ships. The oldest known nautical chart was made by Pedro Reinel in 1485. This chart had a scale of latitudes on it.

By 1569, a Flemish geographer named Gerardus Mercator published the first map based on his Mercator projection. This is an accurate map of the world in which the sphere of the globe is stretched out on a plane.

During the 1900s, maps became more abundant. This is due to improvements in printing and photography. These factors made the production of maps cheaper and easier. Airplanes made it possible to photograph large areas at a time. They are credited with giving people a chance to view the Earth from a greater altitude than ever before possible.

General Comprehension

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

(A) erasing
(B) studying
(C) characterizing
(D) referring to

- **trace (v)** to detect or find
- **constellation (n)** a group of stars which form a pattern
- **accurate (a)** correct; exact
- **nautical (a)** related to the sea
- **abundant (a)** plentiful

2. **According to the passage, which of the following is true about the history of mapmaking?**

   (A) The practice of making maps and globes is called choreography.
   (B) Accurate surveying techniques were used to make maps in ancient Babylon.
   (C) The practice of mapmaking did not advance during the Middle Ages.
   (D) Maps became more abundant in the 1900s due to space travel.

On the TOEFL Test

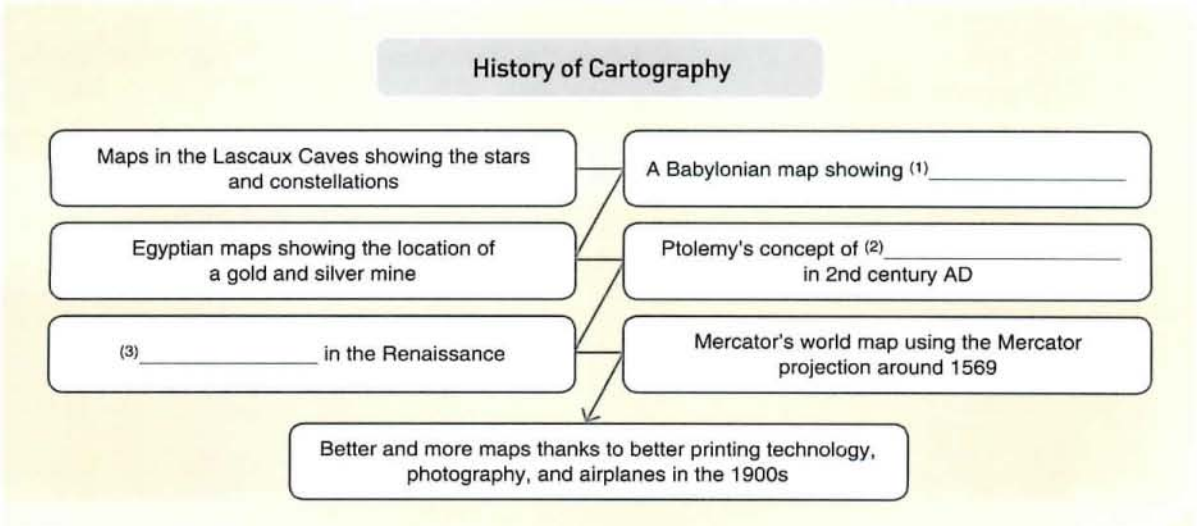
3. **Directions:** An introductory sentence for a brief summary of the passage is provided below. Complete the summary by selecting the THREE answer choices that express the most important ideas in the passage. Some answer choices do not belong in the summary because they express ideas that are not in the passage or are minor ideas in the passage.

   Maps have been made by people for a long time.

   •
   •
   •

Answer Choices

(A) Maps became widely used by photographers in the 1900s.
(B) Some maps on cave walls show various stars.
(C) A map in Babylon from 2500 B.C. shows some land ownership.
(D) Maps were common in ancient Egypt.
(E) Mercator published a map using the projection he had invented.
(F) Mapmaking was not allowed during the Middle Ages.



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Estuaries

marine species	the tidal mouth of a river	the River Thames
somewhat salty	both saltwater and freshwater	

Estuaries are semi-enclosed bodies of water that form near (1)_____. They combine (2)_____. The water formed is (3)_____. Mostly freshwater species live in estuaries, but (4)_____ live in them closer to the ocean. (5)_____ is among the most famous estuaries in the world.

2. The Embryo

three major stages	eight weeks	abortion rights
the organ forming stage	multi-celled life forms	

The embryo is the earliest stage of development for (1)_____. There are (2)_____ of development in the human embryo. These stages include the connection forming stage, the brain forming stage, and (3)_____. This marks the point at which the embryo becomes a fetus. After (4)_____, the fetal stage begins. There is much controversy around the development of the embryo because of (5)_____ _____.

3. Johannes Gutenberg and Metal Type

metal type	an information explosion	handwritten ones
Johann Fust	moveable type	

Johannes Gutenberg invented (1)_____. This revolutionized Europe and led to (2)_____. He used (3)_____ instead of wood-block type. In 1455, he sold copies of a two-volume Bible that were much cheaper than (4)_____. However, Gutenberg's partner (5)_____ sued him and took the rights to his invention. Gutenberg died in poverty.

4. Transgenic Plants

modified	the genes of other species	transfer genes
more nutritious	genetically modified organisms	

Transgenic plants share (1)_____. Scientists (2)_____ from one plant to another to give the plants better resistance to disease or insects or to make them (3)_____. Wheat, tobacco, rice, and even animals have had their genes (4)_____. Some people are opposed to transgenic plants, which they call (5)_____ _____.

5. Sigmund Freud

his parents	the father of psychoanalysis	many critics
psychology	a neurologist	

Sigmund Freud was (1)_____ who founded a new kind of (2)_____. He is often referred to as (3)_____. He had his own practice and soon began to use free association methods with his patients. He also interpreted his dreams and his relationships with (4)_____. He did, however, have (5)_____ during his life and afterwards.

6. The History of Cartography

the stars and constellations	the Renaissance	cartography
Babylon and Egypt	accuracy and efficiency of mapmaking	

Making maps or globes is called (1)_____, and people have been making them for thousands of years. Early maps just showed (2)_____ as in the wall paintings of the Lascaux Caves. There were also early maps in (3)_____. Mapmaking improved in the Middle Ages and (4)_____. Later mapmakers showed lines of latitude and longitude and made maps for sailors. By the 1900s, advancements in photography as well as the advent of airplanes and later, satellites, led to giant leaps forward in the (5)_____.

1. **The word adorned in the passage is closest in meaning to**

   (A) etched (B) decorated (C) scribbled (D) portrayed

2. **According to paragraph 3, which of the following is true about the black-figure period?**

   (A) The pottery looked black due to iron-rich clay.
   (B) The period concluded around 700 B.C.
   (C) It first started in Corinth.
   (D) The pottery had to be fired three times.

3. **The word process in the passage is closest in meaning to**

   (A) method (B) delivery (C) analysis (D) instructions

4. **According to the passage, what can be inferred about ancient Greek pottery?**

   (A) Corinth and Athens made the best pottery.
   (B) The Greeks produced vases for special needs.
   (C) Black-figure period vases were of the highest quality.
   (D) Achilles Painter signed his name on the vases.

5. **The word it in the passage refers to**

   (A) the vase (B) the paint (C) the clay (D) the design

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

   Greek pottery often had many different paintings and pictures on it.

   •
   •
   •

Answer Choices

(A) In red-figure pottery, the painter created the design before the pot was fired.
(B) Corinth and Athens produced high-quality pottery.
(C) Many city-states made their own pottery.
(D) Painters used refined clay to paint figures on the pottery.
(E) Many different characters were often painted on the pottery.
(F) Achilles Painter was one of the greatest painters.

Ancient Greek Pottery

Scholars have knowledge of ancient Greek art through the pottery that survives from that culture. While little else in the way of Greek painting or artwork still exists, there are over 100,000 Greek vases left. Many of these vases are adorned with paintings of Greek characters and scenes. These vases were common in every level of Greek society. This is because the Greeks produced many vases to be used for everyday needs such as drinking and cooking.

In the early periods of Greek civilization, small city-states produced their own pottery. But later, Corinth and Athens became the two great producers of these vases. The pottery from these cities became the standard all over the Greek world. It was so widely exported that it put an end to local varieties.

Two of the major periods of pottery in ancient Greece were the black-figure period and the red-figure period. The black-figure period began around 700 B.C. It originated in the city of Corinth. By this method, vases were made of pale, iron-rich clay. When fired, they became a reddish-orange color. The designs were outlined on the surface of the vase. Refined clay was then used to paint the figures that had been drawn. Finer details were added with an engraving tool, after which the vase was fired again. The second firing process left the painted designs a glossy black color.

Red-figure pottery was developed around 530 B.C. It became such a popular style that it was used over black-figure pottery. Even today, this style is thought to be the height of Greek pottery craftsmanship. The most highly valued surviving Greek vases are of this style. The process that resulted in a finished piece of this type of pottery required close cooperation between the potter and the painter. In this process, the painter would create a design on the vase before it was fired. Since the vase was unfired, the paint and the clay were the same color, and the painter had to create the design without being able to see it. After the potter fired the vase, the design would become visible. This process required the painter to work very quickly and precisely, relying only on his memory.

The painters of these vases rarely signed their names. So the only ways scholars of modern times can identify these artists are by the images they repeatedly painted. For example, one of the greatest vase painters is known as "Achilles Painter" since his most common subject choice was the Greek character of that name. Another way painters are identified is by the name of the potter they worked for. Potters often signed their names on the vases, so the painter who worked for Kleophrades is identified as "Kleophrades Painter."

7. **According to paragraph 1, which of the following is true of cliffs?**

(A) They are always found along rivers.
(B) They are not formed by igneous rocks.
(C) They are formed through erosion.
(D) They are not particularly vertical.

8. **The word vertical in the passage is closest in meaning to**

(A) upright (B) high (C) unique (D) elevated

9. **The author of the passage implies that**

(A) humans are the only reason erosion occurs
(B) it is impossible to repair land damaged by erosion
(C) humans can cause erosion to occur faster
(D) erosion happens quickly

10. **Why does the author mention waterfalls and rock shelters in paragraph 5?**

(A) To state that they only appear on cliffs
(B) To exemplify some features that cliffs sometimes have
(C) To explain why they are eroding forces on cliffs
(D) To emphasize how important they are to cliffs

11. **The phrase peters out in the passage is closest in meaning to**

(A) increases in size (B) becomes more dangerous
(C) stops eroding (D) comes to an end

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

Cliffs have many different features that are a product of forces of nature such as erosion.

•
•
•

Answer Choices

(A) The highest cliff in the world is the east face of Great Trango.
(B) The bases of cliffs are usually formed by erosion-resistant rocks.
(C) Cliffs tend to peter out at the end of a ridge, leaving behind columns of rock.
(D) Scarps are formed by the movement of geological faults or landslides.
(E) There is sometimes ambiguity over whether or not a slope is a cliff.
(F) Erosion can sometimes be slowed down by people using improved land use practices.

The Cliff and Erosion

A cliff is a geographic feature that consists of a sharply vertical rock exposure. Cliffs are created by the process of erosion and weathering. They are most common on coasts and in mountainous areas. The strong bases of cliffs are usually formed by rock that is resistant to erosion and weathering. Sedimentary rocks such as sandstone, limestone, chalk, and dolomite are most likely to form cliffs. Igneous rocks, such as granite and basalt, can also be found.

Erosion is described as the displacement of solids by the agents of wind, water, or ice. These solids can be soil, mud, rock, and other particles. The process of erosion occurs by down-slope movement in response to gravity. It can also be caused by living organisms. This is called bioerosion. Erosion is different from weathering, which is the breakdown of rock and particles through processes where no motion is involved. However, these two processes can occur at the same place and time.

Erosion is a process that occurs naturally. But it is increased by human land use in many places. Cutting down trees and allowing animals to overgraze are poor land use practices that lead to faster erosion. Unmanaged construction activity and road or railroad building also fall into this category. Erosion can be limited by improved land use practices. Activities like terrace building and tree planting can help rebuild damaged areas.

A type of cliff formed by the movement of a geologic fault or a landslide is called a scarp. Most cliffs have a talus slope at their bases. These are usually exposed jumbles of fallen rock in arid areas or under high cliffs. A soil slope may obscure the talus in areas with more water in the air.

Waterfalls and rock shelters also occur as features on cliffs. A cliff sometimes peters out at the end of a ridge. This might leave tea tables or other types of rock columns behind. A cliff does not have to be exactly vertical to be classified as such. So there can be some ambiguity about whether a slope is actually a cliff or not.

There are unique cliffs to be found all over the world. The highest cliff is said to be the east face of Great Trango. It exists in the Karakoram Mountains of northern Pakistan and is about 1,340 meters high. Kalaupapa, Hawaii, is home to the highest sea cliffs. These measure 1,010 meters high. Mount Thor on Baffin Island in Arctic Canada is the highest vertical drop at 1,370 meters in total. It has the longest purely vertical drop on Earth, which is 1,250 meters.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. There was a **cluster** of students gathered around the table.
   (A) lot (B) class (C) group (D) room

2. This was the **central** part of the project.
   (A) secondary (B) next (C) confusing (D) important

3. The businessman **earned** a lot of money last month.
   (A) made (B) spent (C) borrowed (D) used

4. Some trees are highly **resistant** to storm damage.
   (A) destroyed (B) exhausted (C) resilient (D) informal

5. Dr. Park's theory was very **controversial**.
   (A) original (B) divisive (C) educational (D) scholarly

6. The river carried the **sediment** down to the delta.
   (A) water (B) mud (C) sand (D) silt

7. All the students' answers on the test were **accurate**.
   (A) exceptional (B) correct (C) mistaken (D) wrong

8. The plane was traveling at a very **rapid** speed.
   (A) fast (B) moderate (C) slow (D) incredible

B Match each word with the correct definition.

1. brackish	•	• **a.** important parts of the body like the heart, liver, and lungs
2. fertilize	•	• **b.** helpful to humans
3. mold	•	• **c.** a person who studies the nerves and nervous system
4. hysterical	•	• **d.** to detect or find
5. humanitarian	•	• **e.** related to the sea
6. constellation	•	• **f.** to make pregnant
7. neurologist	•	• **g.** a design that stars make in the sky
8. trace	•	• **h.** a shape or form
9. organ	•	• **i.** somewhat salty
10. nautical	•	• **j.** frantic; in a panic

Unit 10

Fill in a Table

Unit

10 Fill in a Table

Overview

■ Introduction

Fill in a Table questions ask you to identify and organize major ideas and important supporting information from across the passage. Then, you should classify them into the appropriate categories. Passages used for this type of question usually have particular types of organization such as compare/contrast, cause/effect, or problem/solution. A five-answer table is worth 3 points, and a seven-answer table is worth 4 points.

■ Question Type

Directions: Complete the table below to summarize information about X discussed in the passage. Match the appropriate statements to the categories with which they are associated. TWO of the answer choices will NOT be used. ***This question is worth 3 points.***

Answer Choices	**Category 1**
1.	•
2.	•
3.	•
4.	
5.	**Category 2**
6.	•
7.	•

■ Useful Tips

- Look at the categories of information in the table first.
- Using your scratch paper, make an outline of the passage according to these categories.
- Distinguish between major and minor information in the passage.
- Wrong answers usually include information that is not mentioned in the passage or that is not directly relevant to the categories in the table.

Sample iBT Question

The Opossum

Marsupials are mammals that have a pouch. The female keeps its babies in the pouch until they are old enough to live outside it. The only marsupial in North America is the opossum.

The opossum is about the size of a large cat. Its fur is gray, and it has a pink nose, feet, and tail. They have large, black eyes for seeing at night when they move around the most. Even though they have fifty very sharp teeth, they are very gentle animals. They try to avoid any kind of fight.

Opossums are very adaptable. They can live in many places, including trees and underground. They eat all kinds of food, both plants and animals. They eat insects, mice, small snakes, grass, leaves, and berries.

The opossum has a variety of defenses. They are mostly immune to snake poison. They usually do not get rabies, a nasty disease, because of the temperature of their blood. Their most famous defense is to play dead. Because most animals do not eat dead things, it is a good defense. The opossum will turn on its back and show its teeth. It will produce a bad smell near its tail. Usually the other animal will go away.

Directions: Complete the table below to summarize information about the adaptability and defenses of opossums. Match the appropriate statements to the categories with which they are associated. TWO of the answer choices will NOT be used. ***This question is worth 3 points.***

Adaptability	Defenses
• •	• • •

Answer Choices

1. They have a variety of homes.
2. They are not affected by snake poison.
3. Their blood temperature prevents rabies.
4. They are as large as cats.
5. They avoid fights.
6. They can eat many different things.
7. They play dead.

Correct Answer Choices 1 and 6 are concerned with the adaptability of opossums, and choices 2, 3, and 7 are about their defenses. Choices 4 and 5 are not relevant to the given categories.

Fill in a Table questions ask you to recognize and organize the important ideas of the passage into table categories. You need to understand what type of organization the passage uses: for example, compare/contrast, cause/effect, or problem/solution.

Classism

The term "classism" refers to a form of prejudice. It takes place against people who are in a lower social class. It is a form of social elitism. Individual classism is practiced by people. It happens when wealthy people disregard those who make less money than they do. It also happens when the rich receive advantages over the middle class or poor. Structural classism occurs in institutions. It happens when things are done in such a way as to exclude people from lower classes. Many people see this type of classism in American politics. This is because people who make the largest campaign contributions seem to have more influence in the government. This practice excludes the working class from having an equal level of influence.

1. **Directions:** Complete the table below by matching FOUR of the six answer choices with appropriate types of individual and structural classism.

Individual Classism	Structural Classism
•	•
•	•

(A) Rich people ignore those people with lower incomes.
(B) People from lower classes cannot find decent jobs.
(C) Bigger political campaign donors have more influence in the government.
(D) The rich receive advantages that the middle class or poor do not get.
(E) The children of the rich receive better gifts than the children of the poor.
(F) People from lower classes cannot participate in making decisions.

Mesopotamia

Mesopotamia is called the "cradle of civilization" because the first human societies began in this area. The area is located in a fertile zone between two rivers. This made it possible for humans to grow crops. Their prosperity led to the rise of cities. Once these cities existed, many discoveries were made. The first writing system was developed. The people of these cities also invented metal working. They were one of the first bronze-age peoples. They used copper, bronze and gold to decorate their palaces and temples. They also used astronomy. By studying the stars, they were able to calculate the length of an Earth year. This led to the accurate 60-minute hour and the 24-hour day that we still use today.

2. **Directions:** Complete the table below by matching FOUR of the six answer choices with the appropriate causes and effects of Mesopotamian discovery and innovation.

Causes	Effects
•	•
•	•

(A) Mesopotamians engaged in farming.
(B) Cities thrived in Mesopotamia.
(C) Mesopotamia was surrounded by a big river.
(D) A unique calculating system was invented.
(E) Mesopotamians were good astronomers.
(F) A day was divided into 24 hours.

Green Revolution

The term Green Revolution is used to describe a large change in farming. This took place in many developing nations between the 1940s and 1960s. It led to a large increase in cereal production. This change was the result of programs of agricultural research. The Green Revolution has had positive and negative impacts on society and the Earth. A positive impact is that famine was avoided. But this led to the negative effect of overpopulation in some areas. The Green Revolution is also credited with the success of large-scale farming. But this success has made it very difficult for small-scale farmers to profit. This shift in economics greatly hurt the socialist movement.

3. **Directions:** Complete the table below by matching FOUR of the six answer choices with the positive and negative effects of the Green Revolution.

Positive Effects	Negative Effects
• •	• •

(A) Agricultural research was widely encouraged.
(B) Fewer people suffered hunger.
(C) Some areas experienced a rapid increase in population.
(D) Large-scale farming took root in some countries.
(E) It became difficult for small-scale farmers to survive.
(F) Cereal production increased substantially in a few countries.

Natural Phenomena

A natural phenomenon is an event that is not caused by humans. It occurs in nature. But it can affect humans. Some natural phenomena can be described by physics. They are called physical phenomena. Lighting is an example of this type of event. The orbit of planets due to gravity is another example. Natural disasters that come from within the Earth are considered to be geological phenomena. A common example is a volcanic eruption. A tidal wave is also this type of event. These events cannot be controlled. Humans do not create them and cannot stop them. But these events can be understood through science.

4. **Directions:** Complete the table below by matching FOUR of the six answer choices with appropriate types of physical and geological phenomena.

Physical Phenomena	Geological Phenomena
• •	• •

(A) A wild fire is caused by humans.
(B) A flash of lightning strikes across the sky.
(C) A tsunami occurs in the ocean.
(D) A volcano explodes and spews hot lava.
(E) Gravity makes planets move in their orbits.
(F) An earthquake is simulated in the laboratory.

Practice with Long Passages

A Read the following passage, and answer the questions.

Emergence

Time Limit: 3 min. 20 sec.

The concept of emergence describes the way in which a complex pattern forms. This pattern arises from its basic parts. An emergent property comes from the relationships between these parts. This is a constantly changing process. It may occur over a long period of time. The evolution of the human body is a good example. Its form emerged over thousands of generations. The human body is very complex. But it is formed by millions of tiny cells, which are not.

Emergence occurs on disparate-size scales. An example is between neurons and the human brain. Interactions between many neurons produce a human brain. This brain is capable of thought. But none of the neurons that made it are capable of thought. The single brain that results from many neurons is much bigger than any of the single neuron parts that created it.

A common way of looking at emergence in nature is through structures. They can come from organic or inorganic sources. A good example of a living structure is a flock of birds. The flock takes a shape and has behavioral characteristics. But these properties are not exhibited by individual birds. Another example of an organic emergent structure is an ant colony. The ant colony is emergent because no single ant, including the queen, could organize such an effective colony of workers. Yet collectively, the colony structure arises. An example of an inorganic emergent structure is a hurricane. This storm system forms as a result of various factors. Some of these factors are pressure, temperature, and humidity. They combine to form a violent storm. But any single factor would not form the same storm.

Emergence also occurs in human culture. One place this kind of emergence has occurred on a large scale is in the stock market. As a system, it regulates the prices of companies around the world. But there is no single leader that controls the entire market. Agents only know of a limited number of companies and must follow strict rules of the market. Through these interactions, the complexity of the market as a whole emerges. Another type of this emergence is with the World Wide Web. In this case there is no central website, yet links between major and minor websites create the complex whole that is known as the World Wide Web.

General Comprehension

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

(A) controls
(B) limits
(C) raises
(D) maintains

- **property (n)** a characteristic
- **evolution (n)** the process by which organisms develop
- **disparate (a)** essentially different and distinct
- **colony (n)** a group of organisms

2. **Based on the information in the passage, which of the following best explains the term "emergence"?**

   (A) the way in which a number of small units interact to form a very large structure
   (B) the way in which simple components combine to form a complex system
   (C) the way in which a complex organic system emerges from its basic parts
   (D) the way in which various single units interlock to form a large system

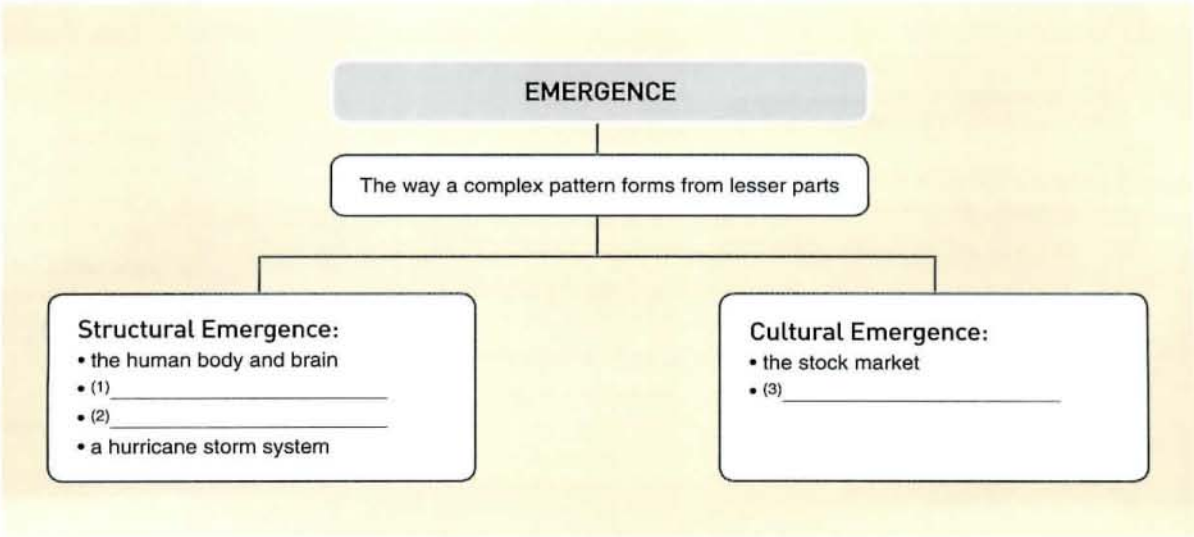
On the TOEFL Test

3. **Directions:** Complete the table below by matching FIVE of the seven answer choices with structural and cultural emergence.

Structural Emergence	Cultural Emergence
• • •	• •

Answer Choices

(A) The queen bee is fed by workers many times a day.
(B) A flock of birds exhibits a shape and certain behavior.
(C) Small and large websites are linked to create the World Wide Web.
(D) The human brain is composed of numerous thinking neurons.
(E) A hurricane is the result of various climatic factors.
(F) The stock market forms a complex pattern.
(G) Ants build an effective colony collectively.



B Read the following passage, and answer the questions.

The Media Influence Theory

Time Limit: 2 min. 50 sec.

The American entertainment industry has been heavily criticized. Critics are unhappy with the amount of pretend violent acts it shows. The Media Influence Theory explains this problem. It suggests that the rise in the rates of real violent acts is linked to entertainment.

This theory considers many acts of violence. High school shootings are the most common. It claims they are due to the high levels of violent acts in the media. This takes on various forms in popular entertainment.

The basis of the theory lies in the assumption that many people are exposed to a high level of violent content in media outlets. A small percentage of these people have trouble separating fantasy and reality about the violence they see. These people think that it is okay to commit violent acts.

The most frequent targets of the theory's advocates are video game companies. These companies produce many first-person shooter games. Most of these feature a high level of violence and gore. Advocates say these games make life seem cheap. These games reward the player for committing acts of violence.

Advocates also target musicians who sing hateful lyrics. They claim these artists incite violence. Violent movies too cannot avoid their accusation. They claim these kinds of movies make violence look glamorous. All of these are forms of entertainment, and people want the companies to take more responsibility for their products. They want them to label products that are extremely violent. They also want minors to have limited or no access to these products.

However, critics of this theory say that government should not regulate media. They say that it would harm American citizens' right to free speech. They compare statistics of violence between the United States and other countries. Some of these other countries have the same kind of violent media. But there are much fewer violent acts being committed. So these critics claim that the problem of violence in America is not due to the media. They say it is caused by the availability of weapons.

General Comprehension

1. According to the author's description of the Media Influence Theory, which of the following is true?

(A) It is inevitable to get exposed to high levels of violence in media.
(B) The most frequent targets of the theory's advocates are gun companies.
(C) Hateful lyrics can encourage people to behave in a violent way.
(D) Easy access to weapons causes violence among teenagers in America.

- **criticize (v)** to find fault with; to judge
- **pretend (a)** not real; imagined
- **assumption (n)** a supposition; belief
- **advocate (n)** a supporter
- **incite (v)** to provoke; to encourage

2. **The word them in the passage refers to**

   (A) advocates
   (B) musicians
   (C) people
   (D) companies

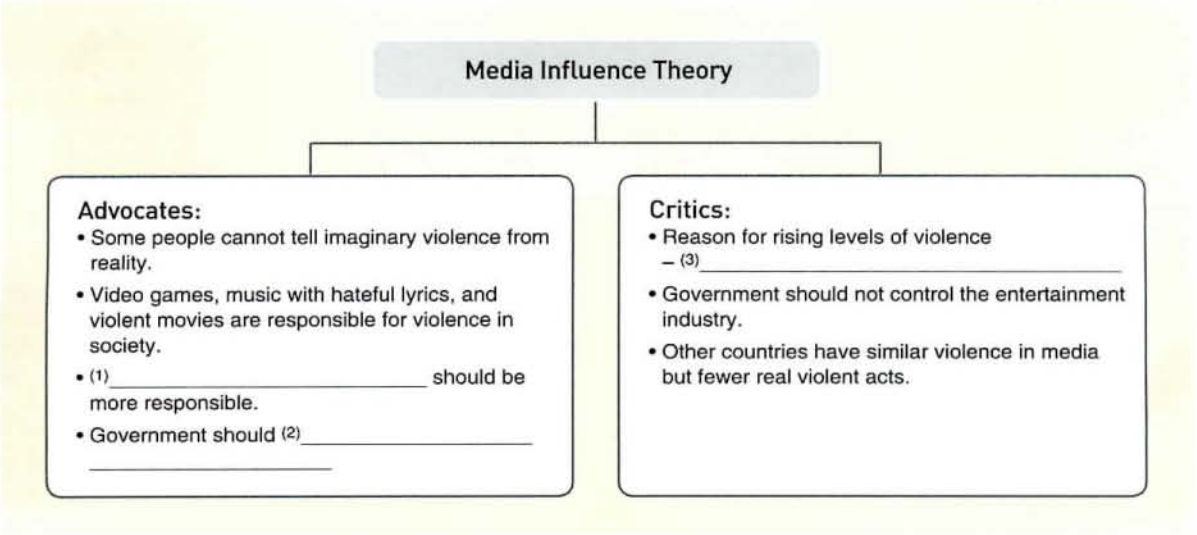
On the TOEFL Test

3. **Directions:** Complete the table below by matching FIVE of the seven answer choices with the appropriate claims made by advocates or critics of the Media Influence Theory.

Advocates	Critics
• • •	• •

Answer Choices

(A) Artists who sing hateful lyrics incite violence.
(B) High school punishment can lead teenagers to be violent.
(C) Alcohol abuse causes people to shoot guns.
(D) Media should not be controlled by the government.
(E) Violent movies make violence look glamorous.
(F) Violent video games cheapen human life.
(G) Violence is caused by weapons being available.



C Read the following passage, and answer the questions.

The Great Chicago Fire

Time Limit: 2 min. 40 sec.

The Great Chicago Fire burned from October 8th to 10th in 1871. It had terrible effects. Hundreds of people were killed by it. Much of the city turned into ashes. It was one of the largest disasters in the U.S. during the 19th century. But the people of Chicago began to rebuild their city immediately. This led to Chicago's status as one of the most economically important American cities.

The fire began around 9 p.m. on Sunday, October 8th. It started in a small shed in an alley off DeKoven Street. The most commonly believed reason for the fire starting is that a cow kicked over a lantern in a barn. This barn was owned by Patrick and Catherine O'Leary.

It is now known that Mrs. O'Leary was used as a scapegoat. Historians think she was blamed for the fire because she was a woman, an immigrant, and a Catholic. All of these groups suffered persecution at this time in American history. The *Chicago Tribune*'s first post-fire issue claimed that Mrs. O'Leary's negligence was the cause. But later, the reporter who wrote the story admitted that he made it up. He said he did it because he thought it was a colorful story.

Richard Bales is an amateur historian. He believes the fire was started by Daniel Sullivan. He was the man who first reported the fire. Bales offered the theory that this man ignited some hay in the barn. He says Sullivan did it while trying to steal some milk.

But Anthony DeBartolo has recently reported some new evidence to the *Chicago Tribune*. He put forth the suggestion that a gambler named Louis M. Cohn may have started the fire. DeBartolo says he did this during a craps game. According to a book by Alan Wykes, a lost will by Cohn includes a confession that he started the fire.

General Comprehension

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

(A) lit up
(B) set fire to
(C) blew up
(D) put out

2. According to the passage, which of the following is true about the Great Chicago Fire?

(A) It turned most of Atlanta into ashes.
(B) It was one of the largest 18th-century disasters in the United States.
(C) There are several theories about how it started.
(D) People believe it was caused by Patrick O'Leary.

- **destroy (v)** to ruin; to demolish; to wreck
- **shed (n)** a small structure used for storage
- **scapegoat (n)** a whipping boy; the fall guy
- **persecution (n)** cruel and unfair treatment
- **a game of craps (n)** a dice game that is usually played for money

On the TOEFL Test

3. **Directions:** Complete the table below by matching FIVE of the seven answer choices with the reported causes and effects of the Great Chicago Fire.

Reported Causes	Effects
• • •	• •

Answer Choices

Ⓐ It killed hundreds of people.

Ⓑ A lantern in a barn was kicked over by a cow.

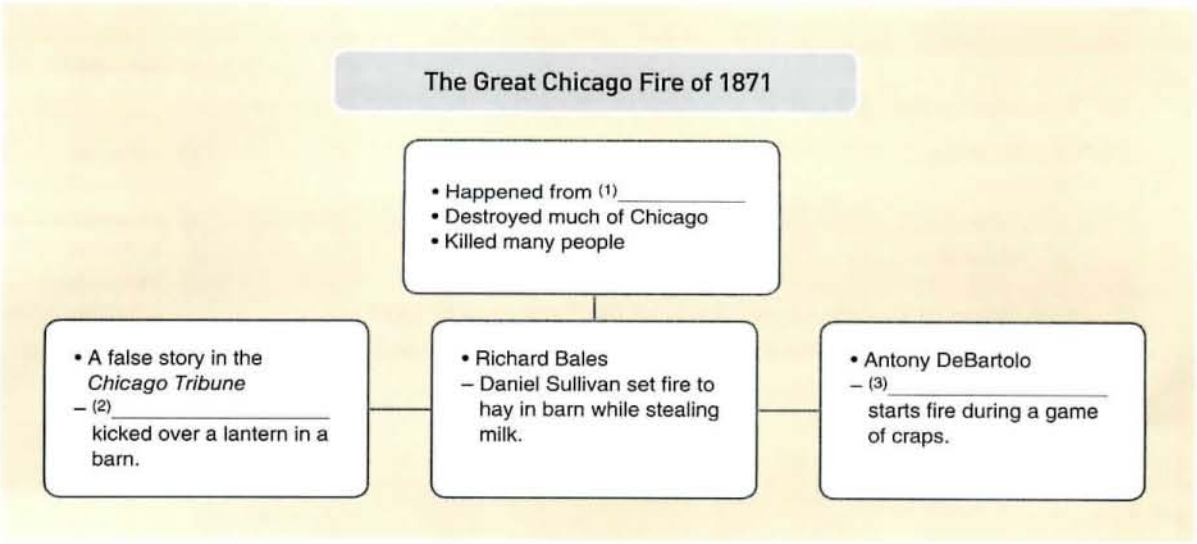
Ⓒ Daniel Sullivan burned the barn while stealing some milk.

Ⓓ A milk thief kicked a torch and started the fire.

Ⓔ Many parts of Chicago were destroyed.

Ⓕ Anthony Debartolo found new evidence of how the fire started.

Ⓖ A gambler started the fire during a craps game.



D Read the following passage, and answer the questions.

Differences in the Concept of Family

Time Limit: 2 min. 50 sec.

A family consists of a group of people who live together. They are linked by birth or marriage. They can also be linked by other legal ties. Some of these are domestic partnerships and adoption.

Many people think families are only related by "blood." But many social scientists say that the notion of "blood" should be taken metaphorically. Many societies define family through other concepts. Article 16 of the Universal Declaration of Human Rights calls family the natural group unit of society. It says that the family is entitled to protection by society and the State.

The structure of families is based on ties between parents and children. It is also based on links between spouses. Or it can be based on both. There are three major types of families.

A matrifocal family consists of a mother and her children. The children are usually the mother's biological offspring. But this does not rule out adoption. This type usually occurs in places where the woman has enough resources to raise their family alone.

A consanguineal family can be found in various forms. The most common form consists of a mother and her children and the family of the mother. Fathers are often not present. This is especially true when property is passed down through inheritance. When men own property, this type of family may include members of the husband's family.

A conjugal family is made up of one or more mothers and their children. It also includes one or more fathers. This kind of family is linked to the existence of a division of labor. Both men and women must do different types of labor in this form. Families in this situation have high mobility.

The nuclear family is a sub-group of the conjugal family type. This type has one woman and one husband. Together they raise their children. This type of family is the most common in modern industrialized society.

General Comprehension

1. The phrase rule out in the passage is closest in meaning to

(A) illegalize
(B) omit
(C) allow
(D) exclude

2. According to the passage, which of the following is NOT a criterion by which the structure of families is defined?

(A) links between husband and wife
(B) blood or legal ties
(C) spousal links and ties between parents and children
(D) parents-children ties

- **adoption (n)** taking legal responsibility for parenting
- **notion (n)** an idea; thought; concept
- **be entitled to (phr)** to deserve something
- **spouse (n)** a husband or wife
- **inheritance (n)** legacy
- **mobility (n)** the ability to move easily

On the TOEFL Test

3. **Directions:** Complete the table below by matching SEVEN of the nine answer choices with the types of families.

Matrifocal Family	Consanguineal Family	Conjugal Family
• •	• •	• • •

Answer Choices

(A) Fathers are often absent from this type of family.

(B) There is usually a division of labor in this type of family.

(C) This kind of family has only children and no parents.

(D) This type usually happens when the mother can support her family by herself.

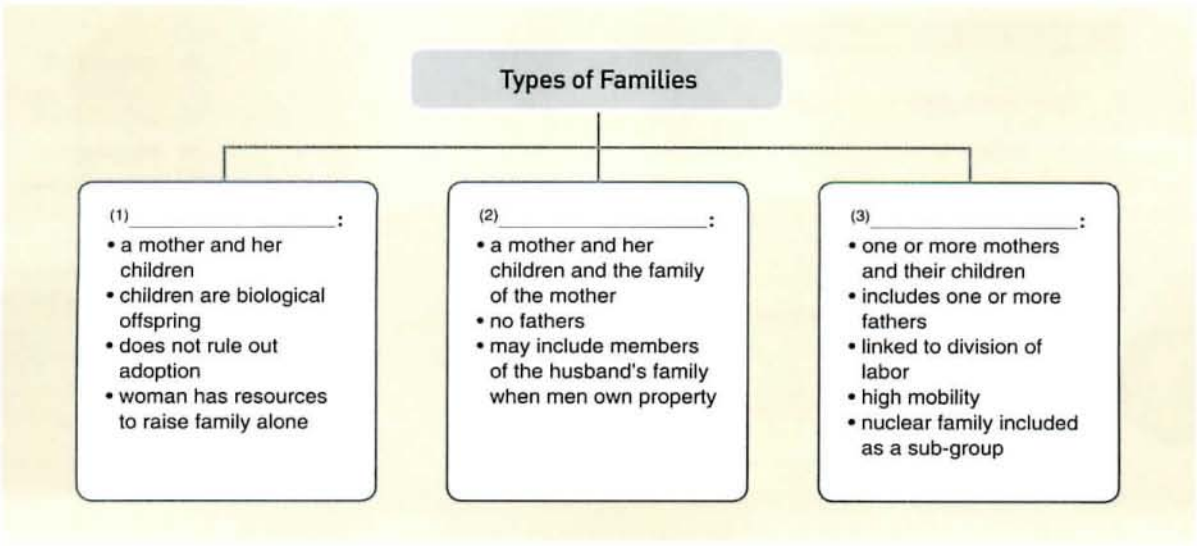
(E) The nuclear family belongs to this type.

(F) A mother and her children and the family of the mother are the most common form of this type.

(G) This type is composed of a mother and her children.

(H) This type includes the husband's parents when he is poor.

(I) There are one or more mothers or fathers in this type of family.



E Read the following passage, and answer the questions.

Bioethics

Time Limit: 2 min. 50 sec.

Bioethics is a branch of applied philosophy. It looks closely at science and medicine. Its function is to ask questions about the morality of research and treatments. It also evaluates the ethics of the laws that regulate science. This field is very important because it protects the human race. Without it, advances by science and medicine could put humans in great danger.

The study of bioethics affects many laws. Many scientists react blindly against those who practice bioethics for this reason. These scientists believe that their work is ethical by nature.

Bioethics is an academic area that shows rapid growth. Its history as a formal study is only thirty years old. Many academic centers now offer degrees in bioethics. In the 1990s, a group of social scientists created a mode of discourse. This established the method of research about ethical issues. This method attempts to resolve these issues with society. This data compiled by bioethicists is subject to the same peer review as other social sciences.

There are some major questions about bioethics. Its validity as an area of academic inquiry is doubted. Why must it exist apart from philosophy? Is everyone not an ethicist? These questions are answered by the needs of institutions. Bioethicists put to work the enormous body of research and history. They apply it to questions of bioethics. They do it in a fair, honest, and intelligent way. They share a commitment to this goal.

Bioethicists research many topics. They often focus on issues that cause controversy in society. They compile data and publish reports. These reports are used to form public opinion. They also form policy. Some of the topics that bioethicists deal with are about abortion and cloning. They also cover the use of embryos in stem cell research. These are difficult ethical problems. They arise from questions about human life. Bioethicists try to educate lawmakers and others with power. These are the ones who draw boundaries. They decide what is acceptable in medicine and science.

General Comprehension

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

(A) settle
(B) avoid
(C) discuss
(D) examine

2. The word these in the passage refers to

(A) embryos
(B) ethical problems
(C) bioethicists
(D) lawmakers and others with power

- **morality (n)** the state of being good or bad
- **evaluate (v)** to look at closely based on a set of criteria
- **blindly (ad)** without considering, examining, looking, or thinking
- **rapid (a)** fast
- **resolve (v)** to solve

On the TOEFL Test

3. Directions: Complete the table below by matching FIVE of the seven answer choices with the topics examined by bioethicists and functions of bioethicists

Topics	Functions
• • •	• •

Answer Choices

(A) They examine the use of embryos in stem cell research.

(B) They compile data about social sciences.

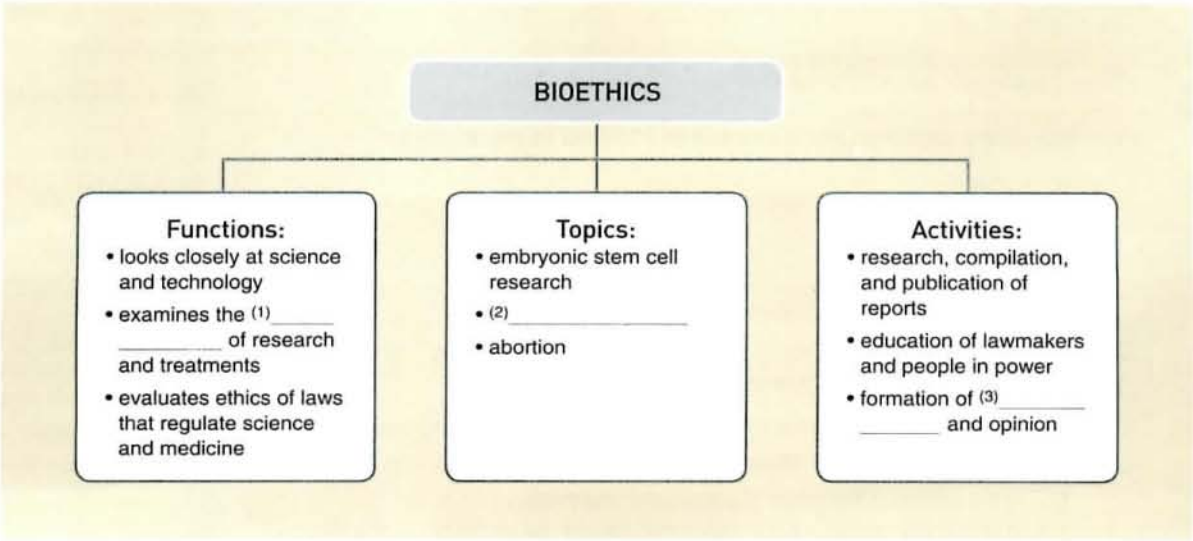
(C) They examine the morality of research and treatments.

(D) They evaluate ethics of laws that regulate science.

(E) They express their opinions about abortion.

(F) They look at the ethics of cloning.

(G) They protect people from the development of science and medicine.



F Read the following passage, and answer the questions.

Paleoanthropology

Time Limit: 2 min. 50 sec.

The study of human and pre-human fossils is called paleoanthropology. It is a branch of physical anthropology. It focuses on tracing the evolution of humans through the ages. Scientists in this field trace anatomic, behavioral, and genetic linkages. These links show how humans developed from pre-humans. Scientists use these links to reconstruct a timeline for the rise of man. This timeline spans from prehistoric to modern times.

Paleoanthropologists are able to study early hominids by digging up fossil remains. They scour the earth digging up small traces. These bits they find give them impressions of ancient life. Preserved bones, tools, and footprints provide this type of fossil evidence.

Paleoanthropology began in the late 1800s when a few important discoveries were made that led to the study of human evolution. The first was made in 1856. A Neanderthal man was discovered in Germany. This was an important event. It led to the emergence of this science. Other notable events were the publication of two important books on this subject. The first was Thomas Huxley's *Evidence as to Man's Place in Nature*. The second important book was Charles Darwin's *The Descent of Man*.

Some of the most important discoveries in this field were made by the Leakey family. Their long list of important fossil discoveries began with Louis Leakey. He began digging in the Olduvai Gorge in Kenya, Africa. In 1959 he and his wife found the remains of an early hominid skull.

After Louis's death in 1972, his wife Mary Leakey continued his research. One of her most notable discoveries was the Laetoli footprints. She found these in Tanzania in 1976. These footprints were preserved in volcanic ash. They were dated back to 3.7 million years ago. They represent the most conclusive proof that early pre-humans walked on two legs.

The Leakey's son Richard is also credited with some important fossil discoveries. In 1972, his group found the skull of a Homo habilis in Tazania. Then in 1975, his group also found the skull of a Homo erectus in Kenya.

General Comprehension

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

(A) spoil
(B) explore
(C) search
(D) study

2. According to the author's description of the Leakey family, which of the following is true?

(A) They published many important books about pre-humans.
(B) They discovered a Neanderthal man fossil in Germany.
(C) They created the field of paleoanthropology.
(D) They made some of the most important fossil discoveries.

- **anthropology (n)** the study of people and their culture
- **trace (v)** to track down; to find
- **anatomic (a)** relating to the body of an organism
- **linkage (n)** something that connects two separate things
- **conclusive (a)** convincing; without doubt

On the TOEFL Test

3. Directions: Complete the table below by matching FIVE of the seven answer choices with the places where major discoveries were made.

Kenya	Tanzania	Germany
• •	• •	•

Answer Choices

(A) The remains of an early hominid skull were found in 1959.

(B) Preserved prehistoric tools were discovered in the 1800s.

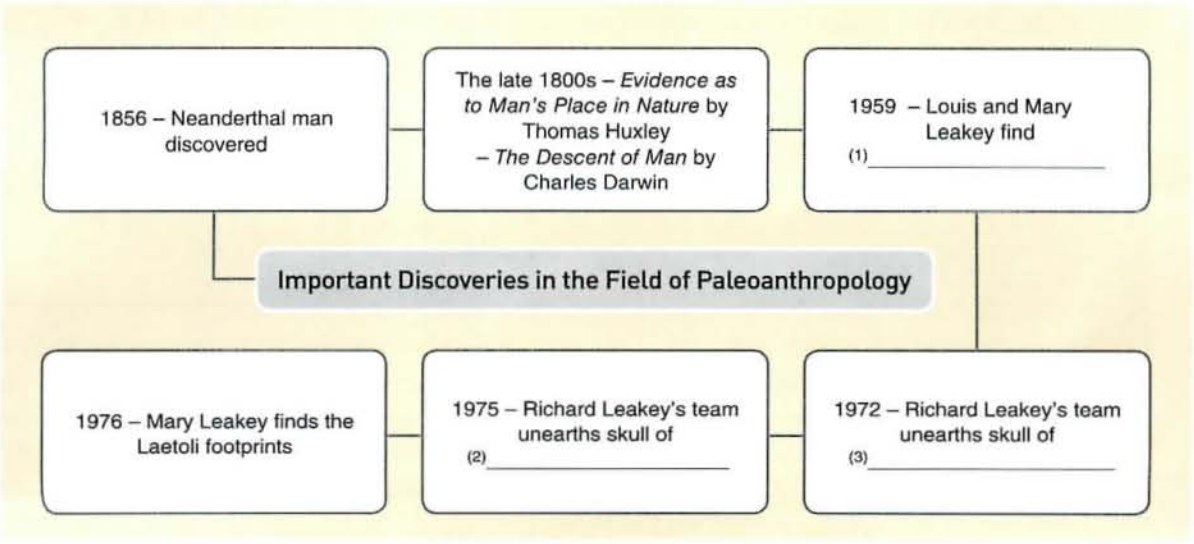
(C) The remains of a Neanderthal man were discovered in 1856.

(D) The skull of a Homo habilis was found in 1972.

(E) Fossil bones of a hominid were found in 1852.

(F) The skull of a Homo erectus was discovered in 1975.

(G) The Laetoli footprints were found in 1976.



Building Summary Skills

The following summaries are based on the long passages you worked on earlier. Complete each of them by filling in the blanks with suitable words or phrases.

1. Emergence

cultural	organic and inorganic structures	the World Wide Web
a complex pattern	ant colonies or flocks of birds	

Emergence is the concept that describes how (1)_____ forms from lesser parts. A good example is the human body, which has developed over thousands of successive generations. Emergence is evident in all forms of (2)_____. Scientists who study emergence look at the characteristics of organic emergent structures such as (3)_____ and at inorganic structures such as hurricanes. Another form of emergence is (4)_____, in which some form of human organization results in a highly complex structure that is more than the sum of its parts. (5)_____ and the stock market are prime examples of the sort of phenomenon in which simple components combine to form a complex whole.

2. The Media Influence Theory

reality	the availability of weapons	regulated by the government
many acts of violence		rising levels of violence

The Media Influence Theory states that (1)_____ in society are attributable to individuals who see violence depicted in entertainment and are unable to distinguish it apart from (2)_____. Advocates of this theory target video games, music with hateful lyrics, and movies as being responsible for (3)_____. They want to see these forms of entertainment heavily (4)_____. On the other hand, critics of this theory think the government should not control the entertainment industry and that rising levels of violence are due to (5)_____.

3. The Great Chicago Fire

a Catholic, female immigrant	steal some milk	1871
a game of craps	Mrs. O'Leary's cow	

From October 8th to 10th in (1)_____, the Great Chicago Fire burned down much of the city and killed hundreds of people. The fire was originally blamed on (2)_____ kicking down a lantern in the barn. But the reporter who wrote this story later said he made it up because it sounded interesting, which led people to believe that Mrs. O'Leary was made a target because she was (3)_____. Some other possible causes of the fire were Daniel Sullivan, who may have started it while trying to (4)_____, or Louis M. Cohn, who is said to have started it during (5)_____.

4. Differences in the Concept of Family

the conjugal family	genetic or other types of bonds	blood relation
the nuclear family	matrifocal, consanguineal, and conjugal	

A family consists of people who live together and are linked by (1)_____. Although (2)_____ defines many families, it is not the only thing that can link people together. There are three major types of families: (3)_____. The most common type of family in modern society is a sub-group of (4)_____ called (5)_____.

5. Bioethics

the human race	public opinion	the ethics of scientific
politicians	bioethics programs	

Bioethics is a branch of applied philosophy that looks closely at (1)_____ _____ and medical practices. This field is very important because it asks questions about and examines policies and treatments that greatly affect (2)_____. It is also an area of academic growth, as many universities have created (3)_____. Although bioethicists' roles are often questioned, they do many activities such as researching and compiling reports that greatly affect (4)_____ and the policies made by (5)_____.

6. Paleoanthropology

the late 1800s	the skull of a hominid	the Leakeys
the Laetoli footprints	a Homo habilis and a Homo erectus	

The study of human and pre-human fossils is paleoanthropology. This field began with several important discoveries and publications in (1)_____, including the discovery of Neanderthal man fossils. Some of the most important discoveries in this field have been made by a family named (2)_____. Their long list of discoveries began in the 1950s when Louis and Mary Leakey found (3)_____ in Kenya. But Mary Leakey's most important discovery came after her husband's death, when she found (4)_____ in 1976. These footprints offered conclusive evidence that early man walked upright on two legs. Their son, Richard, also found the skulls of (5)_____.

1. **The word levied in the passage is closest in meaning to**

   (A) saved (B) pointed at (C) imposed (D) exempted

2. **According to paragraph 1, which of the following is true of a partnership?**

   (A) It is not a very good form of business because it is outdated.
   (B) People who want to work with their friends find this form of business useful.
   (C) A partnership can only be established between people with the same college degrees.
   (D) It is used for businesses such as bakeries and pubs.

3. **According to paragraph 2, which of the following is NOT true of partnership?**

   (A) A partnership agreement may exist between partners.
   (B) A declaration of partnership may be made between partners.
   (C) A partnership cannot be available for public inspection.
   (D) A partnership is a legal entity in many countries.

4. **The word others in the passage refers to**

   (A) charities (B) partnerships (C) businesspeople (D) partners

5. **Which of the following best expresses the information in the highlighted sentence?**

   (A) People about to start a partnership must decide which form they like best.
   (B) Partners must always think about the possible forms of business.
   (C) Partners must make many choices about their new business.
   (D) Business partners should always make choices together.

6. **Directions:** Complete the table below by matching SEVEN of the nine answer choices with the appropriate forms of partnership and the criteria for a partnership to exist. TWO of the answer choices will NOT be used. ***This question is worth 4 points.***

Answer Choices	Criteria
(A) The partners must have known each other for at least ten years.	•
(B) A general partnership is the most basic kind.	•
(C) There must be a valid agreement between parties.	•
(D) A view to profit is necessary.	•
(E) The ability to manage the business is given up by limited partners.	
(F) Unknown partners are not aware of each other's existence.	**Forms**
(G) A limited liability partnership is the third kind.	•
(H) A business must be carried on.	•
(I) Rights such as interest and obligation must have some mutuality.	•

Partnership in Business

A partnership is a type of business. In it, partners share profits and losses with two or more members. Partners are people who have united to take part in the same business. This form of business is good for people who want to work with their friends or people they trust. It is also useful for two or more people who have different specialties. By forming a partnership, they can combine their skills. A partnership can also be made between existing companies.

Partners may have a partnership agreement. Or they may make a declaration of partnership. In some jurisdictions, such agreements must be registered. After doing this, they are made available for public inspection. In many countries, a partnership is a legal entity.

Partnerships are often favored over corporations for taxation purposes. This makes a partnership more useful for businesses that face heavy taxation. A partnership structure may eliminate the dividend tax. This tax is levied on profits made by the owners of a corporation.

A general partnership is the most basic form. In this style, all partners manage the business. They are all personally liable for the company's debts. There are two other forms of partnership as a business. One of them is the limited partnership. With this style, certain "limited partners" give up their ability to manage the business. They trade this ability in order to receive limited liability for the partnership's debts. The other kind is a limited liability partnership. In this style, all partners accept some degree of liability.

According to the Partnership Act 1958, there are four criteria for a partnership to exist. The first is a valid agreement between the parties. The second is for them to carry on a business. This is defined in the agreement as any trade, occupation, or profession. The third is that they must be in common. This means there must be some mutuality of rights. This includes interests and obligations. Finally, there must be a view to profit. This is the reason charities cannot be partnerships.

The businesspeople who are going to form a partnership must choose which form best suits them. Some partners may want more control. They may be willing to risk greater liability. Others may want to lessen their liability. They may be willing to forego some ability to control the business. The balance between control, profit and liability must be found by the new partners. But the most important ingredient for a successful relationship between partners is trust.

7. **The word partitioned in the passage is closest in meaning to**

Ⓐ separated Ⓑ distinguished Ⓒ formalized Ⓓ constructed

8. **The author's description of Cliff Palace mentions which of the following?**

Ⓐ It is a possible site of a war against the Aztec Empire.
Ⓑ It is the most beautiful palace in the United States.
Ⓒ It is located in the southwest corner of Colorado.
Ⓓ It is a dangerous place to visit because of snakes.

9. **According to paragraph 2, which of the following is NOT true about Cliff Palace?**

Ⓐ It occupies a space in an empty sandstone cliff.
Ⓑ There were probably about 120 storage rooms.
Ⓒ Not every room in it had a hearth.
Ⓓ Some Anasazi people still live there.

10. **Which of the following can be inferred about Cliff Palace?**

Ⓐ Rooms without hearths were used by animals.
Ⓑ It is the only structure of its kind in this area.
Ⓒ Tourists are not allowed to take pieces of the stone structure.
Ⓓ The Anasazi people fled because of tourists.

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

Another possibility suggested by some archaeologists familiar with the mysterious structure is that it was used to hold prisoners.

Where would the sentence best fit?

12. **Directions:** Complete the table below by matching FIVE of the seven choices with the appropriate characteristics of the storage rooms, towers, and kivas of Cliff Palace. TWO answer choices will NOT be used. ***This question is worth 3 points.***

Answer Choices	Storage Room
Ⓐ These were built high to be safe from moisture and pests.	•
Ⓑ The structure is partitioned by walls.	•
Ⓒ This room has a self-heating bathtub.	**Kiva**
Ⓓ There is no way to access it through doorways or portals.	•
Ⓔ There are some abstract designs.	•
Ⓕ People accessed these rooms with removable ladders.	**Tower**
Ⓖ This room has a beautiful view of the backyard of Cliff Palace.	•

The Anasazi Architecture of Cliff Palace

The largest cliff dwelling in North America is named Cliff Palace. This is an ancient Pueblo structure. It is located in Mesa Verde National Park. This park is in the southwest corner of Colorado. It was an ancient home to the Anasazi peoples.

Cliff Palace is a large ruin that many people find amazing. It was built into an empty space in a sandstone cliff. This alcove is approximately 40 meters deep and 25 meters high. This stone structure is about 130 meters long. Cliff Palace has 150 rooms. But not all of these rooms had hearths. A hearth used for building fires shows that a room was a living space for people. Only about 25 to 30 of Cliff Palace's rooms have these. The remaining rooms were probably used for storage.

Cliff Palace has many open areas and rooms whose functions are still not understood. Nine storage rooms are built on the upper level. These were built high. They are safe from moisture and pests. The surplus harvest was probably stored here. Removable ladders allowed people access these rooms.

Scientists have made a guess as to how many people lived there. They based their guess on the number of rooms with hearths. It is estimated that Cliff Palace was home to between 100 to 150 Anasazi.

At Cliff Palace there are a few towers. These are square and round structures that go up a few stories. Some of the finest stonework in the ruin is contained in these towers. The interior of a four-story tower at the south end of the complex contains some abstract designs. These are painted on original plaster within the tower.

Cliff Palace also contains round sunken rooms of ceremonial importance. These are called kivas. One kiva is located in the center of the ruin. The entire structure at this point is partitioned by a series of walls. It has no doorways or other access portals. The walls of this kiva were plastered with one color on one side, and a different color on the opposing side. **A** Archaeologists have studied this strange structure. **B** They think that two communities lived here. **C** This kiva may have been used to integrate the two communities. **D**

Archaeologists can tell the age of Cliff Palace through tree ring dating. This indicates that construction and refurbishing of Cliff Palace was continuous. It took place from 1190 AD to 1260 AD. They also figure that a major portion of the building was done during a time span of twenty years. Cliff Palace was abandoned by 1300 AD for reasons that are still unknown.

Vocabulary Review

A Choose the word with the closest meaning to each highlighted word or phrase.

1. Scientists examined several properties of the strange phenomenon.
   (A) characteristics (B) vehicles (C) owners (D) colors

2. His dream was to move to New Mexico and join an art colony.
   (A) house (B) school (C) group (D) list

3. He had a poor reaction after viewing pretend violence.
   (A) real (B) necessary (C) negative (D) imaginary

4. She was a strong advocate of the Media Influence Theory.
   (A) critic (B) supporter (C) not sure (D) enemy

5. The police found many linkages between the crime scene and the suspect.
   (A) fingerprints (B) witnesses (C) similarities (D) connections

6. She suddenly got the notion that he wanted to ask her on a date.
   (A) hope (B) expectation (C) idea (D) worry

7. The morality club engaged in much discourse about current issues.
   (A) questioning (B) argument (C) fighting (D) ethics

8. The doctors were able to reconstruct his nose after the accident.
   (A) rebuild (B) help (C) replace (D) remove

B Match each word with the correct definition.

1. anthropology	•	• **a.** someone who is blamed for a problem, usually unjustly
2. surname	•	• **b.** cells that process and transmit information in the brain
3. scapegoat	•	• **c.** the visual aspect of blood or murder
4. assumption	•	• **d.** a certificate of accreditation from a university or college
5. evolution	•	• **e.** the practice of parents raising a child that is not genetically theirs
6. adoption	•	• **f.** objects or money that is passed from someone who dies to someone else
7. inheritance	•	• **g.** the study of people and their culture
8. neurons	•	• **h.** the process by which organisms develop
9. gore	•	• **i.** the name shared by family members or people who are related
10. degree	•	• **j.** a belief that is created by looking at various information

This part provides lists of important vocabulary words in each unit. They are essential words for understanding any academic texts. Many of the words are listed with their derivative forms so that students can expand their vocabulary in an effective way. These lists can be used as homework assignments.

Vocabulary Wrap-up

Unit 1 • Vocabulary

Step A

- ☐ affection
- ☐ analysis
- ☐ anthropologist
- ☐ archaeologist
- ☐ banish
- ☐ consensus
- ☐ conservation
- ☐ constant
- ☐ constitution
- ☐ despot
- ☐ distinct
- ☐ drought
- ☐ ennoble
- ☐ era
- ☐ expel
- ☐ expose
- ☐ flourish
- ☐ hereditary
- ☐ impoverish
- ☐ initiative
- ☐ intestine
- ☐ launch
- ☐ microbe
- ☐ monarchy
- ☐ nonrenewable
- ☐ opulence
- ☐ overthrow
- ☐ perspective
- ☐ populate
- ☐ precede
- ☐ predictability
- ☐ prestigious
- ☐ prominence
- ☐ proponent
- ☐ rampant
- ☐ ratify
- ☐ reign
- ☐ sovereign
- ☐ thrive
- ☐ treason

Step B

Noun	Verb	Adjective	Adverb
☐ abundance	☐ abound	☐ abundant	☐ abundantly
☐ adherence	☐ adhere	☐ adhesive	☐ adhesively
☐ anatomy	☐ anatomize	☐ anatomical	☐ anatomically
☐ circulation	☐ circulate	☐ circulative / -atory	
☐ colony	☐ colonize	☐ colonial	☐ colonially
☐ competition	☐ compete	☐ competitive	☐ competitively
☐ contrast	☐ contrast	☐ contrastive	☐ contrastively
☐ experiment / -ation	☐ experiment	☐ experimental	☐ experimentally
☐ extortion	☐ extort	☐ extortive	
☐ identification	☐ identify	☐ identifiable	☐ identifiably
☐ inspiration	☐ inspire	☐ inspiring	☐ inspiringly
☐ oppression	☐ oppress	☐ oppressive	☐ oppressively
☐ patron	☐ patronize	☐ patronizing	☐ patronizingly
☐ prediction	☐ predict	☐ predictable	☐ predictably
☐ stability	☐ stabilize	☐ stable	☐ stably

Unit 2 • Reference

Step A

- ☐ abnormal
- ☐ affect
- ☐ approximately
- ☐ biodiversity
- ☐ carnivorous
- ☐ catastrophic
- ☐ condense
- ☐ corpse
- ☐ deadly
- ☐ decline
- ☐ ecology
- ☐ ecosystem
- ☐ equatorial
- ☐ estuary
- ☐ exotic
- ☐ fend for
- ☐ fungus
- ☐ hibernate
- ☐ impose
- ☐ indigenous
- ☐ inertia
- ☐ inhale
- ☐ meteorology
- ☐ momentum
- ☐ nutrient
- ☐ offspring
- ☐ opaque
- ☐ parasite
- ☐ parched
- ☐ phenomenon
- ☐ unprecedented
- ☐ unrestrained

Step B

Noun	Verb	Adjective	Adverb
☐ accumulation	☐ accumulate	☐ accumulative	☐ accumulatively
☐ aggression	☐ aggress	☐ aggressive	☐ aggressively
☐ conduction	☐ conduct	☐ conductive	☐ conductively
☐ deduction	☐ deduce	☐ deductive	☐ deductively
☐ deprivation	☐ deprive	☐ deprivable	☐ deprivably
☐ dissipation	☐ dissipate	☐ dissipative / -ted	☐ dissipatively / -tedly
☐ diversity	☐ diversify	☐ diverse	☐ diversely
☐ domination	☐ dominate	☐ dominant	☐ dominantly
☐ epidemic		☐ epidemic(al)	☐ epidemically
☐ estimation	☐ estimate	☐ estimative / -mable	☐ estimably
☐ evaporation	☐ evaporate	☐ evaporative	☐ evaporatively
☐ falsification	☐ falsify	☐ falsifiable	☐ falsifiably
☐ fertilization	☐ fertilize	☐ fertile	☐ fertily
☐ need	☐ necessitate	☐ necessary	☐ necessarily
☐ precipitation	☐ precipitate	☐ precipitate	☐ precipitately
☐ regulation	☐ regulate	☐ regulative / -tory	☐ regulatively / -torily
☐ sustenance	☐ sustain	☐ sustainable	☐ sustainably

Unit 3 • Factual Information

Step A

- ☐ acrobatics
- ☐ bounce
- ☐ disfavor
- ☐ integrity
- ☐ monument
- ☐ refined
- ☐ summon
- ☐ transparent
- ☐ assassinate
- ☐ cede
- ☐ drastic
- ☐ internal
- ☐ nitrogen
- ☐ sleet
- ☐ supreme
- ☐ treaty
- ☐ awareness
- ☐ civic
- ☐ glacial
- ☐ majestic
- ☐ optical
- ☐ splice
- ☐ thereof
- ☐ unrest
- ☐ botany
- ☐ centennial
- ☐ hygiene
- ☐ massacre
- ☐ propaganda
- ☐ sulfur / sulphur
- ☐ tuberculosis
- ☐ wade

Step B

Noun	Verb	Adjective	Adverb
☐ absorption	☐ absorb	☐ absorptive	☐ absortively
☐ commemoration	☐ commemorate	☐ commemorative	☐ commemoratively
☐ conclusion	☐ conclude	☐ conclusive	☐ conclusively
☐ controversy	☐ controvert	☐ controversial	☐ controversially
☐ corruption	☐ corrupt	☐ corruptive	☐ corruptively
☐ deduction	☐ deduct	☐ deductive	☐ deductively
☐ delight	☐ delight	☐ delightful	☐ delightfully
☐ eruption	☐ erupt	☐ eruptive	☐ eruptively
☐ exaggeration	☐ exaggerate	☐ exaggerative	☐ exaggeratively
☐ immigration / -rant	☐ immigrate	☐ immigrant	☐ immigrantly
☐ incorporation	☐ incorporate	☐ incorporative	☐ incorporatively
☐ induction	☐ induct	☐ inductive	☐ inductively
☐ inscription	☐ inscribe	☐ inscriptive	☐ inscriptively
☐ proclamation	☐ proclaim	☐ proclamatory	☐ proclamatorily
☐ repeal	☐ repeal	☐ repealable	
☐ symbol	☐ symbolize	☐ symbolic	☐ symbolically
☐ transmission	☐ transmit	☐ transmissive	☐ transmissively

Unit 4 • Negative Factual Information

Step A

- ☐ annual
- ☐ arid
- ☐ array
- ☐ camouflage
- ☐ carbon
- ☐ caterpillar
- ☐ commodity
- ☐ comprise
- ☐ circadian
- ☐ crude
- ☐ current
- ☐ deposit
- ☐ epilepsy
- ☐ evaporation
- ☐ fertile
- ☐ fragment
- ☐ habitat
- ☐ manufacture
- ☐ metabolism
- ☐ nectar
- ☐ neurology
- ☐ photic
- ☐ physiologist
- ☐ precipitation
- ☐ reputation
- ☐ specimen
- ☐ spherical
- ☐ vegetation

Step B

Noun	Verb	Adjective	Adverb
☐ assembly	☐ assemble	☐ assembled	
☐ assumption	☐ assume	☐ assumptive	☐ assumptively
☐ competition	☐ compete	☐ competitive	☐ competitively
☐ conversion	☐ convert	☐ convertible	☐ convertibly
☐ domination	☐ dominate	☐ dominant	☐ dominantly
☐ elimination	☐ eliminate	☐ eliminative	☐ eliminatively
☐ externalization	☐ externalize	☐ external	☐ externally
☐ generation	☐ generate	☐ generative	☐ generatively
☐ illustration	☐ illustrate	☐ illustrative	☐ illustratively
☐ inherence	☐ inhere	☐ inherent	☐ inherently
☐ inheritance	☐ inherit	☐ inheritable	☐ inheritably
☐ invention	☐ invent	☐ inventive	☐ inventively
☐ migration /-rant	☐ migrate	☐ migrant	☐ migrantly
☐ modification	☐ modify	☐ modifiable	
☐ obtainment	☐ obtain	☐ obtainable	☐ obtainably
☐ replacement	☐ replace	☐ replaceable	☐ replaceably
☐ reproduction	☐ reproduce	☐ reproductive	☐ reproductively
☐ visibility	☐ view	☐ visible	☐ visibly

Unit 5 • Sentence Simplification

Step A

☐ adept	☐ auditory	☐ binary	☐ concentric
☐ conflict	☐ deciduous	☐ defecation	☐ deficit
☐ edible	☐ entrepreneur	☐ foster	☐ immoral
☐ in disrepair	☐ inflation	☐ latitude	☐ maize
☐ mammal	☐ molecular	☐ mollusk	☐ monetary
☐ olfactory	☐ overt	☐ permanent	☐ protein
☐ rank	☐ staple	☐ substantial	☐ temperate
☐ territory	☐ tissue	☐ tropical	☐ unethical
☐ urination	☐ variant	☐ wayfarer	☐ whereas

Step B

Noun	Verb	Adjective	Adverb
☐ adjustment	☐ adjust	☐ adjustable	☐ adjustably
☐ alternation	☐ alternate	☐ alternate	☐ alternately
☐ contradiction	☐ contradict	☐ contradictory	☐ contradictorily
☐ cultivation	☐ cultivate	☐ cultivatable	
☐ domestication	☐ domesticate	☐ domestic	☐ domestically
☐ elaboration	☐ elaborate	☐ elaborate	☐ elaborately
☐ enactment	☐ enact	☐ enactive	
☐ extinction	☐ extinguish	☐ extinct / -tive	☐ extinctively
☐ mutation	☐ mutate	☐ mutational	☐ mutationally
☐ preservation	☐ preserve	☐ preservative	
☐ prevalence	☐ prevail	☐ prevalent	☐ prevalently
☐ radiation	☐ radiate	☐ radiational	
☐ reference	☐ refer	☐ referent / -tial	☐ referentially
☐ regeneration	☐ regenerate	☐ regenerative	☐ regeneratively
☐ residence / -dent	☐ reside	☐ resident	
☐ restriction	☐ restrict	☐ restrictive	☐ restrictively

Unit 6 • Rhetorical Purpose

Step A

- ☐ accuracy
- ☐ amplify
- ☐ aspect
- ☐ astronomy
- ☐ causal
- ☐ celestial
- ☐ cope with
- ☐ component
- ☐ confederate
- ☐ decade
- ☐ disabled
- ☐ epoch
- ☐ feat
- ☐ fulcrum
- ☐ embrace
- ☐ magnetic
- ☐ infantry
- ☐ metaphysics
- ☐ outermost
- ☐ predatory
- ☐ probe
- ☐ prominent
- ☐ region
- ☐ retrograde
- ☐ shift
- ☐ solitary
- ☐ transcontinental
- ☐ vivid

Step B

Noun	Verb	Adjective	Adverb
☐ ceremony		☐ ceremonial	☐ ceremonially
☐ civilization	☐ civilize	☐ civilizational	☐ civilizationally
☐ contribution	☐ contribute	☐ contributive	☐ contributively
☐ convection	☐ convect	☐ convective	☐ convectively
☐ convergence	☐ converge	☐ convergent	☐ convergently
☐ deformity	☐ deform	☐ deformative	
☐ divergence	☐ diverge	☐ divergent	☐ divergently
☐ exertion	☐ exert	☐ exertive	
☐ foundation	☐ found	☐ foundational	☐ foundationally
☐ influence	☐ influence	☐ influential	☐ influentially
☐ inhibition	☐ inhibit	☐ inhibitive	
☐ intensity / -sification	☐ intensify	☐ intense	☐ intensely
☐ notability	☐ note	☐ notable	☐ notably
☐ representation	☐ represent	☐ representative	☐ representatively
☐ revelation	☐ reveal	☐ revealing	☐ revealingly
☐ suspicion / -pect	☐ suspect	☐ suspicious	☐ suspiciously
☐ theory	☐ theorize	☐ theoretical	☐ theoretically
☐ transportation	☐ transport	☐ transportable	

Unit 7 • Inference

Step A

- ☐ agriculture
- ☐ appendage
- ☐ aquatic
- ☐ cartilage
- ☐ cerebellum
- ☐ complement
- ☐ complex
- ☐ dart
- ☐ disclaim
- ☐ echolocation
- ☐ fissure
- ☐ forage
- ☐ geological
- ☐ horizontal
- ☐ lyric
- ☐ mechanical
- ☐ misconception
- ☐ niche
- ☐ parallel
- ☐ parasite
- ☐ playwright
- ☐ pollen
- ☐ render
- ☐ rupture
- ☐ sensory
- ☐ skeptically
- ☐ spontaneity
- ☐ suffrage
- ☐ symmetrical
- ☐ temporal
- ☐ thrust
- ☐ verbal

Step B

Noun	Verb	Adjective	Adverb
☐ accompaniment	☐ accompany	☐ accompanying	
☐ attachment	☐ attach	☐ attachable / -ched	
☐ confirmation	☐ confirm	☐ confirmative	☐ confirmatively
☐ diminishment	☐ diminish	☐ diminishing	☐ diminishingly
☐ distinction	☐ distinguish	☐ distinct	☐ distinctly
☐ diversification	☐ diversify	☐ diverse / -sifiable	☐ diversely
☐ emergence	☐ emerge	☐ emergent	☐ emergently
☐ emphasis	☐ emphasize	☐ emphatic	☐ emphatically
☐ emission	☐ emit	☐ emissive	
☐ impulse	☐ impel	☐ impulsive	☐ impulsively
☐ initiation	☐ initiate	☐ initiatory	☐ initiatorily
☐ perception	☐ perceive	☐ perceptive	☐ perceptively
☐ prohibition	☐ prohibit	☐ prohibitive	☐ prohibitively
☐ resolution	☐ resolve	☐ resolute	☐ resolutely
☐ separation	☐ separate	☐ separate	☐ separately
☐ significance	☐ signify	☐ significant	☐ significantly
☐ volunteer	☐ volunteer	☐ voluntary	☐ voluntarily

Unit 8 • Insert Text

Step A

☐ acclimate	☐ alignment	☐ allegory	☐ burlesque
☐ carbohydrate	☐ commission	☐ diameter	☐ dispute
☐ doctrine	☐ dormant	☐ embodiment	☐ ensure
☐ entity	☐ explicit	☐ faculty	☐ fictional
☐ groundbreaking	☐ hypocrite	☐ influx	☐ legend
☐ maritime	☐ notion	☐ observatory	☐ pioneer
☐ primitive	☐ proceed	☐ radioactive	☐ repeal
☐ revive	☐ sacred	☐ submission	☐ summit
☐ tense	☐ unmanned	☐ vanish	☐ wane

Step B

Noun	Verb	Adjective	Adverb
☐ attainment	☐ attain	☐ attainable	☐ attainably
☐ consistence	☐ consist	☐ consistent	☐ consistently
☐ conveyance	☐ convey	☐ conveyable	
☐ cremation	☐ cremate	☐ crematory	
☐ criticism	☐ criticize	☐ critical	☐ critically
☐ derivation	☐ derive	☐ derivative	☐ derivatively
☐ hierarchy		☐ hierarchical	☐ hierarchically
☐ immortality	☐ immortalize	☐ immortal	☐ immortally
☐ improvisation	☐ improvise	☐ improvisational	☐ improvisationally
☐ isolation	☐ isolate	☐ isolated	☐ isolatedly
☐ moderation	☐ moderate	☐ moderate	☐ moderately
☐ organization	☐ organize	☐ organizational	☐ organizationally
☐ persistence	☐ persist	☐ persistent	☐ persistently
☐ pursuit	☐ pursue	☐ pursuable	
☐ recollection	☐ recollect	☐ recollective	☐ recollectively
☐ synthesis	☐ synthesize	☐ synthetic	☐ synthetically

Unit 9 • Prose Summary

Step A

- ☐ adorn
- ☐ ambiguity
- ☐ brackish
- ☐ byproduct
- ☐ calculation
- ☐ cartography
- ☐ consciousness
- ☐ constellation
- ☐ craftsmanship
- ☐ delta
- ☐ epidemic
- ☐ embryo
- ☐ engraving
- ☐ era
- ☐ estuary
- ☐ famine
- ☐ fauna
- ☐ fetus
- ☐ geometric
- ☐ germ
- ☐ granite
- ☐ hostility
- ☐ humanitarian
- ☐ hysterical
- ☐ inscription
- ☐ mold
- ☐ nautical
- ☐ navigation
- ☐ neurotic
- ☐ objective
- ☐ obscure
- ☐ organ
- ☐ pottery
- ☐ ruling
- ☐ runoff
- ☐ scarce
- ☐ sediment
- ☐ spine
- ☐ trace
- ☐ transplant
- ☐ triangular
- ☐ umbilical
- ☐ vertical
- ☐ zygote

Step B

Noun	Verb	Adjective	Adverb
☐ abortion	☐ abort	☐ abortive	☐ abortively
☐ association	☐ associate	☐ associative	☐ associatively
☐ assignment	☐ assign	☐ assignable	☐ assignably
☐ erosion	☐ erode	☐ erosive	☐ erosively
☐ demonstration	☐ demonstrate	☐ demonstrative	☐ demonstratively
☐ displacement	☐ displace	☐ displaceable	
☐ illegalization	☐ illegalize	☐ illegal	☐ illegally
☐ nourishment	☐ nourish	☐ nourishing	☐ nourishingly
☐ opposition	☐ oppose	☐ opposing	☐ opposingly
☐ portrayal	☐ portray	☐ portrayable	
☐ promotion	☐ promote	☐ promotive	☐ promotively
☐ recombination	☐ recombine	☐ recombinant	☐ recombinantly
☐ repression	☐ repress	☐ repressive	☐ repressively
☐ resistance	☐ resist	☐ resistant	☐ resistantly

Unit 10 • Fill in a Table

Step A

☐ anatomic	☐ collectively	☐ commitment	☐ conjugal
☐ corporation	☐ disparate	☐ dividend	☐ entitle
☐ evolution	☐ flock	☐ glamorous	☐ gore
☐ hominid	☐ humidity	☐ impact	☐ incitement
☐ jurisdiction	☐ levy	☐ liability	☐ linkage
☐ metaphorically	☐ mobility	☐ morality	☐ outlet
☐ paleoanthropology	☐ prejudice	☐ property	☐ refurbish
☐ scapegoat	☐ scour	☐ skull	☐ span
☐ spouse	☐ statistics	☐ surplus	☐ validity

Step B

Noun	Verb	Adjective	Adverb
☐ adaptation	☐ adapt	☐ adaptable	
☐ adoption	☐ adopt	☐ adoptive	☐ adoptively
☐ advocacy	☐ advocate	☐ advocative	☐ advocatively
☐ compilation	☐ compile	☐ compilatory	
☐ definition	☐ define	☐ definitive	☐ definitively
☐ descent	☐ descend	☐ descendent	☐ descendently
☐ exhibition	☐ exhibit	☐ exhibitive	☐ exhibitively
☐ evaluation	☐ evaluate	☐ evaluative	☐ evaluatively
☐ ignition	☐ ignite	☐ ignitable	
☐ immunization	☐ immunize	☐ immune	☐ immunely
☐ impression	☐ impress	☐ impressive	☐ impressively
☐ integration	☐ integrate	☐ integrative	☐ integratively
☐ persecution	☐ persecute	☐ persecutive / -tory	
☐ pretense	☐ pretend	☐ pretended / -ing	☐ pretendedly / -ingly
☐ prosperity	☐ prosper	☐ prosperous	☐ prosperously
☐ reconstruction	☐ reconstruct	☐ reconstructive	☐ reconstructively

Reading Section **Directions**

This section measures your ability to understand academic passages in English. It consists of three passages and a set of questions about each of them.

Most questions are worth 1 point, but the last question in each passage 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. You can see a definition or an explanation at the end of the passage.

While working on the questions, 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.

You may now begin the Reading section. You will read 3 passages. You will have 60 minutes to read the passages and answer the questions.

Actual Test

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

   (A) summary
   (B) sequel
   (C) forerunner
   (D) framework

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

   But no one had succeeded in organizing the elements in a format that showed those patterns.

   Where would the sentence best fit?

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

3. Which of the following best expresses the essential information in the highlighted sentence in paragraph 3? *Incorrect* choices change the meaning in important ways or leave out essential information.

   (A) Elements with the same number of protons do not react with each other.
   (B) Periodicity refers to an element's tendency to periodically gain an extra proton.
   (C) An element has protons and neutrons in the nucleus of its atoms.
   (D) The properties of elements tend to reoccur at fixed intervals of their atomic weights.

Periodic Table

Humans have always known about certain elemental substances, such as gold and silver, that occur in nature and cannot be broken down into other substances. [A] Other chemical elements were discovered gradually beginning in 1669, when a German merchant, Hennig Brand, accidentally found phosphorus while attempting to find a way to create gold out of more common metals. [B] By 1809, the number of known elements had increased to 47. [C] Chemists studying the elements began to notice patterns in the way chemicals reacted. [D]

The first modern chemistry textbook was written in 1789 by Antoine-Laurent de Lavoisier. He listed the known elements, which he classified into metals and nonmetals. But his listing omitted the gases and included some things that were not substances, such as light and calories. Thus, his list was not accepted as an accurate organizing system.

[An important trait of elements is their periodicity: similarly acting elements tend to occur at regular intervals when arranged by their atomic weight (the number of protons plus neutrons in the nucleus).] A French geologist, Alexandre-Emile Beguyer de Chancourtois, was the first to notice this periodicity. He designed a precursor to the periodic table, the telluric helix. That system arranged the elements on a spiral-shaped cylinder in order of their atomic weight. The elements with similar physical properties appeared vertically on the cylinder. But because Chancourtois's 1862 paper used geological terms and did not include drawings, his periodic system was not accepted by those in the field of chemistry.

4. **According to the passage, the first chemist to notice periodicity was**

   (A) Mendeleev
   (B) Chancourtois
   (C) Lavoisier
   (D) Newlands

5. **The word breakthrough in the passage is closest in meaning to**

   (A) discovery
   (B) quest
   (C) experiment
   (D) goal

6. **Why does the author mention the card game of solitaire?**

   (A) To name the favorite game of Mendeleev
   (B) To identify the source of the organizing plan of the periodic table
   (C) To describe the solitary nature of chemistry studies
   (D) To give an example of a precursor to the periodic table

7. **According to the passage, Mendeleev's main discovery was that**

   (A) some elements have similar physical properties that reoccur at regular intervals of their atomic weights
   (B) an element's atomic weight and number could be shown in a single table
   (C) similarly acting elements appear in groups of eight
   (D) the rarest elements have the lowest atomic weights

As new elements were discovered through the first half of the 1800's, chemists confirmed the regular repetition of the physical properties of the elements. Chemists studied ways to classify the elements in order to reflect this periodicity. In 1863, an English chemist, John Newlands, divided the 56 known elements into groups, each sharing the same characteristics. As each group seemed to contain eight elements, he referred to his system as the Law of Octaves, after the eight keys in an octave on the piano. But Newlands's idea was ridiculed and his theory dismissed. Not until 1919 did it become accepted that the elements should be grouped by eights.

But the underlying concept of the periodicity of the elements was adapted to better effect in 1869 by the Russian chemist Dmitri Mendeleev. His great breakthrough was to see that the two key characteristics of an element—atomic weight and atomic number (the number of protons in the nucleus)—could be combined in a single table. His table came to be called the *periodic table*.

Mendeleev's table was inspired by the card game of solitaire, in which cards are arranged horizontally by suit and vertically by number. Borrowing the same organizing patterns, Mendeleev arranged the elements in groups of seven. He grouped them horizontally by their atomic number in ascending order and vertically by their similar qualities in groups of seven. Thus similar metals such as gold, silver, and copper appear in the same vertical column. Similarly reacting gases such as helium, argon, and neon appear in another column. The most common elements (hydrogen, helium, lithium) have lower atomic

8. The word their in the passage refers to
   - (A) the most common elements
   - (B) lower atomic numbers
   - (C) the rarest elements
   - (D) protons

9. Which of the following can be inferred about hydrogen?
   - (A) Its atomic number is less than uranium's.
   - (B) It appears in a vertical row.
   - (C) It reacts with helium.
   - (D) Its atomic weight is greater than lithium's.

10. The word valid in the passage is closest in meaning to
    - (A) studied
    - (B) misleading
    - (C) legal
    - (D) accurate

11. All of the following are true about the periodic table EXCEPT:
    - (A) It is constantly changing as new elements are found.
    - (B) It originally predicted that more elements would be discovered.
    - (C) It will never contain more than 120 elements.
    - (D) It arranges elements according to their physical properties.

numbers and thus appear near the beginning of the table in the first horizontal row. The rarest elements (uranium and plutonium) have the greatest number of protons in their nuclei. They are ordered near the end of the table.

In Mendeleev's time, only 63 elements had been discovered. The brilliance of his periodic table, however, was that it predicted that new elements would be found to fit into the missing slots in his original table. Today the table shows 120 elements, 92 naturally occurring and 28 created in the laboratory. Scientists believe that many more will be found. The periodic table has been called "the most elegant organizational chart ever devised."

Mendeleev's chart remains valid today. But it has been modified by the continual discovery and manufacture of new elements. And in 1914, Henry Mosely discovered a relationship between an element's X-ray wavelength and its atomic number. Thus, he rearranged the elements by electric charge. Another important improvement was suggested by Glenn T. Seaborg in 1945: the addition of a vertical group of certain heavy elements called the actinide series.

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

This passage explores the history of the periodic table.

-
-
-

Answer Choices

(A) Chancourtois was the first to notice the periodicity of elements.

(B) The periodic table is constantly changing as new elements and new ways of classifying them are discovered.

(C) Lavoisier's list of elements included light and calories.

(D) By 1809, there were 47 known elements.

(E) The most common elements appear near the end of the table while the least common are near the beginning.

(F) Mendeleev organized the elements into a table based on their atomic weight.

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**.

13. The phrase keep track of in the passage is closest in meaning to

(A) preserve
(B) account for
(C) describe
(D) line up

14. According to paragraph 1, the first signs of counting were found in

(A) tallies
(B) sheep
(C) rocks
(D) animal bones

15. According to paragraph 2, Egypt's counting system used which of the following to show numbers?

(A) tallies
(B) pictographs
(C) place values
(D) an inverted U

16. The author mentions the number 236 in order to

(A) illustrate the importance of the zero in the place-value system
(B) explain how the Arabs invented Arabic numerals
(C) identify the first numeral that was written with place values
(D) show a number that does not contain a zero

History of Counting

The earliest signs of counting have been found in ancient hunting artifacts. Notches in animal bones from 30,000 B.C. may have been a tallying system. Tallies were used to keep track of things. A sheepherder would put a pebble in a pile each time a sheep was let out to graze. When the sheep returned at night, the owner would remove the pebble. Any pebbles that remained represented missing sheep. But such tallying was not true counting. It merely compared two sets of objects.

Egypt was one of the first civilizations to adopt a real number system. Beginning in about 3000 B.C., Egyptians expressed numbers with pictographs, or symbols to represent numbers. Thus, the numbers from one to nine were combinations of vertical strokes. Ten was an inverted U, 100 was a coiled rope, and 1000 was a lotus flower.

Different cultures used different base numbers for their counting systems. Many, such as the Egyptians, used a base 10, a reflection of the numbers of fingers on both hands. Others, like the Babylonians, used a base 60. But that system was awkward because it required either separate symbols for each number up to 60 or clusters of 10 numbers. But the base of 60 survives today in geometry (60 seconds and minutes of angular measurement, 360 degrees in a circle, and 180 degrees in a rectangle) and in time-keeping (60 seconds in a minute and 60 minutes in an hour).

The first great advance in numbering was the place-value concept. Invented by the Babylonians, place values were needed to show the value of each digit in a numeric notation. For example, without place values, the number 236 was complicated to write in

17. The word complicated in the passage is closest in meaning to

(A) precise
(B) difficult
(C) simple
(D) definite

18. The author's description of zero mentions which of the following?

(A) It was invented by the Babylonians.
(B) It was first expressed with Roman numerals.
(C) It was needed to make place values accurate.
(D) It was used widely by 3000 B.C.

19. According to the passage, all of the following are true about place values EXCEPT:

(A) They were invented by the Babylonians.
(B) They show the value of each digit in a multiple-digit number.
(C) They allowed calculations with written numerals.
(D) They were included in the system of Roman numerals.

20. In paragraph 7, why does the author mention the abacus?

(A) To contrast it with written numbers regarding speed of calculating
(B) To give an example of the means of counting used after the year 1600
(C) To describe how sheepherders kept track of their sheep
(D) To mention a device invented by Al-Khwarizmi

most systems, as it required multiple symbols and strokes. But with a value assigned to each place (in a system based on 10), we know that the digit 6 represents 6 ones, the digit 3 represents 3 tens, and the digit 2 represents 2 hundreds.

For place value to accurately reflect a number, a "zero" was needed to eliminate any confusion over, for example, whether the digits 236 were intended to represent 236 or 2360 or 2036 or 2306. The zero or "empty" place value was originally indicated by leaving a gap between numbers, as in 23_6 to mean 2306. Eventually, a special symbol was designed to show zero, the "0" digit that we use today. That symbol was invented for the Arabic counting system and was in common use by about 650 A.D.

For zero and place values to be useful in mathematics, it was necessary to invent a symbol for each number up to the base figure. Thus, different symbols for one through nine were adopted, with the zero added after each symbol to reflect another 10 (10, 20, 30, 40, and so on). And multiple zeros were added to represent even larger numbers (100, 1000, and 10,000).

Arabic numerals ultimately replaced the Roman numerals that had dominated Western European history until the seventeenth century. Those are the numerals used in most of the world today. Early forms of Arabic numbers appeared in India by 200 B.C. Indian mathematicians found that a place-value system that included a symbol for zero allowed them to perform mathematical operations by writing down and manipulating numerals. That was faster than the abacus, a mechanical device that had been the principal means of counting. Using written

21. **According to the passage, Al-Khwarizmi's treatise was unknown in Europe until the twelfth century because**

(A) it was not yet translated into Latin
(B) printing was not invented until then
(C) Arab mathematicians wanted to keep it secret
(D) European mathematicians were not interested in other counting systems

22. **The word supplanted in the passage is closest in meaning to**

(A) revised
(B) replaced
(C) reinforced
(D) resurrected

23. **According to the passage, which of the following is true of algorism?**

(A) It was a mechanical device for counting.
(B) It was the Roman system of counting.
(C) It was the Arabic number system.
(D) It was not used after printing was invented.

numerals to calculate did not become known outside India until the ninth century, when an Arab mathematician, Al-Khwarizmi, wrote a treatise about numbers. But his work was not translated into Latin until the twelfth century and thus did not become known in Europe until then. An Italian, Leonardo Fibonacci, popularized the Arabic numbering system (called "algorism") by writing books about it that were read by bookkeepers and merchants. They started to use the system in their commercial transactions.

For a few hundred years after Fibonacci, scholars and merchants debated the merits of algorism versus the abacus. With the invention of printing, books about algorism became widely known, leading to its becoming the accepted method from about 1500 and after. By about 1600, Roman numerals had been supplanted by Arabic numerals for performing most computations.

VIEW TEXT REVIEW HELP BACK NEXT

24. **Directions:** Complete the table below to summarize information about the two ideas that permitted counting with written numerals. Match the appropriate statement to the idea with which they are associated. ***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.

Place value	Select 3 • • •
Zero	Select 2 • •

Answer Choices

Ⓐ Computation required that a number show the value of each digit.

Ⓑ Tallying was used to keep records.

Ⓒ Numbers were complicated to write.

Ⓓ A special symbol was needed to show an empty place value.

Ⓔ The idea was first invented by the Babylonians.

Ⓕ Roman numerals were replaced by Arabic numerals.

Ⓖ The symbol was first used by the Arabs.

25. According to paragraph 1, which of the following is a characteristic of minerals?

(A) crystal structure (B) organic matter
(C) hardness (D) smooth surface

26. The word the latter in the passage refers to

(A) mineral (B) diamond
(C) graphite (D) carbon

27. 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.

(A) The sheets of graphite's carbon atoms slide past the sheets of diamond's carbon atoms.
(B) Graphite contains a network of carbon atoms that create a strong crystal structure.
(C) Diamond is harder than graphite because of its carbon atoms' interlocking structure.
(D) The networks of carbon atoms in diamond and graphite make each mineral very hard.

28. The word identical in the passage is closest in meaning to

(A) similar
(B) complex
(C) same
(D) contrasting

Minerals

Minerals are naturally occurring solid substances formed by geologic movements in the Earth. Their main defining characteristics are that 1) they are inorganic (composed of non-living matter); 2) they have a crystal structure; and 3) they have a unique chemical composition. The type of mineral is determined both by its crystal structure and its chemical composition. A crystal structure occurs when the atoms inside the mineral are ordered in a geometric pattern that repeats itself throughout the mineral. All crystal structures fit into one of 14 possible "lattice"—regular pattern-arrangements of atoms, which lattices can be detected by X-rays.

A mineral's physical traits are influenced by its crystal form. For example, both diamond and graphite are composed of the same element (carbon), but the former is the hardest mineral while the latter is soft. This is because graphite's crystal structure arranges the carbon atoms in sheets that can slide past each other, while diamond's carbon atoms are arrayed in a strong, interlocking network.

Two minerals with identical crystal structures can have different chemical compositions. Thus, halite and galena share the same crystal structure but are composed of different chemicals. Conversely, two minerals with the same chemical ingredients can differ in their crystal structure. For example, pyrite and marcasite both are made of iron sulfide, but the arrangement of their atoms differs.

According to the International Mineralogical Association, 4,000 minerals have been identified to date. Only about 150 of them

29. **According to the passage, two minerals with the same crystal structure can be different because**

(A) they have different specific gravities
(B) they are found in different locations
(C) they were formed by different geologic processes
(D) they have different chemical compositions

30. **According to paragraph 3, halite and galena are different elements because**

(A) they have the same crystal structure
(B) they have different chemical compositions
(C) they were formed by different geologic processes
(D) they have different rankings on the Mohs scale

31. **The word hospitable in the passage is closest in meaning to**

(A) welcoming
(B) hostile
(C) comparable
(D) reactive

32. **Why does the author discuss the role of volcanic movements in creating rocks?**

(A) To give an example of one of the Earth's geologic forces
(B) To identify a factor that determines what kinds of minerals are found in rocks
(C) To explain why some rocks contain silicon
(D) To criticize the theory that minerals are created only by chemical reactions

are plentiful, and about 50 are classified as "occasional." The remainder are rarely found, some consisting of only small grains of rock.

Minerals are often found as components of rocks, which may contain organic matter as well. Some rocks consist wholly of one mineral, such as calcite in limestone rock. Other rocks may host many minerals. Almost all of the rocks visible today contain one or more of a group of about 15 minerals, including quartz, mica, and felspar.

The kinds of minerals found in any given rock are determined by three factors. First, the rock's chemical composition must be hospitable to a particular mineral. For example, rocks containing silicon will likely contain quartz. Second, the conditions under which the rock was formed will influence the kinds of minerals found in the rock. Thus, rock born from volcanic movements at high temperatures and pressures may contain granite. Third, mineral distribution is affected by the geological stages through which the rock passed before reaching its present state. For example, exposure to moisture and acids may decay some minerals and cause others to take their place. During the changes from one ecological stage to another, the rock may disintegrate into sand or soil.

Mineralogists classify minerals according to either physical properties or chemical composition. Minerals have numerous measurable physical properties. *Hardness* is measured on the "Mohs scale," which ranks hardness from one to 10. Any mineral can be cut or marked by a mineral with a higher ranking on the Mohs scale. Thus a diamond,

33. The word disintegrate in the passage is closest in meaning to

(A) decompose
(B) imbed
(C) pressurize
(D) decline

34. Which of the following can be inferred about minerals on the Mohs scale?

(A) Graphite is softer than gypsum.
(B) Quartz can cut a mineral with a rank of 8.
(C) Diamond can cut a mineral with a rank of 9.
(D) The hardest minerals are metals.

35. According to the passage, all of the following are properties of minerals EXCEPT:

(A) cleavage
(B) luster
(C) streak
(D) weight

36. The word residue in the passage is closest in meaning to

(A) engraving
(B) picture
(C) outline
(D) remains

with a rank of 10, can cut into quartz, with a rank of 7. *Luster* measures the reflection of light by the surface of the mineral. Metals have a higher luster than gypsum, which has a porous surface. *Cleavage* refers to the way a mineral splits apart along its natural grain, and *fracture* refers to its breakage against its natural cleavage planes. *Streak* is the color of the residue left by a mineral as it is rubbed across a special plate. *Specific gravity* measures the density of the mineral; it is computed by comparing the mass of the mineral to the mass of an equal volume of water.

Minerals can also be classified by their chemical characteristics. The most frequently occurring minerals are called *silicates* because of their large shares of silicon and oxygen. Almost all rocks fit this category. The second most common minerals are *carbonates*, which contain carbon and oxygen. Carbonates are found on the ocean floor as the deposits of decayed plankton. Another grouping, *halides*, are found where water has evaporated, as in dried lake beds and landlocked seas such as the Great Salt Lake in Utah. Other common classes include *sulfates*, *oxides*, *sulfides*, and *phosphates*.

VIEW TEXT REVIEW HELP BACK NEXT

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

This passage discusses the characteristics of minerals.

-
-
-

Answer Choices

(A) When a mineral is exposed to moisture and acid, it may decay and allow a new mineral to form.

(B) Minerals are classified by their physical properties or chemical composition.

(C) The kind of mineral is defined by its crystal structure and its chemical composition.

(D) Carbonates are deposits of dead plankton that are found on the ocean floor.

(E) Minerals are often found in rocks, and each rock may host one or many minerals.

(F) Cleavage is the property of minerals that concerns the way it breaks along its natural cleavage planes.

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.

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Unit 1 Vocabulary

Skill & Drill

1. (B)

바카족

바카족은 카메룬, 콩고, 가봉, 중앙아프리카공화국의 열대우림에 사는 유목민족이다. 그들은 평균 키가 1.5미터이며 피그미족으로 불린다. 그러나, 그들은 피그미라는 이름을 싫어하며 오히려 그들의 종족 이름인 "바카족"으로 불리기를 원한다.

바카족은 수렵과 채집을 하는 민족이다. 그들은 임시 오두막을 지어 생활한다. 이 오두막은 나뭇가지를 사용해 만들며 커다란 잎으로 덮는다. 남자들은 독을 묻힌 화살과 창을 사용해 숲에서 동물을 사냥한다. 여자들은 과일과 견과류를 딴다. 또한 양봉을 하고 아이들을 돌본다. 무리는 공동체를 이루어 자치를 하며 모든 결정을 만장일치로 내린다.

2. (B)

박테리아

박테리아는 모든 생물 가운데 가장 흔하다. 박테리아는 토양과 수중에서 산다. 또한 다른 생물의 몸 속에서 살기도 한다. 일반적으로, 대부분의 박테리아는 크기가 대단히 작아 육안으로 관찰되지 않는다. 하지만 거대 박테리아는 0.5mm까지 자라기도 한다. 이 박테리아는 식물이나 균류와 같이 세포벽이 있다. 많은 박테리아는 편모라고 하는 돌출된 부분을 펄럭여 움직인다.

박테리아는 인간과 동물에 유익하기도 하고 해롭기도 하다. 어떤 박테리아는 콜레라나 나병 같은 끔찍한 질병을 일으키기도 한다. 그러나 인간의 장 속에 사는 박테리아는 해로운 병균이 자라지 못하도록 하기 때문에 유익하다. 박테리아는 해로운 병균을 분해한다.

3. (D)

가뭄

가뭄은 건조한 날씨가 비정상적으로 오래 지속되는 것을 말한다. 그것은 물이 농업이나 도시, 환경상 필요한 양보다 적은 때를 말한다. 보통은 정상 이하의 강우량이 오래 지속되는 것에 이른다. 하지만 물의 순환량을 감소시키는 요인에 의해 가뭄이 발생하기도 한다.

인간은 날씨를 조절할 수 없다. 그렇기 때문에 가뭄을 일으키는 원인도 막을 수 없다. 가장 일반적인 원인은 물 부족과 높은 기온을 들 수 있다. 많은 과학자들은 최근의 가뭄이 지구온난화 때문에 발생했다고 믿는다. 그들은 우리가 오존층에 입히는 피해를 줄일 수 있다면 가뭄도 줄어들 것이라고 말한다.

4. (C)

은유

은유란 관련이 없는 두 가지 물체를 직접 비유하는 방법을 말한다. 은유는 어떤 식으로 첫 번째 물체를 두 번째 물체와 동일하다고 설명한다. 은유에는 혼합 은유, 활동적 은유, 죽은 은유 등 여러 가지 종류가 있다. 혼합 은유는 일반적으로 사용되는 두 가지 은유를 결합시켜 터무니없는 은유를 만든다. 혼합 은유의 예로는 "그는 주저하지 않고 용감히 어려운 상황에 맞섰다(He stepped up to the plate and grabbed the bull by the horns)"를 들 수 있다. 활동적 은유는 "당신은 나의 태양"처럼 일상 생활에서는 쓰지 않는 은유이다. 죽은 은유는 "어색한 침묵을 깨다(break the ice)"와 같은 진부한 표현에서 사용된다.

5. (C)

엘리자베스 1세 여왕

엘리자베스 1세 여왕은 잉글랜드와 아일랜드를 통치했다. 그녀는 1558년부터 1603년까지 왕위에 앉았었다. 그녀는 또한 프랑스의 여왕으로 간주되기도 했지만 프랑스에서는 아무런 권력을 행사하지 못했다. 그녀는 튜더 왕조의 다섯 번째이자 마지막 군주였다. 그녀는 결혼을 하지 않았기 때문에 "처녀 여왕(Virgin Queen)"으로 불렸다.

엘리자베스의 통치 시기를 엘리자베스 시대라고 한다. 그녀의 통치 기간 동안 많은 위대한 업적이 이루어졌다. 셰익스피어는 희곡을 썼다. 프란시스 드레이크경은 세계일주를 했다. 영국은 북아메리카를 식민지로 삼았다. 그녀가 죽은 바로 직후 버지니아 미국 식민지가 만들어졌다. 버지니아는 처녀 여왕을 기려 이름을 붙인 것이다.

6. (A)

짚신벌레

짚신벌레는 짚신처럼 생겼기 때문에 짚신벌레라고 한다. 짚신벌레는 섬모충이라고 하는 단세포 생물을 말한다. 섬모충이란 몸이 꼬리처럼 생긴 가는 털로 덮여 있기 때문에 붙여진 이름이다. 짚신벌레는 섬모를 계속 움직여 이동을 한다. 세포는 깊은 구강 홈이 있다. 일종의 입이라고 할 수 있는 이 부분도 섬모로 덮여 있다. 입은 수분을 분출하는 데 사용한다. 짚신벌레는 담수 지역, 특히 거품 안에서 자주 발견된다. 짚신벌레는 산성을 좋아한다.

Practice with Long Passages

A **1.** (C) **2.** (C) **3.** (B) **4.** (B)

[1]Absolute / [2]Symbolic / [3]Constitutional

유럽의 군주정치

군주정치란 한 명의 지배자가 국가의 우두머리가 되는 정부 형태를 말한다. 군주정치는 지구상에서 가장 오래된 정치 형태의 하나이다. 군주는 대개 왕이나 여왕이다. 그러나 때로는 군주가 족장이거나 황제 또는 다른 이름으로 불리기도 한다. 일본과 같은 일부 국가에서는 군주가 단지 상징적인 의미만 갖는다. 이런 상징적인 군주는 실권이 없다. 그런가 하면 군주가 엄청난 권력을 휘두르는 국가도 있다. 현재 전 세계적으로 29개의 주권군주국이 있다.

세습군주제는 가장 일반적 형태의 왕위 계승 방법이다. 세습군주제는 전 세계 군주제에서 대부분 시행하고 있다. 이 경우 모든 왕과 여왕은 동일한 가문에서 나온다. 일정 기간 동안 통치를 하는 가문을 왕조라고 한다. 왕좌는 그 가문 출신의 사람에게서 그 가문 출신의 또 다른 사람에게로 세습이 된다. 세습군주제는 안정성, 연속성, 예측가능성이라는 이점이 있다. 가문

국왕과 의회 간의 애정과 충성심 역시 안정에 도움이 되는 요소다.

수 세기 동안 대부분의 유럽 국가는 군주에 의한 통치를 받았다. 영국, 덴마크, 노르웨이는 지금도 여전히 입헌군주국이다. 입헌군주국에서는 왕이나 여왕이 통치를 하지만 국가의 헌법을 준수해야 한다. 이러한 형태의 정부는 군주의 권력을 엄격히 제한한다.

17세기에 영국은 입헌군주국이 되었다. 찰스 1세는 협정에 서명했다. 그는 새로운 세금을 징수하거나 법률을 제정하거나 전쟁을 할 때에는 영국 국회의 승인을 얻어야 했다. 협정에 서명을 한 직후 찰스 1세는 협정을 무시했다. 그는 절대 권력을 행사하고자 했다. 그는 반역죄로 참수되었다. 입헌군주제의 새로운 시대가 열린 것이다.

러시아제국은 유럽의 절대군주국이었다. 첫 번째 통치자는 피터 1세였다. 그는 로마노프 가문 출신이었다. 그는 1692년에 짜르가 되었다. "짜르"란 "황제"를 뜻하는 러시아 말이다. 로마노프 왕조는 1917년 2월 혁명 때까지 이 제국을 다스렸다. 그 해에 러시아인들은 혁명을 일으켰다. 당시 통치를 하고 있던 짜르인 니콜라스 2세는 왕좌에서 물러나야 했다. 1918년경 니콜라스 2세 일가족은 총살형 집행조 앞에서 총살형을 당했다.

B 1. Ⓐ 2. Ⓓ 3. Ⓑ 4. Ⓑ

[1]Hard energy path / [2]Soft energy path

대체 에너지원

화석 연료는 많은 문제를 일으킨다. 지구온난화를 일으키는 심각한 오염을 유발한다. 유전과 가스전을 차지하기 위해 많은 전쟁이 일어나기도 한다. 화석연료는 또한 재생불가능한 에너지원이다. 언젠가는 고갈되고 말 것이다. 연료 부족이 발생하면 세계 각국이 고통을 겪게 될 것이다.

태양력이 화석 연료를 완전히 대체할 수 있을까? 태양력은 깨끗하고 안전하며 저렴하다. 하지만 태양력 하나만으로 화석 연료를 대체할 수 있다는 것은 전혀 비현실적이다. 현재 태양전지 기술은 충분히 발전하지 않았다. 태양전지는 신뢰할 수가 없다. 구름이 끼거나 비가 오는 날에는 사용할 수 없고 밤에도 마찬가지다. 또한, 태양전지는 너무 많은 공간을 차지한다. 거기다가 충분한 에너지를 내지도 못한다.

연성 에너지 경로는 화석 연료 의존에 대한 좋은 대안이 된다. 연성 에너지 경로란 에너지 보존 계획이다. 이것은 경성 에너지 경로에 대한 한 가지 대안이다. 경성 에너지는 유해하고 재생불가능한 에너지를 말한다. 화석 연료와 원자력이 여기에 해당된다. 반면에, 연성 에너지는 재생가능하고 환경에 안전한 에너지를 말한다. 태양력과 풍력은 연성 에너지다. 생물 연료와 지열 에너지 역시 연성 에너지이다.

많은 이들이 연성 에너지 경로를 지지한다. 이들은 새로운 에너지 생산 방법에 해결책이 있다고 믿는다. 첫 단계는 경성 에너지 기술을 사용함에 있어 세심한 관리를 하는 것이다. 그런 다음에는 연성 에너지 기술의 향상에 따라 많은 새로운 연성 에너지원이 단계적으로 사용되게 될 것이다.

일부 비판가들은 이것이 모든 에너지 생산에 피해를 줄 것이라고 주장한다. 그들은 화석 연료가 중요하다고 생각한다. 그들은 가능한 한 많은 석유 생산을 제어하기를 원한다. 그들은 화석 연료의 소비가 산업에 도움이 된다고 생각한다.

캐나다나 스웨덴 같은 나라는 연성 에너지 경로를 택하고 있다. 캐나다는 현재 휘발유에 대한 의존도를 줄이고 있다. 몇 년 후에는 모든 휘발유에 일정량의 생물연료가 포함되게 된다. 스웨덴은 석유 의존도를 40%까지 감소시키기로 했다. 그 나라는 2020년 전까지 이것이 가능하리라고 말한다.

C 1. Ⓐ 2. Ⓒ 3. Ⓓ 4. Ⓐ

[1]Nickname / [2]Tom Wills / [3]August 7, 1858 / [4]How to Play the Game

호주식 풋볼의 역사

호주식 풋볼은 여러 가지 이름으로 불린다. 이 경기를 좋아하는 사람들은 그냥 "풋볼" 또는 "푸티"라고 부른다. 다른 종류의 축구와 구별하기 위해 "오지 룰스" 또는 "AFL"이라고 한다. AFL은 호주 풋볼 리그(Australian Football League)의 약자로 호주에서는 가장 유명한 리그이다.

호주식 풋볼은 1858년 톰 윌스가 만들었다. 그는 크리켓 선수들이 겨울 동안 체력을 유지할 수 있는 스포츠를 만들고 싶었다. 그래서 스포츠 잡지에 자기의 의도를 설명한 편지를 썼다. 그는 또한 풋볼 클럽의 창단을 주장했다. 1858년, 윌스와 다른 선수들은 최초의 호주식 풋볼 게임을 시험적으로 치렀다. 하지만 이 경기에 대한 세부 사항은 거의 전해지지 않고 있다.

1858년 8월 7일, 호주식 풋볼에 두 가지 중요한 사건이 있었다. 멜번 풋볼 클럽이 창단되었다. 이 클럽은 어떤 식으로든 세계 최초의 풋볼 클럽이었다. 또한 멜번 그래미 스쿨과 스카치 컬리지 간의 유명한 경기가 치루어졌다. 심판은 톰 윌스가 맡았다. 두 번째 경기는 8월 21일에, 세 번째 경기이자 마지막 경기는 9월 4일에 있었다. 그 이후로, 두 학교는 매년 경기를 갖는다.

크리켓 경기장으로도 사용할 수 있는 타원형 경기장에서 18명의 두 팀 선수가 경기를 했다. 이 운동장은 길이가 185미터에 이르렀다. 이것은 다른 축구에서 사용하는 경기장의 거의 네 배나 되는 크기이다.

"비하인드" 포인트는 공이 리안을 가로질러 골 포스트와 비하인드 포스트 사이를 지날 때 득점할 수 있다. 또한 비하인드는 공이 골 포스트 사이를 지나갈 때 어느 한쪽 팀 선수의 어떤 신체 부위에 부딪쳐도 득점하게 된다. 한 골은 6점이었으며 비하인드는 1점이다.

D 1. Ⓐ 2. Ⓒ 3. Ⓑ 4. Ⓑ

[1]the human genome / [2]1990 / [3]liver and Alzheimer's disease

인간 게놈 프로젝트

인간 게놈 프로젝트(HGP)는 과학 분야의 대단히 중요한 시도이다. 인간 게놈 프로젝트에서는 게놈 지도를 그리고 서열을 해독하려고 한다. 인간 게놈에는 30억 개의 유전 암호가 있다. 이것은 모두 밝혀졌다. 하지만 아직 서열은 해독되지 않았다. 또한 이 프로젝트는 존재하는 모든 유전자를 밝혀낼 것이다.

국제 인간 게놈 프로젝트는 1986년 찰스 델리시에 의해 시작되었다. 1987년에 발표된 한 보고서에는 "이러한 노력의 궁극적 목표는 인간 게놈을 이해하기 위한 것이다. 인간 해부학이 있어 현재의 의학이 가능했듯이 인간 게놈에 대한 지식은 의학과 기타 건강 과학의 지속적 발전에 필요하다"고 적혀 있다.

30억 달러짜리 이 프로젝트는 1990년에 공식적으로 출범했다. 예상 기간은 15년이었다. 국제 컨소시엄에는 각국에서 온 유전학자들이 참여했다.

최근에 연론은 게놈 지도가 완성되었다고 주장했다. 하지만 2006년 현재 완성된 상태는 아니다. 지도가 완성되기까지는 몇 년이 더 걸릴 것으로 예상된다. 각 염색체의 중심부는 DNA 서열이 상당히 반복적이다. 현 기술로 이것들의 자리를 찾는 일은 대단히 어렵다.

인간 게놈 지도는 현재 92% 정도 완성되었다. 오래지 않아 지도가 완성되리라는 기대가 크다. 지도 제작 기술과 서열 해독 기술이 발전하고 있기 때문에 작업은 점점 쉬워지고 있다.

명확한 게놈 지도는 의사들에게 많은 중요한 정보를 제공해 줄 것이다. 이로 인해 많은 의학적 진보가 있을 것이다. 이러한 지식은 유방암의 초기 진단에도 중요한 진전을 이룰 것이다. 또한 간질환이나 알츠하이머 치료에도 도움을 줄 것이다.

게놈의 분석으로 인류 진화 연구의 새 지평을 열리게 될 것이다. 인간 DNA의 서열은 인터넷에 "유전자은행(Genebank)"이라는 데이터베이스 안에 저장되어 있다. 누구라도 이 자료를 볼 수 있다.

E **1.** (B) **2.** [A], [D] **3.** (C) **4.** (A)

[1]disadvantaged youths / [2]crimes / [3]die or desert (run away)

갱단과 폭력

빈민층의 많은 젊은이들이 갱이 된다. 갱(gang)이란 공통의 정체성을 갖는 개인들로 이루어진 무리를 이른다. 일부 인류학자들은 갱단의 구조가 가장 오래된 인간 조직의 하나라고 믿는다. 갱단은 종종 범죄와 연결된다.

길거리 갱단은 저소득층이나 빈곤층의 젊은이들로 이루어지는 경향이 있다. 반면에, 이탈리아계 미국인 마피아같이 조직적인 범죄조직은 사회의 중류층 또는 상류층을 차지한다.

갱단은 보통 도시나 교외의 일정 영역을 장악한다. 이 영역을 "세력권"이라고 한다. 세력권 내의 한 가지 일반적인 범죄 행위는 "보호 제공"이다. 이것은 갱단을 동원해 보호를 해 주고 돈을 요구하는 흔한 유형의 갈취이다.

1970년대 이후로 많은 갱단이 마약 거래에 관여했다. 갱단과 관련된 가장 심각한 마약은 크랙 코카인이다. 갱단들은 또한 강도, 차량 절도, 무장 강도 등의 범죄도 저지른다.

갱단의 단원들은 보통 갱이라고 한다. 이들은 종종 10대에 갱단에 입단한다. 종종 어린 나이에 마약과 폭력에 노출되기 때문이다. 저소득층 주택 문제와 열악한 주변 환경 등은 갱이 존재하고 번성할 수 있는 이상적인 조건이다.

때로는 갱단의 신입 단원은 호된 "신고식"을 치러야 하기도 한다. 나머지 단원들이 신입 단원의 충성심을 시험하기 위해 신입 단원을 엄청나게 때린다. 또한 신입 단원은 갱단에 입단하기 위해 때때로 강도, 강간, 살인을 해야 하는 경우도 있다.

일단 입단을 하면 갱단 생활을 그만두는 방법은 두 가지가 있다. 한 가지는 죽는 것이다. 다른 방법은 갱단을 떠나는 것인데, 갱단을 떠난다는 것은 다른 단원들로부터 사형 선고를 받는 것이나 다름없다.

갱단 단원들은 아주 어린 나이에 죽는다. 생활방식 때문에 도덕성은 무시된다. 폭력적인 범죄 행위도 금기가 되진 않는다. 사실, 폭력은 종종 갱단 내에서 명예와 명성을 얻는 방법으로 여겨진다.

F **1.** (C) **2.** (C) **3.** (D) **4.** (A)

[1]mass produced items / [2]middle class / [3]locally produced materials

미국 장인 양식

미국 장인 양식은 디자인의 일종이다. 이것은 1900년부터 1930년대까지 인기를 끌었다. 이로 인해 미국의 건축 양식에 변화가 일어났다.

장인 양식은 원래 유럽에서 생겨났다. 1860년대에 영국 미술공예 양식 운동이 일어났다. 이 운동의 독특한 디자인들은 일반인들의 품위를 높이고자 했다. 대량 생산된 제품에 비해 수공으로 만든 제품들이 더 나은 것으로 여겨졌기 때문에 수제품을 선호했다. 하지만 영국 양식은 여전히 빅토리아식이었다. 이 양식은 여전히 가장 부유한 고객만 상대했다.

1897년에 일련의 보스톤 건축가들이 미국에 수제 양식을 소개했다. 그들은 수제품 전시회를 계획했는데, 엄청난 성공을 거두었다. 여기에서 그들은 잠재성을 깨닫고 1897년 6월 28일에 미술공예협회를 설립했다. 이 협회의 슬로건은 "보다 수준 높은 수공예품의 표준을 개발하고 장려하자"였다.

미국 양식은 빅토리아 시대가 끝나가고 있을 때 시작되었다. 미국 양식은 수제품을 강조했다. 독창성과 단순성이 높게 평가 받았다. 그 지역에서 나는 재료와 수제품의 품질이 매우 중요했다. 이러한 특징은 중류층의 소박한 집을 우아하게 만들기 위한 것이었다.

이러한 간결한 공예품들은 그 지역에서 나는 유리와 나무를 사용했다. 이 공예품들은 또한 매우 우아했다. 금속제품은 빅토리아 시대의 풍요함에 대한 반발이었다. 대량 생산하는 주거 용품의 증가를 거부했다. 미국 장인 양식은 깨끗한 선과 견고한 구조를 사용했다. 가능한 경우 이러한 주택들에는 항상 천연재료를 사용했다.

이 양식은 평균적인 미국 가정에 많은 변화를 가져왔다. 하인이 없는 가족을 위해 새로운 디자인들이 만들어졌다. 이것은 새로운 중류층의 특징이었다. 부엌이 숨은 공간에서 열린 공간으로 바뀌었다. 또 다른 변화는 간이식사 코너이다. 이 새로운 공간은 어느 때고 가족들이 한데 모일 수 있는 공간이 되었다.

또한, 세이커 앤 미션 디자인도 장인 양식에 영감을 주었다. 미국 장인 양식은 1930년대의 아르데코 운동을 낳았다.

Building Summary Skills

1. Monarchy in Europe

Monarchy is a form of [1]government in which there is [2]a single ruler. Some forms of monarchy are symbolic, absolute, and constitutional. In a symbolic monarchy, the ruler has [3]no power. In an absolute monarchy, the ruler has [4]total power. In a constitutional monarchy, the ruler must follow [5]the laws of the constitution.

2. Alternative Energy Sources

[1]Fossil fuels cause many problems, such as [2]pollution and wars. But [3]solar cell technology is not currently advanced enough to replace fossil fuels. Many proponents say societies should adopt the [4]soft energy path. This is a plan for reducing [5]fossil fuel consumption while adopting new clean energy technologies as they emerge. Some countries are already adopting the soft energy path.

3. The History of Australian Rules Football

[1]Australian Rules Football is a popular game in Australia. It was created by [2]Tom Wills in [3]1858. The game went through many steps before it became popular. It is played between two teams of 18 on [4]a cricket field. A goal is worth [5]six points, and a "behind" is worth one point.

4. The Human Genome Project

The Human Genome Project is an important effort to [1]identify and sequence the human genome. After working on it for over [2]fifteen years, the project is still [3]incomplete. But this project is so important that it must be completed. Once completed, [4]knowledge of the genome will lead to many advances in [5]medicine.

5. Gangs and Violence

Many young people from [1]poor homes join street gangs. The gangs offer them [2]a violent and short life. The life of a gang member is filled with [3]crime and drugs. The only way to escape the gang lifestyle is to [4]die or desert the gang forever. The gang lifestyle ignores [5]morality.

6. The American Craftsman Style

The American Craftsman style was the American version of [1]the British Arts and Crafts Movement. It was brought to North America by [2]prominent architects. This movement sought to create a [3]unique, simple, and elegant American style of home. It introduced many design changes to [4]middle-class homes of the time. This style [5]influenced a later style as well.

Mini TOEFL iBT

1. (B) **2.** (B) **3.** (A) **4.** (D) **5.** (C)
6. The Great Man Argument (A), (D), (F) /
The Black Plague Theory (B), (E)
7. (B) **8.** (D) **9.** (C) **10.** (C) **11.** (A) **12.** (B)

이탈리아 르네상스 미술

르네상스는 유럽 역사의 한 시대를 말한다. 르네상스는 중세 이후부터 종교개혁 이전까지의 시기이다. 이 시기는 대략 14세기부터 16세기 정도에 해당된다.

르네상스는 예술 분야의 새로운 기술을 특징으로 한다. 이탈리아는 이러한 변화가 집중적으로 일어난 곳으로, 피렌체는 이러한 계몽기의 중심지가 되었다. 피렌체의 문화는 고전적이었다. 예술가들은 아테네와 로마의 공화주의적 이상을 재현하고 싶어했다.

루첼라이는 자신이 위대한 시대에 살고 있다고 썼다. 레오나르도 브루니의 〈피렌체 찬가〉도 비슷한 느낌을 표현했다.

이 시기에는 조각도 크게 발전했다. 조각가들은 고전적 주제와 함께 로마 모델을 사용했다. 인간의 존엄성을 담은 누드상들이 넘쳐났다.

회화 역시 번성했다. 지오토와 프라 안젤리코 같은 화가들이 엄청난 발전을 이루어냈다. 교회가 이러한 화가들의 주요 고객이었던 탓에 회화는 주로 종교적 주제를 다루었다. 하지만 단순히 형상을 묘사한 그림도 있었다.

정상적인 주제는 종종 신화적 또는 종교적 표현을 통해 이루어졌다. 예를 들어, 때로 화가들은 남녀 누드를 표현하기 위해 아담과 이브라는 성서적 인물을 사용했다. 이렇게 하면 누드화도 도덕적으로 용납이 되었다. 무화과 잎을 사용해 성기 부분을 가렸다.

원근법의 사용 역시 눈에 띄었다. 이 때에서야 처음으로 회화가 세상을 보는 창으로 여겨졌다. 그래서 건축도 보다 현실적인 면이 가미되었다. 화가들은 보다 통일된 구도를 사용하게 되었다.

인쇄 기술도 이 시기에 등장했다. 플라톤과 아리스토텔레스가 지은 많은 인본주의 철학서가 출판되고 읽혀졌다. 이로 인해 르네상스의 지적 분위기가 마련되었다.

르네상스가 일어나게 된 데에는 여러 가지 요인들이 작용했다. 한 가지 이론은 막강한 메디치가로 인해 르네상스가 일어났다는 것이다. 이 가문은 피렌체의 많은 예술가들을 후원했다. 하지만 비평가들은 메디치가가 권력을 잡기 전인 1400년대 초기에 르네상스가 일어났다고 주장한다.

또 다른 이론은 위인론이라고 불린다. 이 이론에 따르면 개개인의 천재가 이 위대한 시기를 낳았다는 것이다. 도나텔로와 브루넬레스키와 같은 위대한 예술가들이 촉매 역할을 했다. 피렌체의 화가들은 레오나르도 다 빈치와 미켈란젤로의 도움을 받았다. 하지만 이러한 순환성 주장은 왜 이러한 천재들이 다른 시대의 천재들과는 달랐는지를 설명해 주지는 못한다.

또 다른 주장은 흑사병 이론이다. 14세기에 흑사병으로 유럽 전체 인구의 3분의 1 이상이 죽었다. 가난한 사람들뿐만 아니라 왕과 성직자들도 흑사병으로 사망했다. 기독교 신앙이 이러한 천벌로부터 이느 누구도 지켜주지 못했다. 이로 인해 기독교적 세계관이 흔들렸다. 사람들은 내세보다는 현세에 대해 더 많이 생각하기 시작했다.

프랑스혁명

프랑스혁명은 서양 문화사에서 중요한 시기였다. 이 시기 동안 프랑스의 절대군주제는 공화제로 바뀌었다. 카톨릭 교회는 많은 권력을 포기해야 했다

프랑스는 혁명이 끝나고도 75년 동안 공화제와 제국, 군주제 사이를 왔다 갔다 했다. 하지만 프랑스혁명은 민주주의 시대의 주요한 전환기였다.

여러 가지 정치적, 사회적, 경제적 요인들로 인해 혁명이 일어났다. 이전의 많은 지배자들이 자신들의 경직성으로 인해 몰락했다. 신흥 중류층이 노동자 계급, 빈민층과 손을 잡았다. 이들은 계몽주의의 영향을 받았다.

혁명이 일어나기 전 여러 달 동안 식량이 부족했다. 빵 값이 매우 비싸 노동자들은 빵을 사 먹을 수도 없었다. 실업이 만연했다. 도둑질을 하다가 잡힌 사람들은 단두대의 이슬로 사라지는 위험을 감수해야 했다. 루이 16세는 이러한 문제를 효과적으로 해결하지 못했다.

혁명이 진행되면서 루이 16세는 고관들과 싸워 많은 유혈사태가 발생했다. 국가의 부채는 통제 불능 상태였고 세금은 너무 높았다.

이 즈음에 루이 16세는 국민의회를 해산하려고 했다. 그래서 국민의회는 테니스장에서 회의를 열고 프랑스에 헌법이 생길 때까지 휴회하지 않기로 맹약했다.

1789년 7월 11일 루이 16세는 개혁주의자인 총리 네커를 추방하려 했다. 많은 파리 시민들이 폭동에 가담했다. 7월 14일 그들은 바스티유 감옥으로 몰려가 수비대장을 살해했다. 그들은 죄수들을 풀어주고 파리 시장을 죽였다. 공포에 질린 왕은 백성들에게 헌법을 허락하겠다는 협정에 서명했다. 이로 인해 왕은 얼마간 목숨을 부지할 수 있었다.

혁명의 슬로건은 "자유, 평등, 우애, 아니면 죽음"이었다. 이 슬로건은 아직까지도 사용된다. 억압적 정부를 타도하려는 시도에서 사람들이 부르짖는 구호가 되었다.

프랑스 귀족도 안전하지 않았다. 일부는 프랑스를 떠났고 일부는 하인의 옷을 입고 변장을 하기도 했다. 많은 변화들이 일어났다. 도시에서는 무거운 세금을 거둘 수 없게 되었고 교회도 권력과 토지를 잃었다.

1793년 루이 16세는 사형을 선고 받았다. 그는 대중의 자유와 안전에 반하는 음모죄를 언도 받았다. 1월 21일 그는 단두대에서 참수되었다. 10월 16일 마리 앙트와네트 왕비가 그의 뒤를 따랐다.

1795년 새 헌법이 인준되었다. 이 헌법에 따라 집정내각이라고 하는 새 입법부가 만들어졌다. 입법부는 500명의 대표로 구성되었다. 이 시기 동안 나폴레옹 보나파르트라고 하는 장군이 엄청난 권력을 쥐었다. 그는 1799년에 쿠데타를 일으켰고 5년 뒤 스스로 황제가 되었다. 이로 인해 프랑스혁명의 공화정 시기가 막을 내리게 되었다.

Vocabulary Review

A

1. (B) 2. (D) 3. (C) 4. (D)
5. (B) 6. (A) 7. (C) 8. (B)

B

1. h 2. c 3. a 4. i 5. g
6. j 7. d 8. b 9. f 10. e

Unit 2 Reference

Skill & Drill

1. (B)

안개의 형성

안개는 구름이 지면과 닿을 때 생긴다. 안개는 지면과 접촉한다는 점에서 다른 구름과는 다르다. 대부분의 안개는 지면에서의 상대습도가 100%에 도달할 때 생긴다. 안개는 갑자기 만들어진다. 안개는 기온이 이슬점의 어느 쪽에 있는지에 따라 만들어지는 속도만큼 빠르게 흩어지기도 한다. 안개에는 증발안개와 강우안개가 있다. 강우안개는 수분이 방출되면서 생기고 증발안개는 수분이 재빨리 수증기로 바뀌면서 만들어진다.

지구상에서 가장 안개가 심한 지역은 캐나다 뉴펀드랜드의 그랜드 뱅크스이다. 이 지역에는 북쪽에서 오는 레브라도 해류와 남쪽에서 오는 훨씬 더 따뜻한 걸프 해류가 만나면서 안개가 자주 낀다.

2. (A)

잠자리

잠자리는 시야가 360도나 되는 커다란 다면체의 눈을 가진 곤충이다. 잠자리는 두 쌍의 튼튼한 투명 날개와 확 뻗은 몸을 가지고 있다.

잠자리는 대부분 모기, 파리, 그리고 다른 작은 곤충을 잡아먹는다. 잠자리가 이러한 곤충들을 잡아먹기 때문에 많은 사람들이 잠자리를 좋아한다. 잠자리는 호수, 연못, 시내, 습지 근처에 산다. 약충이라고 하는 잠자리의 유충은 수생이다.

알에서부터 어미 잠자리로 죽기까지 잠자리의 일생은 이삿 달에서부터 길게는 6~7년이 되기도 한다. 잠자리는 일생을 대부분 유충 상태에서 보낸다. 이 유충 상태 동안은 아가미를 이용해 호흡을 하며 올챙이나 물고기를 잡아먹는다.

3. (B)

생태학

생태학이란 서식지에 분포하는 생물을 다루는 학문이다. 생태학에서는 생물이 왜 어떤 특정 지역에 분포하며 한 장소에 얼마나 많은 종이 생존할 수 있는지를 연구한다. 또한 한 종의 다른 종들과의 상호작용도 연구한다.

생물의 환경에는 여러 가지 물리적 요소가 포함된다. 햇빛이나 기후 같은 것이 그 예다. 지질도 또 다른 요소이다. 서식지를 공유하는 다른 생물도 또 다른 요소가 된다.

생태학은 범위가 넓다. 한 가지 분야가 행동생태학이다. 이 학문은 어떤 한 생물체가 주기지에 적응하는 방법을 다룬다. 개체군생태학은 한 종을 다룬다. 이 외에도 생태학에는 여러 분야가 있다.

4. (C)

가설

가설이란 과학으로 입증되지 않은 현상에 대한 설명을 내놓는 것이다. 가설은 두 가지 이상 되는 현상간의 관계를 논리적으로 그럴듯하게 설명한다. 과학자들은 관찰이나 이론에 가설의 기초를 둔다.

과학적 방법은 누구라도 가설을 시험할 수 있어야 한다. 과학계의 많은 이들이 가설은 부정 가능해야 한다고 요구한다. 다시 말해, 가설은 틀린 것으로 밝혀질 수도 있다.

잘 알려진 한 가지 가설은 한 남자가 새로운 나라에 가서 흰 양만 본다고 가정하는 것이다. 그는 이 나라에 있는 모든 양이 하얗다는 가설을 세운다. 그러나 한 마리의 검은 양이 보이면 그 가설은 틀렸다는 게 증명될 것이다.

5. (B)

뉴턴의 운동 법칙

뉴턴의 운동 법칙은 세 가지 물리 법칙이다. 제1법칙을 이해하기 위해서는 식탁 위에 있는 사과를 떠올려보라. 만약 손과 같은 어떤 힘이 사과를 민다면 사과는 관성이 생겨 움직일 것이다.

제2법칙의 경우는 똑같은 사과를 손으로 아주 천천히 약간씩만 움직이게 밀고 있는 모습을 상상해 보라. 만약 손에 점점 더 힘을 많이 주게 되면 사과는 그 방향으로 진행해 사과에 가해진 운동량으로 벽에 부딪칠 것이다.

뉴턴의 제3법칙은 사과가 벽을 미는 반작용에 관한 법칙이다. 모든 작용

에는 반대 방향으로 동일한 크기의 반작용이 생긴다. 이 경우 반작용은 벽을 움푹 들어가게 만들거나 사과가 터지는 현상으로 나타날 수 있다.

6. (B)

생물계

1735년에 카롤루스 린내우스는 생물계에 대한 책을 발표했다. 책에서 그는 생물을 동물계와 식물계의 두 가지로 분류했다. 지구상의 모든 것은 동물 아니면 식물에 해당되었다. 나중에 그는 세 번째로 광물계를 만들었다.

수 년이 지나자 박테리아가 발견되었다. 생물학자들은 박테리아가 이 세 가지 분류 중 어디에도 속하지 않는다는 것을 알게 되었다. 이 부류는 모네라계라고 명명되었다.

과학이 진보를 거듭해 생물에 대해 더 많은 것을 알게 되면서 새로운 계가 필요해졌다. 1969년 로버트 휘태커는 다섯 번째 계를 발견했다. 그는 이 계를 균류라 명명했다. 1980년경 또 다른 계가 명명되었는데, 이것은 미생물을 더 분류하기 위한 것이었다.

Practice with Long Passages

A **1.** (A) **2.** (B) **3.** (C) **4.** (D)

[1]El Nino / [2]La Nina

엘니뇨와 라니냐

엘니뇨와 라니냐는 전 지구적으로 해양과 대기 사이에서 발생하는 현상이다. 이 현상들은 열대 태평양의 표층수에 생기는 커다란 기온 변화를 이른다. 엘니뇨는 0.5℃ 이상의 온도 상승을 말하며 라니냐는 동일한 정도의 온도 하강을 말한다. 이러한 온도 변화가 엘니뇨나 라니냐라고 불리기 위해서는 다섯 달 이상의 기간 동안 유지되어야 한다.

이러한 기후 변화의 영향을 받는 많은 국가들이 남아메리카와 아프리카에 있는 제3세계 국가들이다. 이 국가들의 경제는 대부분 농업과 어업에 의존한다. 이 산업들은 식량, 고용, 국제 무역 등의 주요 원천이 된다. 그래서 이러한 기후 변화를 예측할 수 있는 새로운 방법이 개발되면 이 국가들에 사회경제적으로 큰 도움이 될 것이다.

엘니뇨/라니냐 현상은 보통 불규칙적으로 일어난다. 최근에는 매 2~7년마다 일어났다. 대부분 지속 기간이 1년에서 2년 정도이다. 엘니뇨는 매우 광범위한 지역에 영향을 미친다. 많은 장소에서 정상적인 기후와는 반대되는 날씨를 경험하게 된다. 어떤 지역에서는 엄청난 강우로 인해 무시무시한 홍수가 나기도 한다. 또한 가뭄이 극심해져서 산불도 많이 발생한다. 그런가 하면 라니냐의 효과는 세계적으로 나타나기 시작한다. 라니냐 동안에는 무역풍이 매우 세져서 정상적 수온보다 차가운 물이 태평양 중부와 동부에 비정상적으로 몰리게 된다.

해양 대기 시스템의 정상적인 태평양 패턴은 적도풍이 한 방향으로 불면서 따뜻한 물이 서쪽으로 모이게 된다. 차가운 물은 남아메리카 해안을 따라 융기한다. 어류는 영양분이 풍부한 저온의 물을 따라 움직이기 때문에 해안으로 이동해 이 지역의 어업 경제를 활성화시키게 된다.

엘니뇨가 발생할 때는 따뜻한 물이 남아메리카 해안으로 이동한다. 저온수의 융기가 없어 수온이 올라간다. 따라서 어류는 해안을 따라 움직이는 대신 바다로 나간다. 이러한 상황은 이 지역 어업 경제에 심각한 타격을 가한다.

엘니뇨와 라니냐의 원인은 여전히 밝혀지지 않았다. 그러나 많은 과학자들이 이 전 지구적 기상 현상을 더 잘 이해하기 위해 헌신하고 있다.

B **1.** (B) **2.** (C) **3.** (B) **4.** (C)

[1]Threats / [2]Effects / [3]Decline

생물다양성의 감소

생물다양성이란 한 지역에 서식하는 생물의 범위를 이른다. 지난 100년간, 과학자들은 생물다양성이 엄청나게 줄어든 것을 목격했다. 이것은 지구의 수호자인 인간에게 엄청난 손실을 의미한다.

일부 연구에 따르면 지구상에 존재하는 종 가운데 8분의 1이 멸종 위기에 처했다고 한다. 매년 약 14만 종의 식물이 사라지고 있는 것으로 추정된다. 이렇게 사라진 식물들 가운데 상당수가 신약 개발과 질병 퇴치에 매우 유용하게 쓰일 수 있는 것들이었다. 이런 현상은 지속불가능한 생태학적 관행들 때문에 일어나게 된다.

지난 1,000년간 멸종된 생물의 대부분이 인간 때문에 멸종되었다. 주된 이유는 열대우림을 파괴했기 때문이다. 열대 서식지는 목초지나 농경지, 과수원 등으로 바뀌고 있다. 자연 파괴 행위의 대부분은 소를 위한 목초지를 만들기 위해서 행해졌다. 또한 인간이 먹을 과일을 얻거나 빵을 만들 밀을 키우기 위해서도 이런 파괴 행위가 일어났다.

외래종을 들여오는 것도 또 다른 위험이 된다. 외래종을 어떤 서식지로 들여오게 되면 이들은 자급적 개체군을 형성하려고 한다. 그래서 그 지역의 종들을 위험하게 된다. 이런 외래종들은 포식자나 기생생물이 되기도 한다. 또는 공격적이 되는 수도 있다. 이들은 자생종에게서 양분을 뺏어간다. 자생종은 진화할 기회를 갖지 못했기 때문에 방어기전이 없는 경우가 많다. 자생종은 외래종에 대해 경쟁 상대가 되지 않는다.

전 세계적으로 다양한 생물종이 풍부하게 존재하는 것은 경계가 있기 때문이다. 주요 경계는 바다와 해양이다. 자연적인 방법으로는 절대 이 경계를 넘을 수 없다. 하지만 인간이 배와 비행기를 발명한 이래로 종들이 서로 만나는 일이 가능해졌다. 이 종들은 적응할 시간도 없지만 인간은 계속해서 다른 지역으로부터 여러 종을 들여오고 있다. 지구의 생태계는 공격성이 강한 극소수의 슈퍼 종들의 차지가 될 것이다.

문제를 해결하기 위해서는 소비를 최소한으로 줄여야 한다. 소고기 그리고 자연 환경에 해를 미치는 다른 제품들의 소비를 줄여야 한다. 또한 정부는 자연 서식지를 파괴하고 외래종을 들여오는 행위에 대해 엄격한 규제를 해야 한다.

C **1.** (C) **2.** (A) **3.** (B) **4.** (B)

[1]electricity / [2]nuclear power / [3]the Rance Tidal Power Plant

조력발전소

조력발전은 전기를 만드는 한 가지 방법이다. 조력발전 시스템에서는 조수가 움직일 때 엄청난 양의 물 안에 있는 에너지를 포획한다. 이 방법의 생태학적 효과는 아직도 연구가 진행 중이기 때문에 전 세계적으로 조력발전소는 소수에 불과하다. 하지만 많은 국가들이 점점 더 많은 조력발전소 건설 계획을 세우고 있다. 현재로서는 미국, 멕시코, 캐나다에 8개의 조력발전소가 세워질 계획이다.

랑스조력발전소는 조력 에너지를 사용한 세계 최초의 발전소이다. 이 발

전소는 프랑스 브레타뉴 지역의 랑스강에 위치해 있다. 이 발전소를 건설하기 위해 주변 지역에 배수 설비를 해야 했다. 2년에 걸쳐 두 개의 댐이 건설되었다.

실제 발전소 건설은 1963년 7월 20일에 시작되었다. 이 때 랑스강은 두 개의 댐에 의해 완전히 막힌 상태였다. 발전소는 1966년 완공되었다. 1967년 12월 4일 프랑스 전국 전력망과 연결되었다. 발전소 건설 비용은 5억 2천 4백만 유로였다. 이 발전소는 브레타뉴 지역에서 소비하는 전력의 3%를 생산한다. 이 프로젝트는 엄청난 비용이 들었지만 그럴 만한 가치가 있었다. 이 곳에서 생산되는 전력이 원자력 발전소의 전력에 비해 비용이 훨씬 저렴하기 때문이다.

이 발전소의 댐 때문에 랑스강의 생태계에 전접 더 많은 참니가 쌓였다. 앙미리와 가자미가 멸종되었다. 하지만 농어와 오징어는 강으로 돌아왔다. 여전히 강어귀에는 조수가 흐르고 있다. 발전소 관리자들은 생태계에 미치는 영향을 최소화하기 위해 지금도 노력하고 있다.

북아메리카에 있는 최초이자 유일한 조력발전소는 안나폴리스 로열 조력발전소이다. 이 발전소는 캐나다의 안나폴리스 로열에 위치해 있다. 이 발전소는 지옴에는 전력 생산의 대안으로 1984년 건설되었다. 하지만 그 지역 환경에도 변화를 주었다. 그 지역의 수온과 기온에 변화가 생겼다. 뿐만 아니라 강의 참니 패턴도 바뀌어서 댐 양쪽에 있는 강둑이 커졌다.

D 1. C 2. B 3. A 4. A
[1]Largest lizard / [2]Indonesian islands / [3]6,000

코모도도마뱀

코모도도마뱀은 세계에서 가장 큰 도마뱀이다. 평균 2~3미터까지 자란다. 야생 상태에서 다 자라 어미가 된 경우 70kg까지 나간다. 코모도도마뱀은 왕도마뱀과에 속한다.

코모도도마뱀은 인도네시아의 여러 섬에 서식한다. 이 도마뱀을 처음 목격한 것은 1910년 유럽인들이다. 자바 보고르의 동물학 박물관 관장인 피터 우웬스가 코모도도마뱀에 관한 논문을 발표하면서 이 도마뱀은 널리 알려지게 되었다. 1980년에는 이 동물을 보호하기 위해 코모도국립공원이 자금 지원을 받았다.

코모도도마뱀은 육식동물이다. 죽은 동물의 살을 좋아하긴 하지만 살아 있는 먹이를 사냥하기도 한다. 사냥을 할 때는 먹이에게 살금살금 다가간다. 그런 다음 순식간에 먹이를 공격한다. 사냥을 할 때 최고 시속은 20km에 이른다.

코모도도마뱀은 독이 있지는 않은 것으로 알려져 있지만 이빨에는 50종의 박테리아가 살고 있다. 이 도마뱀에게 물려 죽지 않는다고 해도 1주일 후면 치명적인 감염으로 죽게 된다. 그러면 이 사체는 코모도도마뱀의 먹이가 되는 것이다. 이 도마뱀은 사체의 냄새를 따라가 죽은 동물의 살을 뜯어먹는다.

이 도마뱀은 어릴 때 사용하는 큰 발톱이 있다. 이 발톱을 사용해 나무로 올라가 더 큰 코모도도마뱀으로부터 달아날 수 있다. 하지만 자라서는 이 발톱을 주로 무기로 사용한다.

코모도도마뱀의 먹이는 다양하다. 돼지에서부터 염소, 사슴, 물소 등이 포함된다. 덩치가 작은 다른 도마뱀도 잡아먹는 것이 야생에서 관찰되었다. 때로는 인간을 잡아먹거나 인간의 사체를 먹기도 한다. 지난 100년간 12명 이상이 코모도도마뱀의 먹이가 되었다.

코모도도마뱀은 취약종이다. 현재 살아있는 도마뱀 수는 약 6,000마리 정도이다. 짝짓기는 5월과 8월 사이에 일어나며 알은 9월에 낳는다. 암컷은 땅이나 나무의 움푹한 곳에 알을 낳는다. 이렇게 해야 알을 보호할 수 있기 때문이다. 한 번에 낳는 알의 수는 평균 20개 정도이다. 일단 태어나면 다 자라기까지는 약 5년이 걸린다. 수명은 최고 30년이다.

E 1. C 2. D 3. A 4. C
[1]Uses / [2]Risks

나노기술

나노기술은 새로운 분야의 응용과학이다. 나노기술은 나노 규모의 초소형 기계를 만들려는 시도에서 나왔다. 나노라는 것은 10^{-9}을 가리키는 단위이다. 이것은 아주 작은 것을 묘사하는 데 사용된다.

나노기술을 현재적으로 이용한 한 가지 예는 폴리머를 만드는 것이다. 폴리머는 분자 구조에 기초를 두고 있다. 또 다른 예로는 컴퓨터 칩 레이아웃의 설계이다. 이것은 표면 과학에 기초를 두고 있다.

나노 사이즈에서는 많은 물질의 특성이 변한다. 예를 들어, 구리는 불투명하지가 않고 투명해진다. 순금은 실온에서 액체 상태가 된다. 실리콘 같은 절연물질이 전도체가 된다. 이런 모든 활동은 많은 위험이 따른다.

나노입자들은 상태가 바뀌기 때문에 운동성이 증가한다. 또한 다른 물질과 반응할 가능성도 커진다. 나노입자가 인체 내로 들어가는 방법은 네 가지가 있다. 들이마시거나 삼키거나 피부를 통해 흡수하거나 주사를 놓는 것이다. 일단 이 입자가 체내로 들어가면 대단히 운동성이 커진다.

사실, 이러한 입자가 생물의 몸 속에서 반응하는 방식은 여전히 완벽하게 이해되지 못하고 있다. 하지만 과학자들은 이러한 미세 물체들이 방어세포에 지나친 부담을 주기 쉽다고 한다. 이것은 인체의 질병에 대한 방어력을 약화시킬 수 있다. 인간은 이 정도 크기의 입자에 대한 제어력을 잃기 쉽다. 이로 인해 대규모 전염병이 퍼져 사망에 이를 수도 있다.

나노기술에 대한 또 다른 우려는 환경적인 위험이다. 한 보고서에서는 회색의 끈적거리는 물질로 지구가 뒤덮일 가능성에 대해 자세히 다루고 있다. 이러한 사태는 제어되지 않은 미세로봇의 자기복제로 일어나게 된다. 이 로봇은 나노봇으로 불리며 자기 제어가 가능하다.

따라서, 과학자들은 나노봇을 만들어 선보이기 전에 훨씬 더 많은 자료를 수집해야 한다. 허가를 받은 과학자들만 안전한 실험을 하도록 법적인 규제를 마련해야 한다.

F 1. A 2. C 3. D 4. A
[1]November 11, 1933 / [2]May 11, 1934 /
[3]April 14, 1935

황진지대

황진지대는 미국 중부와 캐나다에서 발생한 연속적인 먼지 폭풍이었다. 이 현상은 1930년 중반과 후반에 발생했다. 원인은 극심한 가뭄과 부적절한 농사 기술이었다. 대평원의 땅을 일구는 과정에서 잔디를 없애버린 비옥한 토양이 노출되었다.

가뭄 동안 토양은 메마르게 되어 흙먼지로 변해 바람에 흩어졌다. 바람은 대규모의 검은 구름으로 이 흙먼지를 동쪽으로 이동시켰다. 이로 인해 시카고까지 하늘이 검게 보이는 현상이 나타났다. 마침내 먼지 구름이 대서양에 이르자 흙먼지는 사라졌다.

황진지대는 1934년에 시작해 1939년까지 계속되었다. 1933년 11월

11일 대단히 강력한 먼지 폭풍이 바싹 메마른 사우스 다코다의 농경지로부터 표토를 쓸어갔다. 이것은 그 해 있었던 끔찍한 먼지 폭풍 가운데 하나에 불과했다.

그러던 중 1934년 5월 11일 황진지대 최악의 폭풍 가운데 한 폭풍이 일어나 연 이틀간 계속된 강력한 폭풍으로 엄청난 양의 대평원의 표토를 쓸어가 버렸다. 다시 한번 시카고까지 먼지 구름이 불었고 이 먼지 구름은 마치 눈처럼 쏟아져 내렸다.

1935년 4월 14일은 블랙 선데이로 알려져 있다. 황진지대 내내 최악의 "검은 폭풍"이 일어났다. 이로 인해 막대한 피해가 발생하고 낮이 밤으로 바뀌었다. 목격자들의 얘기로는 어떤 지점에서는 불과 1.5미터 앞도 보이지 않았다고 한다.

밀 농사로 자생 잔디가 없었던 탓에 수백만 에이커에 이르는 땅의 표토가 쓸려 갔다. 엄청난 물소 떼가 예전처럼 자생 잔디에 양분을 공급해주지 못했다. 이러한 생태계의 재앙으로 텍사스, 아칸소, 오클라호마, 주변의 대평원 등으로부터 물소들이 다른 곳으로 빠져나갔기 때문이다. 50만 명 이상의 미국인들이 집을 잃었다. 이들의 상당수가 일자리를 찾아 서쪽으로 옮겨갔다. 이 사람들이 모두 오클라호마 출신은 아니었지만 이들을 "오키"라고 한다.

Building Summary Skills

1. El Nino and La Nina

El Nino and La Nina are major [1]temperature changes that affect a large portion of the world's climate. The economies of many nations in [2]South America and Africa are strongly affected by these climate changes. El Nino and La Nina occur [3]irregularly and can cause some damaging effects such as [4]drought, flooding, and forest fires. These changes also affect the [5]migratory patterns of fish, which affects the fishing industry. Scientists do not fully understand El Nino and La Nina yet, but they are studying them very closely.

2. The Decline of Biodiversity

[1]Biodiversity, which describes the range of [2]living things, has been declining rapidly over the past century. Many species of plants are becoming extinct because of [3]unsustainable environmental practices. Humans are the biggest cause of these environmental problems, mainly because they chop down so much of the [4]rain forests. Another threat to biodiversity is the introduction of [5]foreign species, which overtake local species. Humans need to take strong steps to stop the decline of biodiversity.

3. Tidal Power Plants

Tidal power plants are a method of [1]generating electricity through the power of [2]moving water and are gaining popularity around the world. The Rance Tidal Power Plant in France is the world's first power plant that uses this method. The construction of the Rance Tidal Power Plant took a lot of [3]time and money, but it has generated enough power to cover its costs. Tidal power plants do affect the [4]local ecosystem, and scientists are still studying how. The first and only tidal power plant in North America is in [5]Annapolis Royal in Canada.

4. The Komodo Dragon

Komodo dragons are the [1]largest living lizards in the world today. They live on [2]the islands of Indonesia. They eat meat, which they kill by a bite that [3]infects the prey and kills it over a period of days. Komodo dragons eat a wide range of other animals, including [4]their own species. Today, the [5]population of Komodo dragons is not very large.

5. Nanotechnology

[1]Nanotechnology is the risky science of building [2]microscopic machines. This technology could be very useful, but it is [3]unpredictable since the properties of many materials change at the microscopic level. Some scientists worry that machines this small could easily enter [4]human bodies and cause effects that nobody can predict. Another concern is that [5]self-replicating nanobots could damage the environment on a very large and unexpected scale. Experiments with nanotechnology should be done in a very cautious fashion as regulated by the government.

6. The Dust Bowl

The Dust Bowl was [1]a series of terrible storms in the 1930s that damaged the farming industries in [2]America and Canada. Farming was damaged because the fertile layer of topsoil was [3]blown away by powerful winds, leaving only [4]dusty, infertile ground. Some of these storms were so bad that the sky was turned black and no one could see the sun. Many farmers were made homeless by this [5]natural disaster and were forced to travel west looking for work.

Mini TOEFL iBT

1. (B) **2.** (D) **3.** (C) **4.** (C) **5.** (A) **6.** (B)
7. (A) **8.** (B) **9.** (A) **10.** (B) **11.** (D) **12.** (C)

기상학

기상학은 지구의 대기를 연구하는 학문 분야다. 기상학은 기상 변화에 초점을 두어 기상 현상을 예측하고 설명한다. 이러한 기상 현상은 기온, 기압, 수증기와 같이 대기 속에 존재하는 요소들에 의해 일어난다. 이러한 요소들은 상호작용을 해서 기후 패턴을 만든다.

기상학을 뜻하는 영어 단어 "meteorology"는 기원전 350년에 아리스토텔레스가 만들었다. 그는 최초로 물이 기화되는 과정을 관찰하고 기록했다. 그는 어떻게 뜨거운 태양이 물을 안개로 만들고 다음날 다시 땅으로 물이 내리앉는지를 관찰했다.

1607년 갈릴레오는 최초의 온도계를 만들었다. 몇 년이 지나 그의 조수는 최초의 기압계를 만들었다. 1648년경, 파스칼은 높이가 올라갈수록 기압이 떨어진다는 사실을 발견했다. 그는 또한 대기 위에는 진공상태가 있을 것이라고 추측했다.

1667년 로버트 후크는 풍속을 잴 수 있는 기구를 만들었다. 나중에 에드먼드 핼리는 선원들을 위해서 무역풍 지도를 그렸다. 그는 또 대기의 변화가 태양열에 의해서 일어난다고 추론했다.

20세기경, 과학 발달 덕분에 많은 기상 현상을 이해하게 되었다. 아마도 가장 중요한 사실은 어떻게 지구의 자전이 대기의 흐름에 영향을 미치는가 하는 것일 것이다. 이 대규모의 힘은 코리올리 효과라고 한다.

1904년 한 노르웨이 과학자는 자연법칙에 근거해 계산을 함으로써 날씨를 예상할 수 있다고 말했다. 이로 인해 현대 기상예보가 탄생했다.

1950년대에는 기상예보자들은 컴퓨터를 사용하기 시작했다. 이러한 초기의 기계들은 기상 실험에 도움이 되었다. 최초의 기상예보는 고온과 저온의 모델을 사용해 이루어졌다.

약 10년이 흘러 최초의 기상위성이 발사되었다. 이로 인해 전 세계적 기상 정보의 시대가 열렸다. 위성은 산불에서부터 엘니뇨에 이르기까지 모든 것을 연구하는 데 중요한 도구가 되었다. 위성 덕분에 과학자들은 지구를 멀리서 바라볼 수 있게 되었다.

요즘에는 기후 모델을 사용해 과거와 기상 자료를 비교한다. 과거의 자료들을 현재 상태와 서로 비교한다. 이를 통해 과학자들은 장기적 기후 변화를 연구할 수 있다. 지구온난화와 같은 현상도 보다 잘 이해하게 되었다. 현재는 강력한 새 슈퍼컴퓨터를 사용하고 있다. 이 컴퓨터 덕분에 움직이는 대기 모델도 만들 수 있게 되었다.

인력을 이용한 기상예보 방법도 많다. 이러한 방법은 기상예보자들의 기술과 판단에 의존한다. 이 방법의 대부분이 50% 이상의 정확도를 가진다.

이 기상예보의 시대에는 많은 사람들이 날씨에 관한 정보에 의존한다. 기상예보는 식량 생산의 성공률을 높인다. 또한 자연재앙이 닥쳤을 때 목숨을 구할 수도 있다. 기상을 예상하는 인간의 능력은 전례 없는 정확도를 자랑하는 수준으로까지 발전했다.

줄무늬다람쥐

지구는 수백만 종의 동물들로 뒤덮여 있으며 각 종은 미묘한 지구 생태계에서 중요한 생태적 지위를 차지하고 있다. 줄무늬다람쥐는 크기는 작지만 서식지의 건강 상태에 대단히 중요한 역할을 한다. 줄무늬다람쥐는 북아메리카와 아시아의 숲 속에 사는 작은 설치류다. 줄무늬다람쥐는 25종이 있다. 많은 종이 적갈색 털이 있으며 몸의 길이를 따라 흰색과 검정색의 줄무늬가 있다.

다른 많은 설치류와는 달리 줄무늬다람쥐는 일 년에 두 번 새끼를 낳는다. 첫 번째 시기는 2월에서 4월까지이고 두 번째 시기는 6월에서 8월까지이다. 줄무늬다람쥐는 한 배에 평균 네 마리를 낳지만 한 마리만 낳는 경우도 있고 최고 아홉 마리까지 낳기도 한다. 어미는 새끼들이 자라서 스스로 돌볼 능력이 생길 때까지 6주 동안 지하에 숨겨서 키운다. 이들의 천적으로는 고양이, 개, 독수리, 매, 여우, 코요테, 늑대 등이 있다. 야생에서 줄무늬다람쥐의 수명은 보통 1년 정도이지만 최고 5년까지 살기도 하는 것으로 알려지 있다.

짝짓기 시기는 예외이지만 줄무늬다람쥐는 대부분의 시간 동안 혼자서 집을 짓고 먹이를 찾고 포식자를 피해 몸을 숨긴다. 이들이 종종 먹이를 찾아 나무를 오르는 모습이 목격되곤 한다.

줄무늬다람쥐는 일반적으로 저장꾼이다. 이들은 긴긴 겨울 굶어 죽지 않고 동면을 하기 위해 봄과 여름 동안 견과류와 씨앗, 곤충, 딸기류 열매, 기타 식량들로 굴을 채운다. 다른 먹이로는 균류, 새 알, 곡식, 벌레 등이 있다.

줄무늬다람쥐의 가장 눈에 띄는 특징 중의 하나가 볼이다. 줄무늬다람쥐는 늘어뜨려 음식물을 채울 수 있는 주머니가 양쪽 볼에 하나씩 있다. 이 주머니를 다 채우면 한쪽 뺨이 줄무늬다람쥐의 머리만해진다. 이 능력 덕분에 줄무늬다람쥐는 쉽게 많은 양의 먹이를 굴로 운반할 수 있다.

줄무늬다람쥐는 몸집이 작은 다른 설치류 동물들과 마찬가지로 "유포 동물"로 알려져 있다. 이들은 씨앗, 균류, 다른 종류의 식물들을 유포한다. 종종 줄무늬다람쥐는 굴로 가져온 먹이를 남기 두거나 도중에 흘리기도 한다. 이 씨앗이 자라서 그 서식지에 있는 다른 동물들의 먹이가 되고 보금자리가 되기도 한다.

줄무늬다람쥐가 씨앗을 유포시키건 다른 동물의 먹이가 되건 간에 줄무늬다람쥐는 모든 서식지의 중요한 구성원이다. 이들은 자연 속에 존재하는 끊임없이 계속되는 순환의 아주 중요한 일부를 이룬다.

Vocabulary Review

A

1. (B) 2. (C) 3. (A) 4. (C)
5. (D) 6. (B) 7. (A) 8. (D)

B

1. d 2. i 3. e 4. b 5. a
6. c 7. j 8. f 9. h 10. g

Unit 3 Factual Information

Skill & Drill

1. (C)

의견

의견이란 소유자에게 중요한 의미를 갖는 어떤 것에 대한 생각이나 사고이다. 사실 의견이란 옳거나 그른 것을 입증할 수가 없다. 하지만 미국 연방대법원의 경우 "의견"은 다른 의미를 가진다. 법원의 경우 의견이란 판

결을 말한다. 판결은 미래의 법이 따를 방향을 제시하는 기능을 한다. 미연방대법원은 1971년 "로우 대 웨이드" 사건에서 판결을 내렸다. 낙태가 합법이라는 판결이었다. 이로 인해 미국의 임산부들이 낙태를 할 수 있게 되었다. 이것은 논쟁을 불러일으킨 판결의 예다. 이 판결이 내려지고 수 년간 이 판결의 효력은 지속되었다

2. (A)

퀼트 짜기

퀼트는 전통적으로 따뜻한 이불로서 침대를 덮는 데 사용되었다. 하지만 요즘에는 많은 퀼트 작품들이 공예작품으로 간주되어 벽에 걸려 전시용으로 쓰인다. 식민지 시대에는 대부분의 여자들이 천을 짜거나 옷을 만들며 시간을 보낼 수 있었다. 이러한 여성들은 모임을 만들어 수다를 떨곤 했다. 퀼트는 종종 결혼이나 출생과 같은 중요한 사건을 기념하기 위해 만들어졌다. 퀼트를 만드는 사람들은 퀼트에 중요한 날짜나 이름을 자수로 새겼다. 또한 옷이나 중요한 깃발을 퀼트로 만들어 역사적 문건을 만들기도 했다.

3. (D)

의약의 역사

1960년 선사시대 사람의 무덤 속에서 의약과 관련한 최초의 증거가 발견되었다. 시신 옆에는 8종의 식물이 있었다. 이 식물들은 모두 오늘날까지도 유익한 약재로 사용되고 있다. 전 세계적으로 의약은 지역에 따라 다르게 발전했다. 전통적인 중국 한의학에서는 의사가 몸을 따라 움직이는 기의 흐름을 변화시켜 치료를 한다. 인도에서는 정신과 육체, 영혼 사이의 조화를 회복해 치료를 한다. 서양 의학은 유럽에서 처음 발달했다. 의사들은 건강을 회복하기 위한 방법으로 주로 음식과 위생에 초점을 둔다. 이제 기술이 발달하고 세계가 점점 좁아지면서 의사들은 세계 각지 의약의 가장 좋은 면만을 취해 사용하고 있다.

4. (B)

출판물

출판물은 몇 가지로 구분된다. 신문, 뉴스잡지, 그리고 일반 잡지 등이다. 또한 무역 잡지나 취미 잡지도 있다. 마지막으로 사보, 개인 출판물, 온라인 뉴스, 블로그 등이 있다.

신문 기자들은 역피라미드 방식을 사용한다. 이 방식은 특집기사보다는 정성뉴스를 다룰 때 사용된다. 글로 쓴 정성뉴스 기사는 단어를 아껴 써야 하고 중요한 정보를 먼저 나열해야 한다. 공간이 충분치 않은 경우는 아래에서부터 기사 내용을 자른다. 특집기사는 이에 비해 좀 더 여유 있게 쓴다.

Practice with Long Passages

A **1.** (A) **2.** (B) **3.** (C) **4.** (D)

[1]long distances / [2]lighter than copper / [3]cheaper

광섬유

광섬유는 유리나 플라스틱으로 만들어진 가늘고 투명한 섬유이다. 광섬유는 광신호를 보내는 데 쓰인다. 광신호는 정보나 빛을 실어 나른다. 광섬유는 통신 시스템에서도 널리 이용된다.

광섬유와 광섬유의 쓰임에 대해 연구하는 것을 섬유광학이라고 한다. 광섬유는 완전내부반사라고 하는 원칙 때문에 빛을 보낸다. 이 원칙에 따르면 광섬유의 바깥 층이 중심보다 더 두껍기 때문에 빛이 광섬유를 통해 계속 반사되게 된다.

섬유광학의 역사는 빅토리아 시대에 영국에서 시작되었다. 그 당시 과학자들은 공공 분수의 물 흐름에 빛을 비추기 위해 완전내부반사 원리를 이용했다. 20세기 중반에는 의사들이 광섬유를 사용했다. 의사들은 위내시경이라는 기구를 만들었다. 이 기구를 이용해 환자의 위나 내장 속을 들여다볼 수 있게 되었다. 1977년 전화회사들이 광섬유 케이블을 사용하기 시작했다. 그들은 광섬유를 이용해 매우 먼 거리까지 전화 신호를 보낼 수 있게 되었다.

과거에는 동선을 사용해 전기 신호를 보냈다. 하지만 광섬유는 동선에 비해 몇 가지 장점이 있기 때문에 보다 널리 사용된다. 광섬유는 손실이 거의 없이 장거리로 신호를 보낼 수 있다. 또한 무게도 훨씬 가볍다. 불과 7kg의 광섬유로 20톤의 동선을 대체할 수 있다. 광섬유는 항공기에 매우 유용하게 쓰인다.

광섬유의 유일한 단점은 단거리 시에 생긴다. 광섬유는 적은 양을 사용할 경우 동선보다 훨씬 비싸다. 꼬기도 힘들고 신호와 함께 전력을 보낼 수도 없다.

오늘날과 같은 컴퓨터 시대에는 주파수 대역폭에 대한 필요성이 점점 커지고 있다. 광섬유는 장거리로 엄청난 양의 데이터를 보낼 수 있다. 섬유광학은 그 어느 때보다 유용하다.

B **1.** (C) **2.** (B) **3.** (B) **4.** (A)

[1]Boston Massacre / [2]Boston Tea Party / [3]Declaration of Independence

미국독립혁명

미국독립혁명으로 인해 영국의 미국 통치가 끝을 맺었다. 그 결과 1776년 미합중국이 탄생했다.

미국독립혁명은 사상의 변화와 함께 일어났다. 미국은 영국의 군주제를 못마땅해했다. 토머스 제퍼슨이나 사무엘 애덤스 같은 건국 시조들이 사고의 새 지평을 열었다. 전 계층의 사람들이 정부에 발언권을 갖기를 원했다. 부패는 가장 큰 죄악으로 비춰졌다. 시민적 미덕이 최대의 선으로 여겨졌다. 가족의 계급이 더 이상 한 사회에서 개인의 위치를 결정짓지 않았다.

혁명전쟁을 낳은 불만은 세 가지 사건과 관련이 있다. 첫 번째로 1765년 영국 의회는 인지조례를 통과시켰다. 종이 제품에 대한 이 세금은 미국에 주둔하고 있는 영국 군대에게 보다 많은 자금을 지원하기 위해 통과되었다. 식민지 주민들은 이미 영국군 주둔을 위한 세금을 지불하고 있었기 때문에 불만을 호소했다. 이로 인해 시위가 잇따르고 저항이 일어났다. 인지조례는 철회되었다.

두 번째 사건은 1767년에 일어났다. 의회에서 타운센드 제법을 통과시켰다. 이 법은 유리, 페인트, 종이와 같은 제품에 세금을 부과했다. 식민지 주민들은 이들 제품에 대한 불매 운동을 벌였다. 이전보다 많은 군대가 보스톤으로 왔고 폭력 사태가 발생했다. 영국 군대는 성난 군중들에게 총을 겨누었다. 그 결과 다섯 명의 시민 사망자가 발생했다. 이것을 보스톤 학살이라고 한다.

독립혁명을 낳은 세 번째 사건은 1773년에 일어났다. 영국 정부가 타운센드 제법을 철회했지만 차에 대한 세금은 그대로 남겨 두었다. 화가 난 보

스론 주민 일당이 영국 선박에 올랐다. 그들은 배에 실려 있던 모든 차를 항구에 던져버렸다. 이것을 보스톤 차 사건이라고 한다.

영국 정부와 미국 식민지 주민은 관계를 회복하지 못 했다. 1775년 렉싱턴에서 전쟁이 일어났다. 1776년 미국 독립 선언서가 통과되었다. 전쟁은 1781년에 끝이 났다. 영국은 미국으로부터 철수했다.

C 1. Ⓒ 2. Ⓓ 3. Ⓑ 4. Ⓐ
[1]the telegraph / [2]*New York Times* / [3]Yellow journalism

19세기의 미국 신문

1844년에는 전보가 널리 보급되었다. 이제 신문을 통해 먼 지역의 소식을 전해 들을 수 있게 되었다. 연합통신(AP, Associated Press)이라고 하는 뉴스통신사가 뉴스를 모으기 위해 출범했다. 미국 전역에 신선한 매일매일의 뉴스기사를 전하는 지역 신문들이 출간되었다. 하지만 뉴욕 시는 뉴스 산업의 중심지였다.

미 전역의 신문은 성장의 길로 들어섰다. 이런 현상은 1961년 남북전쟁이 일어날 때까지 계속되었다. 이 시기 동안 신문은 발전했다. 인쇄와 운송 기술이 완벽해졌고 보도도 훨씬 분명하고 신선해졌다. 사무엘 보울즈와 호레이스 그릴리 같은 논설 위원들이 다시 사설의 인기를 올려 놓았다. 그 당시 사설은 사람들의 눈 밖으로 멀려나 있던 상태였다. 대부분의 사람들은 사설이 정당의 정책을 선전하기 위한 도구라고 생각했다. 그릴리는 자신의 사설을 통해 노예제도에 대한 반대 목소리를 내는 주요인물로 부상했다.

1851년 헨리 J. 레이몬드는 〈뉴욕 타임즈〉를 발행했다. 이 신문은 다른 신문에 비해 한층 진보된 것이었다. 사람들은 그릴리의 〈뉴욕 트리뷴〉이 너무 정치적이라고 생각했다. 그런가 하면 제임스 G. 베닛의 〈뉴욕 헤럴드〉는 보기에 좋은 신문, 많은 부수가 팔리는 신문을 만드는 데에만 관심이 있었다. 하지만 〈뉴욕 타임즈〉는 인론의 고결함과 시각적 효과를 다 만족시켰다. 〈뉴욕 타임즈〉는 한 단계 높아진 훌륭한 신문이었다. 〈뉴욕 타임즈〉는 미국에서 가장 사랑 받는 신문이 되었다. 이것은 지금까지도 마찬가지다.

1895년경, 두 사람이 언론 제국을 지배했다. 조셉 풀리처와 윌리엄 랜돌프 허스트 두 사람 모두 전국 각지에 신문사를 보유하고 있었다. 뉴욕에서는 풀리처의 〈뉴욕 월드〉와 허스트의 〈뉴욕 저널〉이 독자를 끌기 위해 혈안이 되었다. 두 신문 다 범죄 이야기와 사망 기사에 초점을 맞추었다는 비난을 받았다. 사람들은 두 신문 다 너무 과장된 헤드라인을 고른다고 느꼈다. 두 신문사는 독자의 호기심을 끄는 데만 관심이 있었다. 이러한 현상은 "황색 저널리즘"이라고 불렸다. 여기에는 두 가지 이유가 있었다. 한 가지는 두 신문 다 옐로우 키드라고 하는 동일한 인물에 대한 만화를 실었다. 다른 이유는 비겁하거나 부정직한 것을 묘사할 때 사용하는 색깔이 노란색이었기 때문이다. 많은 사람들은 이 문제가 오늘날까지도 해결되지 않고 있다고 생각한다.

D 1. Ⓐ 2. Ⓒ 3. Ⓓ 4. Ⓑ
[1]Statue of Liberty / [2]Liberty Bell

자유의 여신상과 자유의 종

미국에는 미국이 소중히 여기는 자유의 이상을 상징하는 두 가지 기념물이 있다. 자유의 여신상과 자유의 종은 각기 다른 방식으로 자유를 상징한다. 자유의 여신상은 미국 땅을 밟는 이주민들에게 자유에 대한 희망을 불러 일으킨다. 자유의 종은 미국의 과거를 말해 주는 자유를 위한 투쟁을 기념하기 위한 것이다.

과거에는 배를 타고 미국에 들어올 때 가장 먼저 눈에 띄는 것이 자유의 여신상이었다. 이 조각상은 높이가 45m가 넘는다. 이 조각상은 프랑스가 1885년에 선물로 준 것이다. 날짜는 미국의 수립을 기념하기 위한 날을 선택했다.

조각상은 동으로 만들어졌다. 내부구조는 귀스타브 에펠이 디자인했는데, 파리에는 그의 이름을 딴 유명한 에펠탑이 있다. 이 조각상은 뉴욕항의 리버티 아일랜드에 있다. 그녀의 오른손에는 횃불이 쥐어져 있다. 이 횃불은 미국 전역에 자유의 길을 밝히기 위한 것이다. 왼손에는 1776년이라는 숫자가 새겨진 명판을 들고 있다. 이것은 미국이 영국으로부터 독립을 선언한 해를 기리기 위한 것이다. 조각상 안으로 들어갈 수도 있다. 많은 사람들이 머리와 횃불 속에 들어가 보기를 즐긴다.

자유의 종은 펜실베이니아 주의 필라델피아에 있는데, 1776년 7월 8일에 울린 것으로 유명하다. 이 종은 독립 선언서를 최초로 대중에게 낭독하려고 시민들을 불러모으기 위해 타종되었다. 또한 1774년 최초의 대륙회의의 시작을 선언하기 위해서도 이 종을 타종했다. 종 안에는 성서의 레위기 25장 10절이 새겨져 있다. 여기에는 "너희 땅에 사는 모든 이에게 자유를 선포할지니"라고 적혀 있다. 자유의 종은 1752년 처음 만들어졌다. 최초의 타종을 했을 당시인 1753년 그 유명한 균열이 생겼다.

1965년에는 FBI가 자유의 여신상과 자유의 종을 파괴하려던 테러리스트들의 계획을 밝혀냈다. 하지만 자유의 상징물들에 대한 이러한 공격 시도는 재빨리 차단되었다.

E 1. Ⓓ 2. Ⓐ 3. Ⓑ 4. Ⓒ
[1]Sulfur and nitrogen gases / [2]rivers, lakes, and streams / [3]acidity levels

산성비

산성비는 황과 질소 가스가 대기 중으로 방출될 때 생긴다. 화학물질은 일단 공중에 배출되면 비구름에 흡수된다. 오염된 물방울이 지구에 비, 눈, 진눈깨비 등의 형태로 떨어진다. 이것은 토양의 산성도를 증가시킨다. 또한 호수나 시내의 화학적 균형에도 영향을 미친다.

미국환경보호청은 산성비가 미국과 캐나다의 상당 부분에 영향을 미치는 심각한 문제라고 밝혔다. 산성비는 강과 시내, 호수, 숲에 피해를 입힌다.

산성비의 증가를 확인할 수 있는 가장 좋은 방법은 방학을 살펴보는 것이다. 과학자들은 산성도가 급격히 증가한 것을 확인할 수 있었다. 이러한 변화는 산업혁명 이후 계속되고 있다.

산업으로 인한 산성비는 중국, 동유럽, 러시아 등에서도 심각한 문제다. 이들 지역에서 바람이 불어가는 쪽에 위치한 한국이나 일본과 같은 지역도 피해를 입고 있다.

산성비는 영국 맨체스터에서 처음 보고되었다. 맨체스터는 영국 산업혁명의 주요 도시였다. 하지만 산성비는 1960년대 말까지 자세히 연구되지 않았다. 해롤드 하비라는 캐나다 과학자가 최초로 "죽은" 호수를 연구했다. 1990년대에 〈뉴욕 타임즈〉는 산성비의 효과에 대한 보고를 했다. 이로 인해 산성비에 대한 대중의 관심이 일기 시작했다.

산성비는 화산 폭발과 같은 자연 현상에 의해서 생기기도 한다. 하지만 산성비의 주된 원인은 화석 연료 연소와 공장들이다. 공장, 자동차, 발전 시설 등이 이러한 문제를 일으키는 주범이다.

산성비는 초류나 이끼, 곤충과 같은 다양한 동물들을 죽음에 이르게 한다. 또한 건물에도 피해를 준다. 인간의 건강에도 부정적인 영향을 주는 것으로 생각된다. 그뿐만 아니라 토양에도 피해를 미친다. 산성비는 농작물 경작을 어렵게 만들기도 한다.

과학자들은 산성비의 효과를 억전시킬 수 있는 방법을 찾고 잇다. 이러한 전 지구적 문제를 해결하려는 노력으로 여러 국제 협약이 체결되었다. 한 가지 협약이 "대기오염물질의 장거리 이동에 관한 협약"인데, 이는 대기 오염에 대해 인간이 사는 환경을 보호하기 위한 것이다.

F 1. (B) 2. (C) 3. (A) 4. (D)

[1]opener, headliner, and chaser / [2]movie theaters / [3]The Great Depression

보드빌

라디오, 영화, TV 등이 나오기 전에는 많은 사람들이 버라이어티 극장을 즐겨 찾았다. 미국에서는 이 오락 극장을 보드빌이라고 불렀다. "보드빌"이라는 말은 불어인 "voix de ville" 에서 나왔다. 이것은 "도시의 소리"라는 뜻이다. 5센트만 내면 공연을 즐길 수가 있었다. 인기 있는 공연으로는 음악, 희극, 마술, 동물 공연, 곡예, 심지어 강연도 있었다.

일반적인 보드빌 공연은 곡예나 묘기 자전거와 같은 우스꽝스러운 공연으로 시작되었다. 막간에 관객은 좀 늦게 도착해 좌석을 찾을 수도 있었다. 공연은 "인기배우"가 나오는 중간이 절정을 이루었다. 보통 이 부분이 공연 가운데 최고조였다. 공연은 "체이서" 공연으로 막을 내렸다. 이 부분은 못 볼 정도는 아니었지만 지루해하며 극장을 나서는 관객도 있었다.

1880년과 1920년 사이에 보드빌은 대단한 인기를 끌었다. 미국에서는 산업이 발달하고 있었다. 사람들은 유흥에 쓸 수 있는 돈이 더 많아졌다. 많은 극장들이 친절하고 가족 지향적으로 보이기 위해 대단한 노력을 기울였다. 그들은 중류층의 고객을 끌어들이려 했다. 공연가는 욕을 해서는 안 되었다. "제길(hell)" 같은 단어조차 입에 담아서는 안 되었다. 하지만 공연하는 사람들은 종종 규칙을 무시했는데, 이 때문에 관객은 즐거워했다.

성공한 극장주들은 그들의 극장이 화려하고 호화로워야 한다고 주장했다. 커튼과 의자를 최고급 레드 카펫으로 장식했다. 멋진 복장예품에 금박을 입혔다. 그들은 극장을 궁전처럼 보이게 만들었다. 그러면서도 그들은 저글링을 하는 개와 같은 우스꽝스러운 공연을 했다. 1890년 대쯤에 보드빌은 전성기를 맞았다. 보드빌은 교회나 학교와 같은 인기를 구가했다. 보드빌은 사람들이 모이기에 훌륭한 장소였다.

보드빌의 시대가 언제 막을 내렸는지는 정확하지 않다. 하지만 1910년 영화관이 문을 열었다. 이로 인해 사람들은 보다 저렴한 가격에 영화를 볼 수 있었다. 이로 인해 보드빌 관객은 꾸준히 줄어들었다. 아이러니컬 하게도 영화가 처음 상영된 것은 보드빌 극장에서였다. 1930년대쯤에는 미국에 대공황이 불어 닥치면서 보드빌은 자취를 감추었다.

미국의 많은 유명 영화배우와 TV 스타들이 보드빌 무대에서 시작했다. 쓰리 스투지스, 막스 브라더스, 버스터 키튼, 주디 갈랜드 등이 모두 보드빌 무대에서 데뷔했다.

Building Summary Skills

1. Optical Fiber

Optical fibers are made of [1]glass or plastic and are very useful for sending [2]light and information. The study of fiber optics has shown that light can be bounced continuously down an optical fiber. The concept behind optical fibers was discovered [3]in England and later adapted into [4]medical equipment. An optical fiber has many advantages over [5]copper cable. In this age of information, an optical fiber is very useful.

2. The American Revolution

The American Revolution was the war that ended [1]British rule over the colonies of North America and established [2]the United States as a country. The revolution began with a shift in ideology that was led by great men such as [3]Thomas Jefferson and Samuel Adams. Three main events led up to [4]the Revolutionary War. These events were the Stamp Act of 1765, the Townshend Acts of 1767, and [5]the Boston Tea Party in 1773. By 1781 the fighting ended, and the British withdrew from North America.

3. American Newspapers in the 19th Century

In the middle of the 1800s, the wide use of [1]the telegraph enabled newspapers to get reports from far away. This led to a new age of growth in [2]the newspaper industry. During this time, everything from [3]the writing and visual presentation to the delivery of newspapers improved. New York was the most competitive place, and the [4]*New York Times* emerged as the most respected newspaper in the country. Meanwhile, two newspaper owners, [5]William Randolph Hearst and Joseph Pulitzer, battled to win readers, giving rise to the unethical practice of yellow journalism.

4. The Statue of Liberty and the Liberty Bell

Two monuments are the best symbols of [1]America's ideal of freedom: the Statue of Liberty and the Liberty Bell. The Statue of Liberty was given to the United States by France as a gift in 1885 to mark [2]the 100-year birthday of the United States. It was designed by [3]Gustave Eiffel and stands about 45 meters tall in New York Harbor. The Liberty Bell is located in [4]Philadelphia, Pennsylvania, and was most famously rung on July 8, 1776, to announce the first public reading of [5]the Declaration of Independence. It has a crack which was made when it was rung for the first time.

5. Acid Rain

[1]Acid rain is a pollution problem caused by the release of [2]sulfur and nitrogen gases into the air. This problem has been observed in many [3]industrialized countries. Acid rain causes many problems such as [4]the poisoning of bodies of water, killing animals, damaging soil, and harming [5]the health of humans. Scientists are searching for ways to reduce this problem.

6. Vaudeville

Vaudeville was a form of [1]inexpensive live entertainment that was very popular in the United States in [2]the late 1800s and early 1900s. Vaudeville entertained the audience with [3]a variety of acts, including trained animals, acrobats, magic, comedy, musical performances, and lecturers. A typical vaudeville show began with an opener, peaked with [4]a headliner, and closed with a chaser. At the height of its popularity, vaudeville theaters were among the most popular places for people to gather. By the early 1900s, movie theaters and [5]the Great Depression caused vaudeville to disappear.

Mini TOEFL iBT

1. (B) **2.** (D) **3.** (B) **4.** (A) **5.** (C) **6.** (A)
7. (A) **8.** (C) **9.** (D) **10.** (A) **11.** (D) **12.** (C)

앤드류 잭슨 대통령

앤드류 잭슨은 미국의 일곱 번째 대통령이다. 그는 또한 플로리다 최초의 주지사였다. 잭슨은 매우 거친 군인으로 알려져 있다. 그는 딱딱한 나무의 이름을 따 "올드 히커리"라고 불렸다.

잭슨은 13세 때 미국 독립전쟁에서 영국군에 대항해 싸우기 위해 군에 입대했다. 영국군의 부츠를 닦아주길 거부한 탓에 그는 영국군에 의해 얼굴과 손에 상처를 입었다. 그 후로 그는 항상 영국인을 싫어했다. 고향으로 돌아왔을 때 어머니와 나머지 가족이 사망했다는 사실을 알았다.

1815년에 있었던 뉴올리언즈 전투에서 잭슨은 6,000명의 군사를 이끌고 12,000명의 영국군과 맞서 싸웠다. 미국은 승리를 거두었다. 잭슨의 군대는 겨우 8명의 사망자를 낸 데 비해 영국군의 피해는 2,000명에 달했다.

1817년에 잭슨은 플로리다에서 군대를 이끌고 스페인과 세미놀 인디언들과 전투를 벌였다. 그는 세미놀족을 격파했다. 이 승리로 스페인은 플로리다의 권력을 미국에게 넘겨 주어야 했다. 그는 최초의 플로리다 주지사로 임명되었다.

앤드류 잭슨은 1824년 대통령 선거에 출마했다. 토머스 제퍼슨처럼 많은 이들이 그가 대통령이 되기에는 너무 심한 무법자라고 생각했다. 잭슨은 선거에서 존 퀸시 애덤스에게 패했다. 1828년 선거에 잭슨은 재출마했다. 이번에는 애덤스를 꺾고 대통령이 되었다.

잭슨의 대통령직 수행에 있어 가장 논란의 대상이 되었던 부분이 미국 원주민들에 대한 처우였다. 1830년에 그는 "인디언 강제 이주법"을 제정했다. 이 당시 45,000명의 체로키 인디언들이 그들의 땅을 포기하고 서쪽으로 이동해야 한다. "눈물의 행로"라고 불린 행진에서 수천 명이 목숨을 잃었다. 한 역사가는 이 시기를 "미국 역사상 가장 불행했던 순간"이라고 불렀다.

1835년 1월 30일 리처드 로렌스가 잭슨 대통령 암살을 시도했다. 이 정신이상자는 잭슨에게 다가가 잭슨을 겨냥해 두 발을 발사했다. 총알은 빗나갔다. 그러자 잭슨은 들고 있던 지팡이로 로렌스를 내리쳤다.

앤드류 잭슨은 레이첼이라는 여자와 결혼했는데, 그녀가 첫 번째 남편과 이혼을 한 후였다. 그 후 많은 이들이 그녀를 욕했다. 잭슨은 아내의 명예를 위해 103번의 결투를 했다. 이 모든 결투에서 잭슨은 찰스 디킨슨이라는 한 사람만을 살해했다. 그는 잭슨의 아내를 모욕했고 그래서 둘은 결투를 하게 되었다. 디킨슨이 먼저 총을 쏘았다. 그의 총은 잭슨의 갈비뼈를 맞췄다. 그러자 잭슨이 총을 발사했고 디킨슨은 사망했다. 잭슨은 수많은 결투에서 생긴 이런저런 상처가 많이 있었다. 이 상처들은 일생 내내 그를 괴롭혔다. 그는 종종 피를 토하기도 했다. 그는 78세의 나이에 결핵과 심장마비로 사망했다.

아리스토텔레스와 고대 그리스의 과학 발전

서양 과학은 고대 그리스에서 비롯되었다. 아리스토텔레스는 이 시대의 위대한 사상가였다. 그가 최초의 과학자나 철학자는 아니었지만 가장 영향력이 큰 인물이었다. 그는 플라톤의 제자였고 알렉산더 대왕의 스승이었다.

18세에서 37세까지 그는 학생 신분을 유지했다. 그는 아카데미라고 불렸던 플라톤의 학교에 다녔다. 그리고는 몇 년 동안 여행을 했다. 여러 섬에서 생물학을 공부하기도 했다. 그러자 마케도니아의 필립 왕은 그를 불러들였다. 그는 자신의 아들인 알렉산더를 가르쳐 달라고 부탁했다. 소년은 13세였다. 수 년 후 알렉산더는 아리스토텔레스를 떠나 아시아 정복 길에 올랐다. 아리스토텔레스는 아테네로 돌아왔다. 그는 리케이온이라는 학교를 열어 학자들을 가르쳤다.

아리스토텔레스는 여러 가지 주제에 관한 책을 지었다. 그의 작품은 모든 주제를 망라한다. 그는 과학에서부터 예술에 이르기까지 모든 방면에 박식했다. 그의 저서 가운데 완벽한 상태로 남아 있는 것은 단 한 권도 없다. 하지만 아리스토텔레스의 연구는 서양 철학과 과학의 기초가 되었다.

아리스토텔레스는 오감을 통해 얻은 지식을 소중히 여겼다. 그는 감각과 대화법을 통해 진실을 추구했다. 이 대화법은 플라톤에서 비롯되었지만 아리스토텔레스를 거치면서 한층 발전했다. 아리스토텔레스의 대화법은 논리에 의존했다. 한 질문으로 다른 질문의 답을 하는 식이었다. 답들을 이용해 진리를 찾을 수도 있었다. 이러한 방법을 귀납법과 연역법이라고 한다.

아리스토텔레스의 논리에 기초를 둔 과학적 방법이 등장했다. 과학적 방법은 과학자들이 사용하는 과정이다. 첫 번째로 가설을 만든다. 그런 다음 실험으로 증명을 한다. 과학적 방법은 현대 서양 과학에서 가장 중요한 방법이다. 아리스토텔레스는 직접 많은 실험을 하지는 않았다. 하지만 그의 논리 체계를 이용해 다른 이들이 많은 것을 발견했다. 아이작 뉴턴과 갈릴레오도 이 과학적 방법을 사용했다. 그들의 발견도 아리스토텔레스의 영향을 받았다.

아리스토텔레스는 또한 범주라는 개념을 만들었다. 그는 가능한 모든 분야의 학문을 연구했다. 그런 다음 그 학문들을 여러 개의 그룹으로 나누었

다. 그는 동물학에서부터 지질학에 이르기까지 모든 주제를 두루 섭렵했다. 그의 저작은 그리스 지식의 엄청난 부분을 차지한다.

아리스토텔레스를 비판하는 사람들도 많다. 일부 학자들은 그가 여성을 존중하지 않았다고 생각한다. 어떤 이들은 거의 저작이 너무 혼란스럽다고 말한다. 그는 종종 자기 자신의 논리 규칙을 따르지 않는 것처럼 보이기도 한다. 실수가 없는 것으로 보였던 그의 저작을 중세 시대에는 백성을 억압하는 데 사용하기도 했다. 하지만 아리스토텔레스의 저서는 수천 년 간 인용되었다. 그의 연구는 현대사회를 받쳐주는 기둥이다.

Vocabulary Review

A 1. (B) 2. (C) 3. (D) 4. (A)
5. (B) 6. (A) 7. (C) 8. (A)

B 1. e 2. i 3. h 4. j 5. a
6. d 7. b 8. g 9. c 10. f

Unit 4 Negative Factual Information

Skill & Drill

1. (C)

모충

모충은 나비나 나방의 유충을 말한다. 모충은 몸이 길며 체절로 되어 있다. 몸은 부드럽다. 그렇기 때문에 많은 먹이를 먹고 풍선처럼 빠른 속도로 커질 수 있다. 모충은 번데기 상태로 들어가기 위해 엄청난 양을 먹어 치운다.

모든 곤충들처럼 모충은 입으로 호흡을 하지 않는다. 그들은 몸의 옆쪽을 따라 난 관을 통해 호흡을 한다. 시력이 매우 나쁘기 때문에 더듬이를 사용해 먹이를 찾는다.

모충은 새나 다른 동물로부터 자신을 방어하기 위한 여러 가지 방어기전이 있다. 모충의 몸은 위장에 능하다. 어떤 모충은 뱀이나 나뭇잎처럼 보이기도 한다. 어떤 모충은 독이 든 잎을 먹어 독성을 지닌다.

2. (B)

냉장고

인간의 일상생활을 바꾼 한 가지 발명품은 냉장고이다. 냉장고가 나오기 전에는 사람들이 매일매일 신선한 식량을 구하는 데 많은 시간을 썼다. 음식을 차게 유지하는 유일한 방법은 커다란 얼음 덩어리를 집으로 배달시키는 것이었다. 이것은 비용도 만만찮은 데다 불편하기 그지없었다.

최초의 가정용 냉장고가 등장한 것은 1911년의 일이다. 이 당시 냉장고는 새 차 가격의 거의 2배였다. 초기 모델은 너무 많은 공간을 차지했다. 때로는 방 두 개가 필요하기도 했다.

1927년경 제너럴 일렉트릭(GE)사에서 모니터 탑 냉장고를 선보였다. 이것은 널리 보급된 최초의 냉장고이며 오늘날까지도 사용되고 있다.

3. (A)

바람의 종류

바람은 지표면 위의 공기의 이동이다. 바람은 대기가 불균일하게 데워지기 때문에 발생한다. 바람에 영향을 미치는 두 가지 주요 요인은 적도와 극지방 간의 가열과 지구의 자전이다.

바람의 종류를 분류하는 한 가지 방법은 원인이 되는 힘에 따라서다. 무역풍이나 편서풍, 제트기류 등과 같은 탁월풍은 지구의 순환에 의해 일어난다. 종관풍은 온난전선과 한랭전선이 충돌해서 생긴다. 중간 규모의 바람은 뇌우에 의해 발생한다. 소규모의 바람은 갑자기 일어나는 매우 짧은 기간의 바람이다.

바람은 매일매일 우리의 생활과 지구를 변화시키는 가장 흔하면서도 강력한 힘이다.

4. (D)

벌새

벌새는 날개를 빠르게 퍼덕거려 공중에 떠 있을 수 있는 것으로 알려져 있다. 벌새는 초당 15번에서 80번 날개를 퍼덕거린다. 이 동작을 통해 꽃에서 꿀을 빨아먹으면서도 공중에 떠 있을 수가 있다. 날개로 벌과 비슷한 윙윙거리는 소리를 내기 때문에 벌새라는 이름이 붙었다.

꿀벌새는 세상에서 크기가 가장 작은 새로 1.8g이 나간다. 갈색벌새는 좀 더 전형적인 벌새로 3g이 나간다. 큰벌새는 24g이나 나간다.

벌새는 곤충을 제외하고 대사율이 가장 높다. 심장은 분당 1,260번 뛴다. 이런 심장 박동을 유지하기 위해서는 매일 자기 체중만큼의 먹이를 섭취해야 한다.

Practice with Long Passages

A 1. (B) 2. (D) 3. (B) 4. (A)
[1]photic zones / [2]mild wave action / [3]Threats

산호초

산호초는 충분한 태양빛이 물 속까지 들어가는 열대해의 유광층에서 자란다. 산호는 생존하기 위해 약간의 파도가 치는 곳에 서식해야 한다. 약한 파도는 산호를 부서지게 만들 정도로 세지는 않지만 물을 휘저어 먹이와 산소를 공급해 주기에는 충분하다.

산호초는 폴립이라는 작은 동물에서 나온 수백만 개의 뼈로 이루어져 있다. 폴립이 죽으면 파도와 물고기들이 뼈를 분해한다. 그러면 그 조각들이 산호에 떨어져 산호가 자라게 된다. 조류(藻類)는 뼈에 붙어 자라는데 뼈를 석회석으로 변화시킨다. 석회석은 산호 위에 쌓여 보호막을 형성한다. 조류는 얕고 깨끗한 물 속에서 가장 잘 자란다.

전 세계 산호의 대부분이 태평양과 인도양의 열대해에 서식하고 있다. 아프리카와 남북아메리카의 서쪽 해안에는 산호초가 거의 없다. 이것은 이 지역의 해류가 강하고 차기 때문이다.

산호초는 엄청나게 다양한 생물들에게 도움을 준다. 산호초는 많은 동물

과 식물 종들이 살 수 있는 서식지가 된다. 산호초가 없다면 이런 많은 종들이 멸종 위기에 처할 것이다.

현재 전 세계 산호에 몇 가지 위협이 되는 요소가 있다. 공장이나 농장에서 나오는 많은 오염물질들이 산호를 죽인다. 이 지역의 수질은 유독해서 산호초와 그 주변의 생물들을 죽게 만든다.

산호에 가해지는 또 다른 위협으로는 인간에 의한 과도하고 파괴적인 어업 활동을 들 수 있다. 관상용으로 키울 목적인 물고기를 잡는 많은 어부들이 물고기를 기절시키기 위해 시안화물을 사용한다. 이 때문에 잡힌 물고기의 수명도 단축되고 산호도 오염시키게 된다. 다이너마이트를 이용한 낚시법도 산호 생태계를 해치는 요인이 된다. 이 방법은 건강한 암초의 서식지가 되는 산호를 죽게 만든다. 많은 환경 보호 단체들이 전 세계의 산호초를 보호하기 위해 활발하게 활동하고 있다.

B 1. Ⓒ 2. Ⓓ 3. Ⓐ 4. Ⓑ

[1]assembly lines / [2]93 minutes / [3]315 million

대량 생산과 포드 자동차 모델 T

조립 라인에서 엄청난 양의 제품을 생산하는 것을 대량 생산이라고 한다. 20세기 들어 생산 라인이 생기면서 사람들이 일하고 생활하는 방식이 바뀌었다. 이 방법은 1908년 헨리 포드의 포드사가 "모델 T" 자동차를 생산하기 시작하면서 일반화되었다.

헨리 포드는 이 차의 발명자이자 포드사의 사장이었다. 그는 항상 보다 효과적인 생산 방법을 연구했다. 1913년 그는 생산 공장에 움직이는 조립 라인을 도입했다. 1914년경이 되자 포드의 조립라인은 워낙 효율적이어서 모델 T 한 대를 만드는 데 93분 밖에 걸리지 않았다. 모델 T는 매 3분마다 한 대씩 조립 라인에서 완성되어 나왔다. 포드는 모든 경쟁사들을 합친 것보다 더 많은 자동차를 만들었다.

뿐만 아니라 포드의 조립 라인은 새로운 수준의 근로자 안전을 가져왔다. 작업자들로 하여금 지정된 장소에만 있게 함으로써 사고율을 줄일 수 있었다. 또한 포드는 하루에 5달러라는 전례 없는 보수로 미국을 놀라게 했다. 노련한 작업원을 끌어들이려는 포드사의 이러한 노력은 노동자 최소 임금의 배를 넘어섰다.

1908년 모델 T의 가격은 825달러였으나 가격은 해마다 떨어졌다. 1916년이 되자 가격은 360달러로 떨어졌다. 모로 위를 달리는 차 중 절반 이상이 모델 T였다. 이 모델은 색깔이 검정색뿐이었다. 그 이유는 검정색 페인트가 싸고 건조도 빨라 생산비를 낮출 수 있었기 때문이었다. 헨리 포드는 "고객 누구라도 차를 원하는 색깔로 할 수 있죠. 그 색깔이 검정색이기만 하다면요."라는 농담을 한 적이 있다고 한다.

1920년대까지 1천 5백만 대의 모델 T가 생산되었다. 이 기록은 30년간 깨지지 않았다. 많은 사람들이 모델 T로 운전하는 법을 배웠다. 그들은 모델 T에 대한 아주 좋은 기억을 갖고 있다.

모델 T는 전 세계 사람들이 일하고 이동하는 방식에 변화를 가져왔다. 이제는 모든 산업계에서 조립 라인을 이용한다. 뿐만 아니라 사람들은 일상생활에서 차를 사용한다.

C 1. Ⓑ 2. Ⓒ 3. Ⓑ 4. Ⓐ

[1]Ancient Greece / [2]*Anatomy of the Brain* / [3]a brain tumor

신경학의 선구자들

신경학의 역사는 고대 이집트로 거슬러 올라간다. 두루마리 족지에는 뇌 질환이 묘사되어 있다. 고대 이집트인들은 신경계에 대한 기초 지식이 있었다. 이집트인들은 심지어 간단한 뇌수술도 했다.

고대 그리스에서는 히포크라테스라는 유명한 의사가 간질의 원인이 신체적인 것이라고 확신했다. 히포크라테스 전에는 간질은 신이 내린 형벌로 간주되었다. 또 다른 의사인 갈렌은 표본의 신경계를 관찰했다. 그는 원숭이의 뇌에서 어떤 신경을 잘랐다. 그리고는 원숭이가 소리를 내지 못한다는 사실을 관찰했다.

1664년 토머스 윌리스는 〈뇌의 해부학〉이라는 책을 발표했다. 이 책에서 그는 뇌를 통한 혈액의 흐름을 가능하게 하는 윌리스환에 대해 설명했다. 또한 그는 "신경학"이라는 단어를 최초로 사용했다. 1700년대에는 베일리와 크루빌리가 최초로 뇌 그림을 발표했다. 이 그림은 의사와 과학자들에게 도움이 되었다. 이로 인해 뇌졸중에 생기는 뇌 손상 같은 질환들에 대한 이해가 가능해졌다.

1837년에는 J.E. 푸르키니에가 최초로 뉴런을 관찰했다. 그는 현미경으로 뉴런을 관찰했다. 이로 인해 과거의 조잡했던 그림이 한 단계 발전하게 되었다. 유명한 철학자인 르네 데카르트는 뇌에 관해 사고했다. 그는 행동에 관한 이론을 세웠다. 그는 어떤 동물의 모든 활동은 외부 자극에 대한 필수 반응이라고 생각했다. 일부 의사들은 환자를 대상으로 실험했다. 그들은 신경계에 대해 보다 많은 것을 알아내게 되었다.

러시아 생리학자인 파블로프는 신경학적 행동에 대한 새로운 이해를 가능하게 했다. 그는 벨이 울리면 개가 침을 흘리도록 훈련을 시켰다. 이 실험은 고도의 뇌 작용에 의해 간단한 반사작용이 바뀔 수 있다는 것을 밝혀주었다.

윌리엄 백퀀은 1878년 환자의 뇌종양을 떼어냈다. 그 환자는 그 후로 몇 년을 더 살았다. 그는 수술 시 텐덤 해머와 같은 도구를 사용했다. X레이와 컴퓨터 단층촬영(CT)도 먼 훗날의 얘기가 아니었다. 이러한 발전으로 인해 오늘날 사람들에게 도움을 주는 신경학 분야가 빛을 보게 되었다.

D 1. Ⓒ 2. Ⓓ 3. Ⓐ 4. Ⓑ

[1]Antarctica / [2]Regs / [3]Ergs

사막 기후의 영향

사막은 강수가 거의 없는 지형의 일종이다. 일반적으로 사막은 연간 강수량이 250mm 이하인 곳을 말한다. 하지만 아리조나의 투산 같은 곳은 강수량이 그보다 많지만 여전히 사막으로 간주된다. 이는 증발량이 훨씬 많기 때문이다.

많은 환경보호론자들은 사막이 점점 늘고 있다고 말한다. 이 과정을 사막화라고 한다. 유용한 토양이 바람에 의해 쓸려가면 사막화 현상이 일어난다. 그런 다음 온도가 상승해 한때는 비옥했던 지역이 사막이 된다. 그들은 이런 현상의 원인이 지구온난화라고 말한다. 또한 과도한 개발도 원인이 된다. 이러한 두 가지 문제는 인류에게 주요한 위협이 되고 있다.

진정한 사막에는 초목이 거의 없다. 이러한 사막은 지구상 가장 건조한 지역에 존재한다. 이러한 지역에는 비가 거의 오지 않는다.

사막에는 생물이 거의 살지 않는 것으로 알려져 있다. 그러나 이는 사실과 다르다. 사막에는 낮 동안 숨어 지내는 많은 동물들이 있다. 지구의 약 5분의 1은 사막으로 덮여 있다.

사막 지형은 주로 모래와 바위로 되어 있다. 모래 언덕과 레그라는 암석면이 사막에서 종종 발견된다. 한대 지방의 사막은 비슷한 특징을 가지고 있지만 비 대신 눈이 내린다. 남극은 가장 큰 한대 사막이다. 가장 큰 열대 사막은 사하라사막이다.

대부분의 사막은 기온 변화가 극심하다. 밤에는 기온이 대단히 낮다. 이것은 공기가 건조해서 열을 거의 붙잡지 못하기 때문이다. 사막은 태양이 지면 차가워진다. 구름 한 점 없는 하늘 역시 밤에는 열 방출을 증가시킨다.

지구 전체 사막의 약 20%는 모래로 덮여 있다. 사막에는 여섯 가지 종류가 있다. 한 가지는 고산 또는 분지 사막이다. 암석사막은 고원 지형으로 되어 있다. 자갈사막은 암석으로 덮여 있다. 모래사막은 사해에 의해 형성된다. 소산간분지는 고도가 높은 곳에서 생긴다. 마지막으로, 황무지는 점토가 풍부한 토양으로 이루어진 건조한 지역을 말한다.

E **1.** (A) **2.** (D) **3.** (B) **4.** (C)

[1]Migrate / [2]Two populations / [3]Hawaii

제왕나비의 이동

제왕나비는 북아메리카 지역에 분포한다. 19세기 이후에는 뉴질랜드, 호주, 카나리아제도 등지에서도 발견되었다. 또한 아조레스군도, 포르투갈, 스페인 등지에도 이동해 서식하고 있다. 일부 지역에서는 제왕나비가 유주성 나비로 알려져 있다.

제왕나비는 장거리를 이동하는 것으로 알려져 있다. 이동은 해마다 일어난다. 8월부터 10월에 걸쳐 엄청난 수가 남쪽으로 날아간다. 그런 다음 봄이 되면 북쪽으로 이동한다.

이동 동안 암컷은 다음 세대를 위한 알을 낳는다. 북아메리카 지역의 제왕나비는 두 개체군으로 나뉜다. 한 무리는 로키산맥의 동쪽에 분포한다. 이 무리는 멕시코의 미초아칸에서 겨울을 난다. 서쪽에 사는 무리는 캘리포니아 중부, 주로 퍼시픽 그로브와 산타 크루즈에서 겨울을 난다.

제왕나비의 이동 기간은 나비 한 마리의 일생보다도 길다. 나비는 초여름에 태어나 두 달을 채 살지 못한다. 여름의 마지막 세대는 약 일곱 달을 산다. 이 시기 동안 제왕나비는 겨울 보금자리를 찾아 날아간다. 이 세대는 봄에 다시 이동을 할 때까지 번식을 하지 않는다.

과학자들은 어떻게 해서 제왕나비가 세대를 뛰어넘어 공백이 생기는데도 같은 겨울 보금자리를 찾아올 수 있는지 잘 이해하지 못한다. 이에 관해 많은 연구가 행해지고 있다. 비행 패턴은 유전적으로 이어지는 것으로 추정된다. 연구에 따르면 이들은 일주기 생체 리듬과 하늘에 뜬 태양의 위치를 조합해 움직인다고 한다. 새 연구에 의해 제왕나비는 방향 감각을 주는 특수한 자외선 광수용기가 있는 것으로 밝혀졌다.

알맞은 조건을 가진 영국 지역에서도 몇 년 동안 소수의 제왕나비가 관찰되었다. 또한 하와이제도에도 일부 제왕나비가 분포한다. 이들은 이동하지 않는다. 먹고 살기에 충분할 만큼 풀에 꿀이 있는 꽃이 있으면 6~8주 정도 산다.

F **1.** (A) **2.** (B) **3.** (D) **4.** (C)

[1]Writing Ball / [2]IBM Selectric typewriter / [3]daisy wheel

타자기의 발전

한 사람이 단독으로 타자기를 발명한 것은 아니다. 타자기가 발명되기까지는 여러 사람의 노력이 있었다. 1714년 헨리 밀은 특허를 받았다. 특허를 받은 기계는 타자기와 비슷한 기계였다. 하지만 이 기계에 관해서 알려진 것은 아무 것도 없다. 또 다른 초기의 혁신자는 투리라는 사람이었다. 그가 만든 기계는 시각장애를 가진 사람도 글을 쓸 수 있게 해 주었다. 투리는 또한 먹지도 발명했다.

윌리엄 오스틴 버트는 1829년 타이포그래퍼라는 기계에 대한 특허를 받았다. 일부 사람들은 이 기계를 최초의 타자기로 본다. 이 기계는 손으로 쓰는 것보다 속도가 느렸다.

1865년에는 한센이 라이팅 볼이라는 기계를 발명했다. 이 기계는 생산된 최초의 타자기였다. 하지만 속도는 여전히 느렸다. 인간의 손보다 빠르게 타자를 칠 수 있는 타자기가 최초로 선보인 것은 1867년 숄즈와 글리든에 의해서였다. 이들은 특허를 레밍턴에게 팔았다. 그는 1873년 이 기계를 생산하기 시작했다.

초기 타자기에 공통된 한 가지 문제는 가시성이었다. 타이프바의 위치 때문에 페이지가 보이지 않았다. 그래서 타이피스트들은 방금 자신들이 쓴 글자를 읽을 수가 없었다. 1895년에 이 문제가 해결되었다. "가시" 타자기가 생산되었다. 이전 모델은 1915년까지도 시판되었다.

20세기가 되자 IBM은 셀렉트릭 전동타자기를 생산하기 시작했다. 이 타자기는 구형 타이프 볼이 특징이었다. 이 타자기는 곧바로 시장을 석권했다. 구형 타이프 볼은 중요한 발전이었다. 덕분에 두 개의 키를 한꺼번에 쳤을 경우 생겼던 고장이 없어졌다. 이 기계는 오늘날에도 여전히 이용되고 있다.

마지막 주요한 발전이 있었던 것은 1980년대였다. 타이프 볼이 데이지 휠로 대체되었다. 데이지 휠은 타이프 볼보다 간단하고 저렴했다. 하지만 훨씬 빨리 마모된다.

오늘날에도 타자기는 종종 이용된다. 타자기는 컴퓨터가 비현실적이거나 불편한 곳에서 사용된다. 스미스 코로나, 올리베티, 브라더 같은 회사에서는 아직도 타자기를 만든다. 하지만 일반적으로 타자기는 컴퓨터로 대체되었다.

Building Summary Skills

1. Coral Reefs

Coral reefs grow best in photic tropical zones with [1]mild wave action. Reefs are made of the skeletons of millions of [2]tiny polyps that have been turned into limestone by algae. These reefs are most common in [3]the tropical Indian and Pacific Ocean regions. Reefs are important because they support a wide range of species that would otherwise [4]become extinct. There are many threats to reefs, such as [5]pollution, over-fishing, and destructive fishing that conservation groups are fighting against.

2. Mass Production and the Ford Model-T

[1]Henry Ford changed the way people worked and lived in the 20th century with his Ford Model-T and the mass assembly line it was produced on. After beginning Ford

Motor Company and inventing [2]the Model-T car, Ford introduced [3]moving assembly lines in his production plants. These were so effective that the Model-T car became common around the world and the price [4]became lower every year. [5]By the 1920s, there were more Model-Ts on the road than any other car, and people around the world worked on assembly lines and drove cars.

3. Pioneers in Neurology

The ancient [1]Egyptians and Greeks were the first to experiment on and begin to understand the brain. Scientists such as [2]Thomas Willis created the study of neurology and furthered knowledge of the brain by [3]describing its anatomy. By the 1800s, scientists and doctors, such as J.E. Purkinje began using [4]microscopes to expand their knowledge of the human nervous system. By 1878, [5]successful brain surgery was performed, leading the way to a modern age of neurological understanding and treatment.

4. The Effects of Desert Weather

Deserts are regions that [1]receive little precipitation. [2]Desertification is the process by which fertile land becomes desert. Many environmentalists argue that temperature increases due to [3]global warming are accelerating the rate of desertification around the world. Deserts are capable of [4]supporting life forms that have adapted to their harsh environments. There are six kinds of deserts, including mountain or basin deserts, hamada deserts, regs, ergs, [5]intermontane basins, and badlands.

5. The Migration of the Monarch Butterfly

The Monarch butterfly is found in some parts of the world, including [1]North America. Scientists wonder how the Monarch is able to [2]migrate so far every year. New generations of the Monarch return to [3]the same winter location every year even though they were not [4]alive at the time of the last migration. Scientists are curious about the fact that Monarchs have [5]very different life spans based on their place in the seasonal migration cycle.

6. The Development of the Typewriter

[1]No single person invented the typewriter, but many people have contributed to its creation [2]over the years. The history of the typewriter is [3]full of small improvements made over the years. When problems such as the type bar blocking the typist's view arose, new improvements corrected them. These days the typewriter has been replaced by [4]the computer. But some people still use [5]typewriters, and some companies still make them.

Mini TOEFL iBT

1. (B) **2.** (A) **3.** (D) **4.** (B) **5.** (C) **6.** (C)
7. (A) **8.** (A) **9.** (D) **10.** (B) **11.** (B) **12.** (A)

침팬지

침팬지에는 두 종류가 있다. 일반적인 침팬지는 서아프리카와 중앙아프리카에 산다. 사촌격인 보노보라는 피그미침팬지는 콩고의 숲에 산다. 콩고강은 이 두 종 간의 경계가 된다.

다 자란 침팬지 수컷은 몸무게가 35~70kg 정도 나간다. 키는 보통 0.9~1.2m이다. 암컷은 보통 몸무게는 26~50kg, 키는 0.66~1m 정도이다. 침팬지는 야생에서 거의 40년 이상을 살지 못 한다. 하지만 포획 상태에서는 60년까지 사는 것으로 알려졌다.

아프리카 사람들은 수천 년 동안 침팬지와 접촉해 왔다. 최초로 유럽인이 침팬지를 발견했다는 기록은 1600년대의 것이다. 포르투갈의 탐험가인 두아르뜨 빠체꾸 페레이라의 일기에 침팬지를 보았다는 기록이 있다. 그는 침팬지가 간단한 도구를 사용했다고 적었다.

침팬지는 1600년대 앙골라에서 유럽으로 들어서 왔다. 최초의 침팬지는 1640년에 오란주 공에게 선물로 주어졌다. 과학자들은 침팬지와 인간 사이의 유사성에 놀랐다. 그 후 20년간 사람들은 많은 침팬지를 유럽으로 들여왔다.

1859년에는 다윈의 〈진화론〉이 발표되었다. 이로 인해 사람들은 인간과 침팬지와의 연관성에 관심을 갖게 되었다. 그 당시 관찰자들은 침팬지의 행동에 관심을 보였다. 그들은 인간 행동과의 유사성을 찾으려 했다. 주된 목표는 침팬지가 유전적으로 "흘림"한가를 밝히내는 것이었다. 하지만 그들의 관심은 실용과학에만 머무르지 않았다. 침팬지의 지능을 과대평가하는 것이 그 당시의 추세였다. 한때는 침팬지 직장을 만들려는 계획도 있었다. 침팬지로 하여금 공장 같은 곳에서 미친한 노동을 하게 만드는 계획이었다.

20세기가 되면서 침팬지는 훨씬 더 많은 과학적 관심의 대상이 되었다. 1960년대 이전에는 자연 서식지에서의 침팬지의 행동에 관해 거의 알려진 것이 없었다. 그러다가 제인 구달이 탄자니아의 곰베 숲에 가서 살았다. 그녀는 거기에서 침팬지들과 생활하며 그들의 습성을 관찰했다. 침팬지가 도구를 사용하는 모습을 관찰한 것은 대단한 발견이었다. 이전에는 인간만이 도구를 사용한다고 믿었었다.

보통의 침팬지는 때때로 사람을 공격한다. 우간다에서는 많은 어린이들이 침팬지의 공격을 받았다. 침팬지의 공격은 일반적으로 아이들에게 치명적이다. 침팬지가 이런 공격을 한 이유는 아이들을 원숭이의 일종으로 오해했기 때문이다. 이 원숭이는 콜로부스원숭이라고 불리는 원숭이로 침팬지가 가장 즐겨 먹는 먹이의 하나다.

인간은 침팬지를 다룰 때 매우 조심해야 한다. 인간을 그들의 경쟁자로 보기 때문이다. 또한 보통의 침팬지는 성인 남자보다 상체의 힘이 약 5배나 강하다. 이 사실은 전 전미스톡자동차경주협회(NASCAR, National

Association for Stock Car Automobile Racing) 선수인 세인트 제임스 데이비드가 침팬지의 공격을 받아 거의 죽을 뻔 한 사건을 계기로 알려지게 되었다.

유리 제조술

유리는 균질의 무결정 고체이다. 유리는 주로 이산화규소로 되어 있다. 이산화규소는 모래의 주요 원료이다. 원료에 1%의 철이 포함되어 있는 경우 유리는 색깔을 띤다. 그래서 미세유리 공정에서는 유리를 보다 깨끗하게 만들기 위해 규소를 농축한다.

유리가 자연적으로 만들어질 때는 녹색을 띠는 경향이 있다. 이것은 철이 포함되어 있기 때문이다. 하지만 유리를 부는 직공은 유리의 색깔을 바꾸기 위해 금속 가루를 첨가한다. 황이나 탄소를 첨가하면 유리는 노란색에서부터 검정색까지 나타나게 된다. 산화주석을 사용하면 하얀색의 유리가 나온다. 또한 약간의 코발트를 첨가하면 유리는 진한 파란색을 띤다. 그리고 소량의 셀레늄을 사용할 경우 유리는 "셀렌적색"라고 하는 밝은 색깔을 띠게 된다.

흑요석은 뜨거운 마그마가 흘러나올 때 자연적으로 생기는 유리이다. 이 유리는 석기 시대 이후로 날카로운 칼과 화살촉, 다른 도구들을 만드는 데 사용되었다. 역사적으로 볼 때 최초로 유리를 만든 이들은 페니키아인들이다. 그들은 일찌이 기원전 3000년전에 그들의 도기에 유리를 입혔다.

기원전 1500년경에는 고대 이집트인들이 유리 그릇과 염주를 만들었다. 그들이 만든 염주는 녹인 유리로 금속막대를 감싼 것이었다. 염주는 소중한 재산이었다. 염주는 마력을 갖고 있는 것으로 간주되었다.

로마인들은 새로운 유리 제조 기법을 개발했다. 또한 로마인들은 유리의 사용법을 중국과 브리튼제도까지 퍼뜨렸다.

북유럽에서는 1000년경, 새로운 유리 제조법이 발견되었다. 소다 대신 잿물을 사용해 유리를 만들었다. 잿물은 훨씬 더 풍부했기 때문에 이 발전은 중요한 의미를 가졌다. 잿물은 나무 재로부터 얻는다. 이 때부터 북유럽과 지중해 지역의 유리 세공은 서로 구별되게 되었다.

11세기 독일에서는 판유리를 만드는 기술이 등장했다. 이로 인해 모든 주택과 건물에 사용하는 창문을 만드는 현대 기술이 나타나게 되었다. 14세기경에는 베니스가 미세 유리 세공의 중심지였다. 베니스에서는 거울, 식기, 꽃병과 같은 온갖 종류의 사치품들이 만들어졌다.

손에 잡고 불어서 만든 유리는 오늘날까지도 여전히 일용품으로 여겨진다. 가장 유명한 미세 유리 공예가로는 데일 치홀리, 르네 라리끄, 루이스 컴포트 티파니 등을 들 수 있다. 그들의 작품은 스미소니언박물관 같은 박물관에 전시되어 있다. 그들의 작품 가운데 일부는 수천 달러에 팔리기도 한다.

냉각 가공법은 유리를 미세한 크리스털로 바꿀 때 사용된다. 에딘버리 크리스탈이나 워터포드 크리스털과 같은 크리스탈 제조업체에서는 다이아몬드 톱을 사용해 유리를 절단하고 연마해서 아름다운 모양으로 만든다.

Vocabulary Review

A 1. (B) 2. (C) 3. (D) 4. (A) 5. (A) 6. (B) 7. (C) 8. (A)

B 1. e 2. f 3. g 4. a 5. j 6. i 7. b 8. c 9. d 10. h

Unit 5 Sentence Simplification

Skill & Drill

1. (B)

민간요법

민간요법이란 전통적인 치료법을 말한다. 민간요법은 질병이나 부상을 치료하는 데 사용된다. 또한 출산이나 건강 유지에 도움을 주기도 한다. 민간요법은 과학적인 의학과는 구별되는 의학이다. 보통 문서 형태가 없이 구전되다가 누군가가 자료를 수집한다. 어떤 문화에서는 많은 성인들이 민간요법에 대해 알고 있다. 치료사나 무당이 민간요법을 정리해 사용하기도 한다. 산파, 무당, 약초 거래상 등도 민간요법을 사용한다. 민간요법이 항상 체계 있게 정리되지는 않는다. 많은 치료법들이 서로 상충된다.

2. (A)

배심원 선정

미국에서는 형사 사법 시스템과 민사 소송에서 배심원단이 필요하다. 배심원단은 해당 법정이 있는 지역의 성인 가운데 무작위로 선정된다. 배심원단을 구성하는 사람을 배심원이라고 한다. 배심원의 수는 보통 6명에서 12명이다. 배심원은 재판을 공정히 판단할 수 있는 능력을 기준으로 선정된다. 배심원이 건강이나 다른 이유로 임무를 완수할 수 없는 경우는 얼마든지 있을 수 있다. 그래서 소수의 배심원 후보가 지명된다. 그들 역시 재판 내내 지켜보지만 판결을 내릴 때 참여하지는 못한다.

3. (C)

오크

"오크"란 단어는 수백 종의 나무와 관목을 일컫는 말이다. 오크는 북반구에 자생한다. 오크에는 낙엽성 종과 상록수 종이 포함되며 한대 지방에서부터 열대 아시아와 아메리카 대륙에까지 분포한다.

오크는 많은 종의 경우 끝부분에 얼핀이 있으며 나선형으로 잎이 배열되어 있다. 일부는 가장자리가 메끄러운 톱니 모양의 잎을 가지고 있다. 꽃은 미상화로 봄에 핀다. 열매는 도토리라고 하며 컵 모양으로 생긴 구조 안에 들어 있다. 도토리는 각각 안에 하나의 씨가 들어 있으며 6~18달이 지나면 익는다. 길이는 종에 따라 다르다. 상록의 오크는 "라이브 오크"라고 불리지만 별개의 그룹은 아니다. 이 종에 속하는 오크들은 다른 종들 사이에 섞여 있다.

4. (A)

목재 산업

재목으로 사용하기 위해 베어낸 나무를 목재라고 한다. 목재를 판으로 만든 것을 판재라고 한다. 판재는 거친 상태나 마무리를 한 상태로 보급한다. 거친 목재는 가구 제작의 재료가 된다. 거친 목재는 여러 종에서 얻을 수 있지만 대개는 단단한 나무에서 얻는다. 마무리를 한 목재는 표준 크기로 보급하는데, 보통 건설업계에서 사용한다. 목재 산업은 미국의 초기 산업 가운데 하나였다. 메인과 뉴욕은 목재 생산의 초기 리더였다. 나중에는 미시간, 오리곤, 워싱턴, 캘리포니아로 확대되었다. 목재를 만들기 위해 나

무를 자르는 사람을 벌목꾼이라고 한다. 벌목꾼은 초기 미국 전래동화에 자주 등장했다.

Practice with Long Passages

A **1.** (C) **2.** (D) **3.** (B) **4.** (A)

[1]Six / [2]human food / [3]cash crop

밀 생산

밀은 세계 각지에서 생산된다. 전 세계적으로 밀은 인간에게 가장 중요한 곡식이다. 밀은 곡류 가운데 옥수수 다음으로 생산량이 많다. 세 번째는 쌀이다. 밀은 발효시켜 납작하게 찐 빵을 만드는 데 필요한 밀가루의 재료가 되는 주식이다. 밀은 또한 쿠키, 케이크, 파스타, 국수, 쿠스쿠스를 만드는 데도 사용된다. 그뿐만 아니라 맥주나 보드카 같은 술을 만드는 데도 사용된다. 요즘은 생물연료를 만드는 데도 사용되고 있다. 하얀 밀가루를 만들 때 떨어져 나오는 껍질을 밀기울이라고 한다. 가축을 위한 사료로 밀을 일정량 섞기도 한다. 짚은 가축의 사료나 지붕을 이는 건축재로 사용된다.

추수한 밀은 시장에 내놓기 위해 성분에 따라 분류된다. 밀을 사는 사람은 어떤 밀을 구매해야 하는지를 보기 위해 분류를 참고한다. 각 분류마다 특별한 용도가 있다. 밀 생산업자들은 이 시스템으로 어떤 밀을 경작하는 것이 가장 유리한지를 결정한다.

밀은 단위 면적당 수확량이 좋기 때문에 현금 작물로 널리 경작된다. 또한 온대기후에서 잘 자라며 비교적 성장 기간이 짧다. 밀은 빵을 굽는 데 널리 사용되는 고품질 밀가루를 생산한다. 대부분의 빵은 밀가루로 만드는데, 안에 들어 있는 다른 곡식의 이름을 따 호밀빵, 오트밀빵 등으로 부른다. 이 외에도 밀가루로 많은 식품을 만든다. 그 결과 식량이 꽤 남아도는 곳에서도 밀에 대한 수요가 많다.

미국에는 여섯 종의 밀이 자란다. 마카로니밀은 밝은 색깔을 띠며 매우 단단하다. 경적춘소맥은 갈색을 띠며 단백질이 풍부하다. 경적동소맥은 비슷한데, 주로 캔자스에서 자란다. 연적동소맥은 부드러우며 단백질 함량이 낮다. 경백소맥은 색깔이 밝고 분필 같은 느낌이 난다. 연백소맥은 단백질이 극소량 함유되어 있으며 온대의 습한 지역에서 자란다.

B **1.** (B) **2.** (A) **3.** (D) **4.** (C)

[1]Proponents / [2]Critics

냉동보존술

냉동보존술이란 죽은 생체 조직을 냉각시키는 방법이다. 이 방법은 죽은 지 얼마 되지 않은 인간이나 동물에 사용된다. 가까운 미래에 다시 그들을 회생시키는 것이 목적이다. 인간의 경우 법적으로 사망한 이후에만 시행하도록 법에서 정하고 있다. 많은 과학자들과 의사들은 냉동보존술이 완전히 비윤리적이라고 생각한다. 하지만 냉동보존술을 지지하는 사람 역시 많다.

냉동보존술을 지지하는 사람들은 미래의 기술이 발전할 것을 믿는다. 분자 기술이 임상적 사망의 초기 단계를 되돌릴 수 있을 것으로 기대한다. 그래서 아주 작은 단계로 조직을 회복시킬 수 있으리라 기대한다. 또한 냉동보존술은 조직과 기관의 재생을 가능하게 한다. 또한 그들은 언젠가는 질병과 노화도 되돌릴 수 있을 것으로 믿는다.

이러한 지지자들은 최근에 사망한 사람의 뇌에 있는 기억과 정체성을 저장하기를 원한다. 냉동보존술은 뇌 보존액을 사용해 이를 시도한다. 이 냉각액은 기억과 정체성이 남아 있는 뇌의 미세한 세포 구조를 보존하는 기능을 한다.

냉동보존술을 비판하는 사람들은 이 과정이 시간과 돈을 낭비하는 것이라고 생각한다. 그들의 견해는 현 수준의 과학에 기초하고 있다. 세포며 조직, 혈관, 작은 동물 기관 등을 보존했다가 다시 되돌릴 수 있다는 것은 사실이다. 몇 마리의 개구리들은 어는 점 몇 도 아래에서 부분 냉동 상태로 몇 달 동안 있다가 살아나기도 했다. 하지만 이것은 진정한 의미의 냉동 보존이 아니다. 사망한 상태에서도 기억과 정체성이 회복될 수 있는지는 입증되지 않았다.

비판 의견을 내는 사람들은 또한 죽은 사람을 회생시킬 수 있다면 많은 사회적 문제가 발생할 것이라고 생각한다. 그들은 이것이 결국 엄청난 인구과잉을 가져올 것이라고 우려를 표한다. 또한 많은 사람들이 죽음을 되돌리려는 것은 신의 뜻을 거역하는 것이기 때문에 비도덕적이라고 생각한다.

C **1.** (C) **2.** (D) **3.** (D) **4.** (B)

[1]the right to use the roads / [2]according to law

로마의 도로법

도로는 로마제국의 성장에 꼭 필요했다. 이러한 도로로 인해 군대가 빠르면서도 효율적으로 이동할 수 있었다. "모든 길은 로마로 통한다"라는 속담이 있을 정도다. 로마의 도로 체계는 전성기에 53,000마일에 이르는 도로가 깔렸으며 교차로만도 372개나 되었다. 로마인들은 "viae" 라고 하는 이 도로를 건설하는 데 뛰어난 솜씨를 보였다.

역사상 계획 도로가 건설된 것은 로마에서였다. 기원전 약 450년으로 거슬러 올라가는 12표법에는 직선 도로의 너비는 8피트(2.4m), 곡선도로의 너비는 16미터(4.8m)여야 한다고 구체적으로 규정되어 있다. 12표법에는 로마인들에게 도로를 만들어야 하며 도로가 파손된 곳에서는 통행인들에게 사유지를 지나갈 수 있는 권리를 주어야 한다고 규정하고 있다. 따라서 빈번한 보수가 필요하지 않은 도로를 건설하는 것이 목표가 되었다.

로마인들은 도로를 사용할 수 있는 권리를 "servitus" 즉 "역권" 이라고 불렀다. 통행권으로 인해 사유지의 일부를 가로질러 갈 수 있는 역권이 주어졌다. 마차도 통행권이 주어졌다. 도로는 조정인이 정한 올바른 너비를 준수하는 한 두 가지 형태의 역권이 다 통용되었다. 기본적인 너비는 8피트(2.4m)였다. 비교적 단순해 보이는 이 법 덕분에 일반인들이 사유지를 지나가는 모습이 곳곳에서 흔히 눈에 띄었다.

로마인들은 할 수만 있다면 표준화를 선호했다. 기원전 20년에 아우구스투스는 도로 상임이사가 된 이후로 새턴 사원 근처에 금으로 만든 이정표를 세웠다. 여기에는 제국의 모든 도시와 도시 간의 거리가 표시되어 있었다. 나중에 이것은 로마의 중심이라 불렸다.

로마의 도로는 제국의 안정성과 확장에 매우 중요한 역할을 했다. 로마 군대는 도로 덕분에 많은 도움을 받았다. 이 도로들은 수천 년이 지난 오늘날에도 여전히 이용되고 있다. 로마제국의 몰락기 동안에는 똑같은 길이 야만인들이 침략하는 통로가 되었다. 도로는 로마 군대를 패배로 인도했다.

D 1. D 2. B 3. C 4. A

[1]Visual / [2]Olfactory / [3]Auditory

동물의 영토권

"영역"이라는 단어는 어떤 동물이 방어하는 지역을 이르는 말이다. 영역을 지키는 동물은 영토성이 있다고 말한다. 동물 영토의 개념을 처음 언급한 사람은 엘리엇 하워드이다. 그는 1920년에 출판된 그의 저서에서 이 개념에 관해 언급했다. 1930년대에는 바가렛 모스 니스에 의해 이 개념이 한 단계 진보했다. 그녀는 멧종다리를 대상으로 자세한 연구를 했다. 나중에 이 개념은 로버트 아드리의 책 〈영토적 본능〉을 통해 널리 알려졌다. 책이 인기를 얻으면서 영역의 중요성이 과장되게 되었다. 이 개념은 사회생태학의 일부인 것으로 생각되었다. 하지만 소수 종만이 분명한 경계가 있는 영역을 가지고 있다. 그들은 이 경계 안에서 생활하며 필요한 모든 것을 해결한다.

영토성이 있는 동물의 가장 분명한 예는 조류와 어류이다. 이 동물들은 종종 밝은 색깔을 내어 다른 동물들을 자기의 영역에서 내쫓는다. 유럽붉은가슴울새와 투어barbel는 이러한 색깔을 이용해 자신들의 영역을 지킨다. 보통 이 영역 안에는 보금자리가 있고 자신들과 새끼를 위한 충분한 먹이가 있다.

여간해서는 방어가 노골적인 싸움으로까지 번지지는 않는다. 더 흔하게는 강도 높은 자기과시를 한다. 이 자기과시가 시각적인 경우가 있다. 자기과시의 예로 유럽붉은가슴울새의 붉은색 가슴을 들 수 있다. 또는 청각적일 때도 있다. 많은 명금들과 긴팔원숭이가 소리를 내는 것도 이런 이유 때문이다. 또는 후각적이기도 하다. 냄새가 나는 물질을 뿌리는 것이다. 소변이나 대변 같은 배설물을 이러한 표시물로 사용하기도 한다. 개는 이런 방법으로 영역 표시를 한다. 또는 특수한 냄새 선을 가진 신체 부위를 영역 안에 있는 사물에 문질러 냄새 표시를 하기도 한다. 고양이는 사물에 얼굴과 옆구리를 문질러 냄새 표시를 한다.

E 1. A 2. B 3. D 4. A

[1]Old Style / [2]Current Style

미국 경제 활동의 흐름

미국은 세계에서 경제 규모가 가장 크다. 하지만 1980년대 초반 이후로 미국은 변했다. 한때는 세계에서 가장 큰 채권자였지만 지금은 상당한 경상수지 적자를 내고 있다. 또한 대규모의 국가 부채도 안고 있다. 국가 부채는 현 GDP의 64%로 1950년대 이후 최고치다.

연방정부는 경제가 꾸준한 성장세를 이어가도록 안도한다. 꾸준한 성장만이 아니라 고고용과 물가안정도 목표로 하고 있다. 소비와 세금을 조절해 경제 성장을 둔화시키거나 가속화시킬 수도 있다. 통화 공급 조절과 신용 대출 조절을 통해서도 동일한 효과를 낼 수 있다. 이 과정 역시 물가와 고용에 영향을 주기 때문이다.

과거 1930년대에 대공황이 닥쳐서 미국 경제에 엄청난 타격을 주었다. 느린 경제 성장과 높은 실업률은 경제를 위협하는 최대의 적이었다. 경기 침체의 위험은 심각했다. 정부는 보다 많은 소비를 통해 경제를 튼튼하게 하려고 노력했다. 또한 소비자들이 보다 소비를 많이 하도록 세금을 줄였다. 통화 공급량을 늘려 빠른 성장을 유도했다.

또한 1970년에는 대규모 물가 상승, 특히 에너지원의 요금 상승이 있었다. 이것은 인플레이션 우려를 일으켰고 전체적인 물가 상승으로 이어졌다. 그 결과 정부 지도자들은 인플레이션을 잡는 데 초점을 맞춰야 했다.

1960년대와 1990년대 사이에 많은 변화들이 있었다. 1960년대에는 정부가 재정정책에 대한 신뢰를 가졌다. 대통령과 미의회는 경제 방향을 잡는 데 중요한 역할을 했다. 하지만 높은 인플레이션과 실업으로 인해 대중은 정부에 대한 믿음을 잃었다. 전체적으로 느린 성장률도 그들에 대한 신뢰를 잃게 만든 요인이다. 지금은 경제 활동의 흐름을 조절하기 위해 금융정책을 사용한다. 이 정책은 미연방준비제도이사회(FRB)라고 알려진 중앙은행에서 감독한다. FRB는 대통령이나 의회의 간섭을 거의 받지 않는다.

F 1. D 2. C 3. A 4. D

[1]two African types / [2]120kg at birth / [3]6 hours and 50km

코끼리의 진화

코끼리목에서 살아남은 유일한 과가 코끼리이다. 현존하는 코끼리는 세 종이 있다. 아프리카 덤불코끼리와 밀림코끼리, 인도코끼리가 그것이다. 다른 종들은 마지막 빙하기 이후 멸종되었다.

코끼리는 현재 살아있는 포유류 가운데 가장 몸집이 크다. 임신 기간은 22개월이다. 이것은 육상 동물 가운데 가장 길다. 새끼 코끼리는 태어나자마자 몸무게가 120kg이 나가는 것은 흔한 일이다. 코끼리는 70년까지 살 수 있는데, 어떤 코끼리는 그보다 훨씬 오래 살기도 한다. 지금까지 보고된 코끼리 중 가장 큰 코끼리는 1956년 앙골라에서 총에 맞아 잡혔다. 그 코끼리는 수컷으로 몸무게는 약 12톤에 달했다. 가장 몸집이 작은 코끼리는 송아지 또는 돼지 정도의 크기였다. 이 종은 크레타 섬에 살았던 신사시대 변종이다. 기원전 3,000년 전에서 기원전 5,000년 전까지 생존했다.

코끼리는 인간으로부터 점점 더 많은 위협을 받고 있다. 인간과 코끼리의 충돌은 종종 치명적이다. 이 충돌로 아시아에서 해마다 150마리의 코끼리와 최고 100명의 사람이 죽는다. 아프리카코끼리는 1970년에는 3백만 마리이던 것이 1989년에는 60만 마리로 줄어들었다. 2,000년경에는 그 수치가 272,000마리로 줄어들 것이다. 최근에는 이런 동물들을 구하려는 여러 시도가 있어 수가 증가했다. 현재는 전 세계적으로 코끼리를 보호하고 있다. 코끼리를 보호하는 차원에서 포획과 가축용을 엄격히 규제하는 여러 가지 제한 조치가 제정되었다. 상아와 같은 제품의 거래도 규제 대상이다.

일부 과학자들은 코끼리과가 바다소와 먼 친척 관계라고 믿는다. 또한 그들은 코끼리와 바위너구리 사이에도 관련이 있다고 생각한다. 유전학적 증거를 보면 이를 알 수 있다고 많은 이들이 생각하지만 어떠한 화석 증거도 나타나지 않았다. 한 가지 이론에 따르면 이 동물들은 대부분의 시간을 물 속에서 보냈다고 한다. 물속에서 숨을 쉬기 위해 코를 스노클처럼 사용했을지도 모른다. 현대의 코끼리들은 여전히 이 능력이 있어서 그렇게 해엄을 치는 것으로 알려져 있다. 그들은 최장 6시간 동안 50km까지 헤엄을 친다.

Building Summary Skills

1. Wheat Production

Wheat is one of the most [1]widely grown and important crops in the world. It has many important uses by

humans. Wheat grain is harvested according to a [2]classification system that determines [3]the quality and price. Wheat is a very [4]profitable crop because it is used so widely in products that are consumed daily. There are [5]six classes of wheat grown in the United States.

2. Cryonics

[1]Cryonics is the controversial process of [2]freezing animals or humans immediately after death in hopes of reviving them at a later date. Although reversing death is [3]not possible through current scientific methods, practitioners of cryonics hope future advances will make it possible. Their current goal is to [4]preserve the memory and identity of those who die. Critics of cryonics think it is [5]unethical as well as a waste of time.

3. Road Law in Rome

Roads were a very important part of the Roman Empire, and the Romans were very advanced at [1]building and administering laws to control them. [2]Roman roads were built to very strict measurements, and laws protected travelers when roads were not available or [3]in disrepair. There was even a point from which all roads to Rome led, called [4]the golden milestone. Roman roads eventually enabled barbarians to [5]invade and conquer Rome, but its roads still exist today.

4. Animal Territoriality

Animals defend areas called [1]territories, that are important to them. This concept was introduced [2]in the early 20th century although it was greatly exaggerated. Many animals develop [3]bright colors or strong smells to protect their territories. [4]Few animals fight over territory. Many common animals [5]mark their territory with their own smell.

5. The Flow of Activity in the U.S. Economy

[1]The U.S. economy was once the most powerful in the world, but it is now the most indebted. The federal government controls many factors that change [2]the direction of the economy. During [3]the Great Depression, the federal government shifted its economic philosophy from creating growth to holding back prices. Because of these changes, the public has lost faith in [4]the president and Congress's role in influencing the economy. [5]The nation's central bank now independently attempts to guide the economy.

6. The Evolution of the Elephant

There are only [1]three species of elephants still living today. They are the largest of all land mammals and have [2]the longest pregnancy period. These days, elephants have been endangered [3]by humans, but efforts are being made to [4]increase their numbers. Scientists think elephants are genetically related to [5]sea cows and possibly hyraxes although there is not enough evidence to prove this.

Mini TOEFL iBT

1. (B) **2.** (B) **3.** (D) **4.** (C) **5.** (A) **6.** (B)
7. (A) **8.** (C) **9.** (C) **10.** (B) **11.** (C) **12.** (D)

미국의 산업 발달

미국혁명이 일어난 후 미국의 산업은 유럽보다 뒤처졌다. 하지만 그다지 많이 뒤처진 것은 아니었다. 곧 새로운 발명과 성장의 물결이 밀려왔다. 이것은 150년 간에 걸쳐서 일어났다. 이러한 발전으로 미국 경제는 세계에서 가장 규모가 크면서도 현대적이 되었다.

미국혁명 동안 미국은 산업시대로 들어서지 못했다. 대부분의 제조업은 가정집에서 이루어졌다. 영국은 산업화가 된 반면 미국은 아직 따라잡지 못하고 있었다. 그때 프랜시스 캐봇 로웰이 1811년 영국으로 건너갔다. 그는 역직기 제조법의 비밀을 외웠다. 그와 일행이 미국으로 돌아온 후 그들은 보스톤에 여러 개의 직물 공장을 세웠다. 가장 유명한 것이 매사추세츠의 로웰에 있는 것이다. 이 공장은 1822년에 건설되었다. 로웰 공장은 많은 "작공"들을 고용했다. 그들은 공장 가동을 위해 기숙사 생활을 했다.

뉴잉글랜드는 성장하는 직물 산업의 요람이었다. 뉴잉글랜드는 미국에서 최초로 빠른 성장을 경험한 지역이 되었다. 이러한 성장은 펜실베이니아에서도 일어났다. 철 산업의 발달로 펜실베니아주는 발전했고 훨씬 빠른 속도로 성장할 수 있었다.

진보의 방향이 변하기 시작했다. 이 새로운 시기는 1810년과 1860대 사이에 일어났다. 공장은 팽창하기 시작했다. 하지만 보다 큰 진전은 발명 분야에서 이루어졌다. 미국 제조업과 농업도 대단히 발전했다. 이러한 진전은 실용적인 발명품들 덕분에 가능했다. 리처드 체너위스는 주철 쟁기를 만들었는데, 이 쟁기는 부품을 갈아 낄 수 있었다. 존 디어는 강철 쟁기를 만들었는데, 흙이 쟁기에 붙지 않았기 때문에 작업 속도가 훨씬 빨라졌다. 엘리 휘트니는 조면기와 지그를 발명했다. 이로 인해 남부에서는 대규모의 면화 산업이 시작되었다. 사무엘 모스는 전보를 발명해 장거리 통신 시대를 열었다. 엘리샤 오티스는 승강기를 발명했다. 이로 인해 현대식 고층건물 건설이 가능해졌다. 마지막으로, 조지 풀먼은 기차의 침대차를 발명해 장거리 여행이 가능하게 만들었다.

1850년대 이후 미국의 산업은 급속한 발전을 이루었다. 남북전쟁은 끝이 났다. 북부가 승리를 거두면서 북부의 사업가들이 번창했다. 정부는 사업이 팽창하는 것을 보고 싶어했다. 위에 열거한 혁신적인 발명들로 인해 신속하면서도 극적인 변화가 이루어졌다. 이제는 미국 전역으로 제품을 운송하기 위한 철도가 필요했다. 남부의 사람들은 면화를 거래했다. 그들은 면제품을 북부와 영국에 팔았다.

1900년대 초반이 되자 많은 사람들이 자동차를 필요로 했다. 자동차 산업은 미국을 새로운 차원의 성장으로 이끌었다. 1920년경 헨리 포드는 모델 T를 선보였다. 이 모델과 함께 현대식 조립라인도 등장했다.

미생물

미생물이 발견되기 전에는 음식이 오래 되면 왜 변하는지 알 수가 없었다. 왜 포도가 포도주로 되고 우유가 치즈로 변하는지 아무도 알지 못했다. 너무 작아 육안에는 보이지도 않는 작은 생물체가 음식에 어떤 작용을 하고 있으리라고 생각한 사람은 아무도 없었다. 그러다가 1676년 네덜란드의 한 과학자가 이 미생물을 발견했다.

지금은 사람들이 미생물에 관해서 훨씬 많은 것을 알고 있다. 미생물을 전문적으로 연구하는 과학자들은 여러 가지 형태의 이 작은 생물들을 관찰한다. 미생물에는 박테리아, 균류, 고세균, 진핵생물 등이 있다. 바이러스는 살아 있지 않기 때문에 미생물로 간주되지 않는다. 미생물은 단세포 혹은 다세포 생물이다. 원생생물이라고 알려진 몇몇 단세포 생물은 육안으로도 관찰할 수 있다.

보통 미생물은 끓는 점 이하의 물이나 다른 액체 안에서 발견된다. 과학자들은 온천, 해저, 심지어 지각 깊은 곳에서도 미생물 표본을 채취했다. 이러한 미생물들은 지구의 많은 생태계에서 중요한 역할을 담당한다. 미생물은 양분의 재활용과 질소 순환에 중요한 역할을 한다.

과학자들은 약 40억년 전에 최초의 단세포 미생물이 탄생했을 것으로 믿는다. 이 생물은 지구상 최초의 생물이자 30억 년 동안 유일한 생물이기도 했다. 미생물은 빠른 속도로 엄청난 수로 불어난다. 이들은 다른 종과 자유롭게 유전자를 교환할 수 있다. 또한 점점 빠른 속도로 변이해서 새로운 환경에 적응하기 위해 빠르게 진화할 수 있다. 이런 급격한 진화 능력과 관련된 한 가지 우려는 모든 현대 항생제에 저항을 가진 "슈퍼 버그"가 출현할지도 모른다는 사실이다.

가장 간단한 미생물은 박테리아다. 박테리아는 또한 지구상의 생물 가운데 가장 흔한 생물이기도 하다. 섭씨 140도 이하의 모든 환경에서 박테리아를 발견할 수 있다. 박테리아는 해수, 토양, 심지어 인간의 위나 장에서도 자란다. 박테리아의 게놈은 한 가닥의 DNA로 되어 있다. 박테리아는 세포벽으로 둘러싸여 있다. 이들은 2분열이라고 하는 과정에 의해 번식한다. 이 과정을 통해 분열하고 다시 분열한다. 일부 박테리아는 최적의 조건하에 10분마다 두 배로 자랄 수 있다.

미생물의 또 다른 종은 고세균이다. 이 단세포 생물은 핵이 없다. 고세균은 극단적인 환경을 포함해 모든 종류의 서식지에서 발견된다. 진핵생물은 박테리아나 고세균과는 다르다. 진핵생물은 체내에 세포기관이라고 하는 다세포 구조가 있다. 진핵생물의 DNA는 핵 세포기관 내에 있다.

미생물 가운데 가장 흥미로운 종류가 극한미생물이다. 극한미생물은 대단히 불리한 환경에 적응했다. 이 특별한 생물은 남극과 북극, 사막과 심해에서 발견된다. 이 미생물은 심지어 지표면 아래 7km나 되는 깊은 곳에서도 발견되었다. 일부 극한미생물의 경우 진공 상태에서도 생존하며 방사선에도 내성이 있다. 이러한 성질 때문에 과학자들은 극한미생물이 우주 속에서도 생존할 수 있을 것이라 믿는다.

Vocabulary Review

A 1. D 2. C 3. B 4. D
5. B 6. A 7. C 8. D

B 1. i 2. f 3. h 4. j 5. a
6. d 7. c 8. g 9. e 10. b

Unit 6 Rhetorical Purpose

Skill & Drill

1. C

빗살해파리

빗살해파리는 해양생물이지만 진짜 해파리는 아니다. 이는 독침이 없기 때문이다. 전 세계 해양에 살고 있는 빗살해파리는 100종이 넘는다. 이들은 플랑크톤 생물량의 많은 부분을 차지한다. 그 중 한 종이 풍선빗해파리로 이종은 북해에 자생한다. 이 종은 수가 대단히 많다. 수가 하도 많아 어부의 그물을 막을 정도다. 이런 정도로 수가 많은 생물은 거의 없다. 빗살해파리는 대단히 조작이 약해서 연구하기가 상당히 어렵다. 그래서 수명에 대한 자료도 없다. 하지만 빗살해파리가 다 자라기도 전에 번식을 한다는 것은 확인되었다. 그래서 세대 주기가 짧을 것으로 추정된다.

2. B

백색왜성과 갈색왜성

질량이 작거나 중간 정도 되는 별은 죽으면 백색왜성의 단계로 들어간다. 적색거성 단계를 거쳐 바깥 층의 물질이 사라지고 백색왜성의 단계에 들어가게 된다. 백색왜성은 지구 정도의 크기이지만 밀도는 태양과 비슷하다. 백색왜성은 블랙홀이나 중성자별, 퀘이사를 제외하고는 밀도가 가장 높다. 반면에 갈색왜성은 밀도가 아주 낮다는 점에서 백색왜성과는 차이가 있다. 갈색왜성은 대부분 가스로 이루어지며 큰 행성과 구별하기가 힘든 경우가 많다.

3. D

거미의 사회성

거미는 포식동물이다. 많은 경우 암컷은 짝짓기가 끝나면 수컷을 잡아먹는다. 어떤 종류의 거미는 자기 새끼도 잡아먹는 것으로 알려져 있다. 대부분의 거미는 독거성 생물이지만 몇몇 종은 큰 군락을 이루고 함께 거미집을 짓고 산다. 거미가 사회성을 보이긴 하지만 벌이나 개미 같은 사회적 곤충만큼 진화하지는 않았다. 가장 사회성이 강한 거미는 꼬마거미과의 아넬로시무스 엑시미우스이다. 많은 거미들의 경우 수명이 한두 해에 불과하다. 하지만 타란툴라는 약 20년까지 산다.

4. C

수세공

수세공은 유용하면서도 매력적인 방법이다. 수세공에서는 보통 손으로 제품을 만들지만 간단한 도구를 사용하기도 한다. 수세공이란 단어는 전통

적으로 물건을 만들던 방법을 가리킨다. 제품의 독특한 스타일이 중요하다. 그러한 제품들은 종종 문화 종교적 의미를 지녔다. 대량 생산이나 기계로 만들어진 제품은 수세공품이 아니다. 수세공품은 사용하거나 입기 위한 용도로 만들어진다. 이것이 장식미술품이나 공예품과는 다른 점이다. 수세공은 일반적으로 보다 전통적인 작업으로 여겨진다. 수세공은 일상생활의 일부로 시작되었다.

Practice with Long Passages

A **1.** (D) **2.** (B) **3.** (A) **4.** (C)

[1]7,000℃ / [2]hydrogen, helium, and methane / [3]13 moons

해왕성

해왕성은 태양계의 여덟 번째 행성으로 가장 바깥쪽에 위치해 있다. 태양계의 행성 가운데 지름 크기로는 네 번째, 질량으로는 세 번째 행성에 해당된다. 사실, 해왕성은 지구 질량의 17배나 된다. 천왕성은 해왕성과 쌍둥이별에 가깝지만 해왕성이 약간 더 크다. 해왕성은 로마의 바다의 신 이름을 따 영어로 "Neptune"이라고 한다.

해왕성의 대기는 주로 수소와 헬륨으로 구성되어 있다. 또한 소량의 메탄도 있다. 그래서 해왕성은 푸른 빛을 띤다. 해왕성은 비슷한 양의 메탄을 가진 천왕성보다 훨씬 선명하다. 그래서 알려지지 않은 성분 때문에 해왕성이 강렬한 색깔을 띠는 것으로 생각된다.

해왕성은 여러 가지 사실로 과학자들의 흥미를 끈다. 한 가지는 해왕성이 태양계의 행성 가운데 바람이 가장 세다는 것이다. 시속 2,500km 정도의 강풍이 분다. 또한 해왕성 주위를 도는 위성은 확인된 것만 13개다. 역행 궤도로 유명한 위성이 트리톤이다. 이 위성은 질소/메탄 대기로 이루어져 있으며 대단히 춥다.

해왕성의 구름 꼭대기의 온도는 약 −210℃이다. 해왕성은 태양계에서 가장 차가운 행성에 속한다. 이는 해왕성이 태양으로부터 멀리 떨어져 있기 때문이다. 해왕성 중심부에는 고온의 기체와 암석이 있어 온도가 약 7,000℃에 달한다. 이것은 태양의 표면온도보다 뜨거운 온도다. 하지만 해왕성의 가장 바깥 층은 극도로 온도가 낮다.

1989년 보이저 2호는 해왕성을 근접 통과하다가 대암반이라는 지점을 발견했다. 이 점은 해왕성의 남반구에 있었다. 이것은 목성의 대적점과 비교된다. 또한 해왕성 주변에는 희미한 고리가 보인다. 이 고리들은 토성의 고리보다 훨씬 작다. 이 고리는 에드워드 귀넌의 연구팀이 발견했다. 처음에는 고리가 해왕성의 둘레를 다 감지 않은 상태에서 사라지 불완전하다고 생각되었으나 보이저 2호가 찍은 사진에 의해 완전한 고리임이 밝혀졌다.

B **1.** (A) **2.** (D) **3.** (B) **4.** (D)

[1]Material Cause / [2]Formal Cause / [3]Efficient Cause / [4]Final Cause

아리스토텔레스의 형이상학

아리스토텔레스는 전 시대를 통틀어 가장 영향력이 큰 사상가에 속한다. 과학이나 기술이 존재하기 전 그는 많은 학문 분야를 탄생시켰다. 그 중의 하나가 형이상학이다. 그는 모든 것의 원인은 그 시작을 살펴보면 알 수 있다고 했다. 또한 우리가 무엇인가의 원인을 알게 되면 과학적인 지식이 생긴다고 했다. 어떤 것의 존재를 알기 위해서는 그것의 존재 이유를 알아야 한다. 그는 이후의 모든 인과론에 대한 토대를 마련했다. 아리스토텔레스의 이론에 따르면 모든 원인은 일곱 가지 부류 중 하나에 해당된다.

그는 원인을 네 개의 대분류 속에 넣어 규정했다. 질료인(質料因)은 부분들이 결합한 결과 물체가 존재하게 되었다는 것이다. 이것의 예가 치즈버거이다. 치즈버거는 치즈와 빵, 고기를 모아 만들어진다. 하나씩 따로 있어서는 치즈버거가 아니다. 하지만 부분부분은 치즈버거의 존재 이유가 되는 것이다. 형상인(形相因)은 어떤 물질이 무엇인지를 말해 준다. 홍수의 형상인은 괴다한 수분이다. 시동인(始動因)은 변화에 대한 이유가 된다. 이것의 예로 다음을 들 수 있다. 불이 타고 있는데 비에 의해 불이 꺼진다. 왜냐 하면 비가 불을 멈추었기 때문이다. 목적인(目的因)은 무엇인가가 행해지는 목적이다. 이것의 예는 한 나라가 국경을 지키기 위해 전쟁을 하는 경우로, 이것이 전쟁의 목적인이다.

실체의 개념도 아리스토텔레스의 형이상학에서 다루었다. 그는 한 실체는 질료와 형상의 결합으로 생긴다고 했다. 그는 다섯 가지 주 요소를 규정했다. 뜨겁고 마른 것을 불, 차고 마른 것을 흙, 뜨겁고 축축한 것을 공기, 차갑고 축축한 것을 물, 천체를 구성하는 신성한 물질을 영기라고 명명했다.

아리스토텔레스가 기록한 이러한 분류는 근대 자연과학의 길을 열었다. 아리스토텔레스의 업적은 근대 물리학이 세워질 수 있었던 콘크리트 기초 공사에 비유할 수 있다.

C **1.** (C) **2.** (B) **3.** (D) **4.** (A)

[1]1809 / [2]1821 / [3]1823

세쿠오야

세쿠오야는 체로키 원주민이다. 그는 조지 지스트로도 알려졌다. 그의 장기는 은세공이었다. 하지만 그는 체로키 문자를 만든 것으로 유명하다. 그는 문자를 만든 사람의 명단에 오르는 명예를 얻었다.

세쿠오야가 출생한 날짜와 장소는 알려져 있지 않다. 이는 기록이 남아 있지 않기 때문이다. 역사가들의 어림짐작으로는 출생연도가 1760년과 1776년 사이쯤일 것으로 추측된다. 출생 장소는 테네시, 조지아, 노스 캐롤라이나, 앨라배마, 사우스 캐롤라이나 중의 한 곳일 것으로 짐작된다. 체로키족을 연구하는 저명한 역사가 제임스 무니는 사촌의 말을 인용해 세쿠오야와 그의 어머니는 테네시의 터스키기 마을에서 어린 시절을 보냈다고 말했다.

세쿠오야라는 이름은 "돼지"라는 뜻의 체로키어에서 왔다. 이 별명은 아동기 때의 장애를 묘사한 것일 가능성이 있다. 아니면 나중에 그를 장애인으로 만든 부상을 말한 것일 수도 있다.

세쿠오야의 아버지는 백인이거나 백인과 아메리카 인디언의 혼혈이었을 것이다. 하지만 세쿠오야는 영어를 하지 못했다. 다시 말해, 아버지가 그와 그의 어머니를 버렸을 가능성이 있다. 세쿠오야는 1809년 앨라배마의 윌스타운으로 이사했다. 그는 거기에서 은세공사로 일했다.

세쿠오야는 백인들의 문자에 종종 놀라곤 했다. 그는 영어가 적힌 종이를 "말하는 나뭇잎"이라고 부르곤 했다. 세쿠오야는 1809년경 체로키어의 문자를 만들기 시작했다. 그는 다양한 음절을 나타내기 위해 85개의 기호를 만들었다. 이 작업이 완결된 것은 12년 후의 일이다.

그런 다음 세쿠오야는 딸에게 자기가 만든 문자를 읽고 쓰는 법을 가르쳤다. 체로키 부족 사람들은 이것을 보고 놀라워했다. 하지만 체로키족의

주술사는 그가 악령에 씌었다고 말했다. 세쿠오야는 이 문자를 전사들에게 가르쳤다. 그러자 부족의 다른 사람들도 그것을 받아들였다. 1823년이 되자 체로키족은 이 문자 시스템을 완전히 인정했다. 이 문자로 인해 미래 세대들을 위해 역사를 기록할 수 있는 길이 열렸다.

D 1. Ⓓ 2. Ⓒ 3. Ⓐ 4. Ⓓ

[1]Union Pacific Line / [2]Central Pacific Line

최초의 대륙횡단 철도

최초의 대륙횡단 철도를 건설한 나라는 미국이다. 이 철도는 북아메리카를 가로질렀다. 공사는 1860년대에 시작해서 완공되었다. 철도는 미국 동부의 철도망을 캘리포니아와 연결했다. 1869년 5월 9일에는 그 유명한 골든 스파이크 행사가 열렸다. 이 행사는 철도 개통식이었다. 이 철도로 인해 전국 여행이 가능해졌다. 철도는 미국 서부의 인구와 경제에 변화를 가져왔다. 또한 이로 인해 마차가 자취를 감추게 되었다.

1862년의 태평양 철도 조례에 따라 철도를 건설하기로 합의했다. 연방 정부 역시 이 프로젝트를 적극 지원했다. 그러한 철로를 건설한다는 것은 10년간의 노력의 결실이었다. 이것은 아브라함 링컨의 최대 업적 가운데 하나였다. 철도가 완성된 것은 그가 사망한 지 4년 후였다. 철로 건설에는 엄청난 기술과 노동력이 요구되었다. 철로는 평원과 고산 지대를 통과했다. 철로는 유니언 퍼시픽 철도와 센트럴 퍼시픽 철도로 구성되었다. 두 철도 다 민영회사에서 건설했지만 연방 정부의 든든한 후원을 받았다. 이 철로는 동서를 연결했다.

철로의 건설은 남북전쟁의 불화가 동안 미국을 하나로 단결시킨다는 것을 의미했다. 이로 인해 서부에 백인들이 정착하게 되었다. 반면에 이 지역의 인디언들이 줄어들게 되었다.

유니언 퍼시픽 철로의 대부분은 아일랜드 노동자들이 건설했다. 남부군과 북부군의 퇴역군인 그리고 몰몬교인들 역시 철로 건설을 도왔다. 센트럴 퍼시픽 철로는 대부분 중국 노동자들에 의해 건설되었다. 처음에는 중국인들이 이런 종류의 일을 하기에는 너무 약하다고 생각되었다. 하지만 보다 많은 사람들을 중국에서 데려왔다. 대다수 인부들은 일당 1달러에서 3달러를 받았다. 하지만 중국인들의 보수는 훨씬 적었다. 마침내 중국인들은 파업을 거행했다. 이 파업으로 약간의 임금 인상을 얻어냈다.

E 1. Ⓑ 2. Ⓓ 3. Ⓑ 4. Ⓒ

[1]a lever / [2]the Colt revolver / [3]assembly lines

기계화

인간의 노동력에서 기계로의 변화를 기계화라고 이른다. 기계화는 인간의 역사를 완전히 바꾸어 놓았다. 기계는 훨씬 더 적은 힘으로 훨씬 더 많은 일을 하도록 해 준다. 인간은 역사를 기록하기도 전부터 간단하거나 복잡한 기계를 만들어왔다.

가장 간단한 기계는 지렛대이다. 지렛대는 물체의 아래 그리고 돌이나 다른 물체의 위에 설치하는 막대이다. 막대 밑의 물체는 받침점 역할을 한다. 이렇게 하면 막대에는 지레의 힘이 생긴다. 막대에 힘을 주어 밑으로 누르면 이 막대는 받침점에 힘을 가해 막대의 끝 부분으로 물건을 들어올린다. 지렛대를 이용하면 보다 적은 힘으로 보다 무거운 물체를 들어올릴 수 있다. 이것은 모든 기계 개발의 기본 원리이다. 최소한의 힘을 가하는 사람 대신 지렛대가 일을 해 주는 것이다.

한 가지 중요한 기계는 증기로 가동시키는 선반이었다. 이 장치는 금속 세공과 나무세공의 속도와 정확도를 높여주었다. 또 다른 유용한 기계는 증기기관으로, 이로 인해 증기선박과 증기철도가 가능했다. 이로 인해 운송수단에 혁명이 일어나게 되었다. 콜트 권총은 연속 발사가 가능한 최초의 기관권총이었다. 이 총 때문에 전쟁은 더욱 무시무시해졌다. 20세기 초에는 포드 조립 라인 덕분에 자동차 조립 라인이 기계화 되었다. 이로 인해 사람들의 작업 방식과 이동 방식에 변화가 생겼다.

"기계화"라는 용어는 군대에서도 사용된다. 이 용어는 장갑차량을 사용하는 것을 말한다. 병력수송장갑차도 이 차량의 일종이다. 이 차량은 대단히 많은 수의 군인을 전쟁터로 재빨리 실어 나를 수 있다. 또한 이 차량은 군인들을 보호해 전쟁터까지 가는 중간의 피해를 최대한 줄일 수 있었다. 과거에는 군인들이 전쟁터에 도착하기도 전에 사망하는 일이 많았다. 기계화로 인해 이동성과 전투력이 대단히 향상되었다. 현대 사회에서는 모든 무장 군인들이 기갑 보병대의 지원을 받는다.

F 1. Ⓒ 2. Ⓓ 3. Ⓒ 4. Ⓑ

14.8 million years ago / [2]700,000 years ago / [3]10,000 years ago

매머드

가장 흔히 발견되는 선사시대 화석이 매머드 화석이다. 매머드는 코끼리의 변종으로 지금은 멸종했다. 매머드는 엄니라고 하는 긴 곡선 모양의 이빨이 있었다. 북부 종은 두터운 털로 덮여 있었다. 매머드는 홍적세 동안 지구 위를 어슬렁거리며 돌아다녔다. 홍적세는 1백 6십만 년 전부터 약 1만 년 전까지의 시기이다.

매머드의 혈통은 현대의 인도코끼리와 아주 비슷하다. 두 종의 아프리카 코끼리는 인도코끼리만큼 매머드와 비슷하지는 않다. 인도코끼리와 매머드의 공통 조상은 아프리카코끼리 혈통에서 갈라져 나왔다. 이 분기는 약 6백만 년 전에 서부의 7백 3십만 년 전에 일어났다. 인도코끼리와 매머드는 그로부터 5십만 년 후에 서로 갈라져 나왔다.

과학자들은 매머드가 처음에 북아프리카에서 진화했다고 믿는다. 매머드의 기원은 약 4백 8십만 년 전으로 거슬러 올라간다. 이 정도 오래된 것으로 추정되는 뼈가 차드, 리비아, 모로코, 튀니지에서 발견되었다. 남아프리카와 케냐에 있는 지역에서도 매머드의 가장 오래된 종으로 보이는 화석이 나왔다.

그 후 아프리카매머드가 이동했다. 화석 기록에 의하면 아프리카매머드는 북으로 이동해 유럽에 이르렀다. 얼마 지나지 않아 난대매머드라고 하는 새로운 종이 나왔다. 이 종은 아시아와 유럽 지역에 서식했다. 연구 작업을 통해 지금은 가라앉은 베링해협 육교를 건너갔다는 것이 밝혀졌다. 이것은 현재의 시베리아와 알래스카를 지나 아시아와 북아메리카를 연결했던 얼어붙은 땅 덩어리였다. 이로 인해 매머드가 북아메리카에 상륙했다.

그러던 중 7십만 년 전경, 따뜻하던 기후에 변화가 생겼다. 유럽, 아시아, 북아메리카 등지에서 사바나 평원은 더 춥고 덜 비옥한 스텝 초원이 되었다. 남대매머드는 제일 먼저 멸종되었다. 새로운 종인 양털매머드가 3십만 년 전 발달했다. 이 종은 두터운 털로 덮여 있었다. 그래서 빙하기의 극심한 추위를 견뎌낼 수 있었다.

Building Summary Skills

1. Neptune

Neptune is [1]the outermost planet of the solar system and is [2]the fourth largest in diameter and the third largest in mass. Its atmosphere is composed mostly of gas, and it has [3]a vivid blue appearance. There are many strange facts about the planet, such as its high winds, 13 moons, and [4]hot core temperature that make it interesting to scientists. The only human probe ever to visit and collect information of Neptune was [5]Voyager 2.

2. The Metaphysics of Aristotle

Aristotle was one of the most important thinkers of all time because he created many fields of study, one of which is [1]metaphysics. He created the guidelines for understanding [2]the causes of things, of which there are [3]four major categories. He made many conclusions about [4]the substance of matter and form as well as defining five major elements. His classifications laid important foundations for [5]modern science that are used today.

3. Sequoyah

Sequoyah was a [1]Cherokee Native American who is famous for creating the first system of writing for the Cherokee people. His exact place and date of birth are unknown because his people lacked [2]a system of writing for recording historical data. After 12 years of work, Sequoyah created a writing system for the Cherokee language that used [3]85 characters to represent the sounds of the language. This system was at first rejected by the Cherokee people, but they later accepted it after Sequoyah taught it to [4]a group of respected warriors. This system gave the Cherokee people a way to [5]record their history for future generations.

4. The First Transcontinental Railroad

The first transcontinental railroad to [1]run across North America was completed in 1869 and commemorated with the famous Golden Spike event. The railroad was heavily backed by [2]the federal government and stands as one of the great achievements of [3]President Abraham Lincoln. The building had many effects, such as bringing the Union states together during the Civil War as well as leading to the decline of [4]Native Americans in the West by populating it with white settlers. Much of the railroad was built by immigrant laborers from [5]Ireland and China as well as by veterans of the Union and Confederate armies and Mormons.

5. Mechanization

[1]Human history has been changed by the shift from human labor to [2]mechanization. A good example of a simple machine that relieves a human of labor is [3]the lever. Some very important machines were [4]the steam-powered lathe, steam-powered trains, the Colt revolver, and the mechanization of car assembly lines. Military forces have also mechanized their forces, which results in many advantages in [5]warfare.

6. The Mammoth

The mammoth was [1]a prehistoric variety that is now extinct and whose fossil remains are the most commonly found. Mammoths are most closely related to [2]the Asian variety of elephant, having genetically split off from the African varieties of elephant [3]over 7 million years ago. Due to fossil evidence, scientists believe the mammoth originally evolved in [4]North Africa and then migrated around the world, ending up in North America. Mammoths began to die off due to [5]climate changes that began 700,000 years ago.

Mini TOEFL iBT

1. (B) **2.** (D) **3.** (B) **4.** (D) **5.** (A) **6.** (C)
7. (B) **8.** (D) **9.** (D) **10.** (A) **11.** (C) **12.** (B)

흑점

흑점이란 태양 표면에 있는 검은 부분을 말한다. 흑점은 수천 년 동안 천문학자들에게 신비의 대상이었다. 중국 천문학자들도 기원전 28년 이에 대한 기록을 남겼다. 그들은 가장 큰 점들을 볼 수 있었다. 태양 섬광이 중앙아시아 사막에서 불어오는 먼지 바람에 의해 걸러져 흑점이 보인 것이다. 서양에서는 중세 동안 큰 흑점이 관찰되었다. 하지만 이러한 현상이 분명하게 이해가 된 것은 1612년 갈릴레오의 설명을 통해서였다.

흑점은 1700년 이후로 천문학자들에 의해 기록되었다. 현재의 과학자들은 이러한 흑점의 출현 주기를 기원전 11,000년 전까지 추정할 수 있었다. 가장 최근의 흑점 추세는 1900년에서 1960년대까지로 바뀌었다. 태양은 8,000년도 더 전에 이와 비슷하게 활동이 활발했다.

흑점 지역은 주변보다 기온이 낮다. 또한 자기 활동이 더 활발하다. 자성이 강하기 때문에 태양의 정상적 대류가 제대로 일어나지 않는다. 그 결과 표면 온도가 낮아지게 된다. 하지만 이러한 지역은 너무 밝아서 직접 볼 수는 없다. 흑점은 절대 온도가 4,000도에 이를 정도로 낮다. 한편, 태양의 나머지 부분은 절대온도 5,700도에서 불타고 있다. 이러한 차이로 인해 가시적인 검은 점이 생기게 된다. 태양 외의 다른 항성에서도 "별의 흑점(starspot)"이라고 하는 비슷한 흑점이 관찰되었다.

왜 흑점이 생기는지는 분명하게 밝혀지지 않았다. 하지만 흑점이 태양의 대류층에 있는 자기 선속관에 해당하는 것은 분명하다. 자기 선속관은 계차 회전에 의해 "감기게" 된다. 선속관에 가해지는 힘이 일정 한계에 이르게 되면 선속관은 고무밴드 같이 꼬여서 태양의 표면을 뚫고 나오게 된다. 이 지점에서는 대류가 억제된다. 그러면 태양 내부에서 나오는 에너지 흐름이 감소해서 표면 온도가 내려가게 된다.

흑점의 수는 태양복사열의 강도와 관련이 있다. 위성의 복사열 측정이 가능해진 1979년 이후로 이러한 관련성이 기록되었다. 흑점은 어둡기 때문에 점이 많을수록 태양복사열이 적은 게 당연하다고 짐작한 것이다. 하지만 흑점 주위는 더 밝다. 그래서 전체적으로는 흑점이 많으면 태양이 더 밝게 보인다. 하지만 이런 차이는 너무 미미해서 육안으로는 관찰할 수가 없다. 마운더 극소기라고 하는 시기는 태양에 거의 흑점이 없었던 때이다. 이 당시 지구 온도가 1℃ 정도 내려갔을 것으로 생각된다.

뇌우의 빈도

뇌우는 번개와 천둥이 치기 때문에 전기 폭풍이라고 불린다. 이러한 심한 폭풍은 폭우나 우박을 만드는 작란운에 의해 생긴다. 드물게는 눈이 내리기도 한다. 이 눈은 보통 겨울에 내리며 뇌설이라고 불린다.

불안정한 대기에서 많은 응결이 일어날 경우 뇌우가 형성된다. 이 과정에서 다양한 물방울과 얼음결정이 생긴다. 심한 상방운동이 이것을 떠받친다. 이 현상은 세 가지 조건이 특징이다. 첫 번째는 지온 대기 속의 충분한 수분이다. 이것이 높은 이슬점에 의해 반사된다. 두 번째는 큰 기온 하락과 고도의 증가이다. 이것을 단열감률이라고 한다. 세 번째는 자동수렴과 같은 힘이다. 이 힘은 한랭전선을 따라 발생하며 양력을 집중시킨다.

뇌우는 세계 전역에서 발생한다. 심지어 극지방에도 뇌우가 발생한다. 가장 폭풍이 많이 치는 지역은 열대우림이다. 이 곳에서는 거의 매일 일어난다. 우간다의 캄팔라와 토로로는 지구상에서 뇌우가 가장 빈번한 곳이다. 인도네시아의 보고르 역시 뇌우가 빈번히 발생한다. 온대지역에서는 뇌우가 대부분 봄에 발생한다. 하지만 연중 어느 때고 한랭전선을 따라 일어난다. 플로리다는 열대지방을 제외하고 뇌우가 가장 빈번한 곳이다. 심한 폭풍이 플로리다의 남부와 중부를 습격한다. 여름에는 하루가 멀다 하고 뇌우가 치는 일도 종종 있다.

미국은 가장 강력하면서도 위험한 폭풍이 친다. 가장 심한 폭풍은 중서부와 남부 주를 강타한다. 이러한 폭풍은 대단히 큰 우박을 내리게 만든다. 또한 강력한 토네이도가 되기도 한다. 뇌우는 미국의 서부 해안에는 잘 내리지 않는다. 하지만 내륙 지역은 다르다. 새크라멘토와 캘리포니아의 샌 호아퀸 밸리는 뇌우가 발생한다. 북서부의 폭풍은 중서부와 비슷한 패턴을 가진다. 하지만 빈도와 강도 면에서는 훨씬 약하다.

초기의 인류 문명은 잦은 뇌우에 의해 영향을 많이 받았다. 로마인들은 불칸이 만든 번개를 주피터가 던져서 생긴 전투라고 생각했다. 뇌우가 점점 자주 발생하자 로마인들은 화난 신을 달래기 위해 많은 동물을 제물로 바쳐야 한다고도 생각했다. 아메리카 인디언들은 이러한 뇌우가 "위대한 영"의 하인들과 관련 있다고 믿었다. 또한 빈도는 영의 분노와 관련이 있다고 느꼈다. 요즘에는 매년 봄이면 폭풍을 좇는 사람들이 미국의 대평원과 캐나다의 평원으로 향한다. 여름이 되면 이들은 눈으로 그리고 과학적 방법을 사용해 폭풍과 토네이도를 조사한다. 이런 스릴을 즐기는 사람들에게는 뇌우가 잦을수록 모험에 대한 욕구가 더 많이 충족된다.

Vocabulary Review

A

1. (A) 2. (C) 3. (B) 4. (A)
5. (A) 6. (C) 7. (B) 8. (B)

B

1. d 2. h 3. j 4. c 5. b
6. g 7. f 8. i 9. e 10. a

Unit 7 Inference

Skill & Drill

1. (D)

해면동물

해면동물은 스폰지 같은 동물이다. 이 동물은 해면동물문에 속한다. 이들은 물 속에 사는 원시적 여과섭식 동물이다. 해면동물은 동물 가운데 가장 단순한 동물에 속한다. 진정한 의미의 조직도 없다. 또한 근육, 신경, 내부 기관도 없다. 알려진 종의 수는 5천 종이 넘는다. 바위 표면에 붙어 있으며 조간대에 서식한다. 8,500m 이상의 깊이에서 발견되기도 한다. 해면동물의 화석 기록은 선캄브리아대로 거슬러 올라간다. 하지만 지금까지도 새로운 종이 발견되는 일이 흔하다.

2. (A)

테노치티틀란

테노치티틀란은 고대 아즈텍 왕국의 수도였다. 현재 멕시코시티가 위치한 곳이다. 이 고대 도시는 텍스코코 호수의 작은 섬들 위에 건설되었다. 이 도시 계획은 좌우대칭적 배열에 기초를 두고 있었다. 도시는 캄판이라고 하는 네 부분으로 나누어졌다. 도시는 수로로 연결되었는데, 이는 유용한 교통수단이 되었다. 이 도시는 제사경내를 중심으로 한 정해진 계획에 따라 건설되었다. 이 곳에는 도시 위로 60m 높이까지 솟아있는 테노치티틀란 대피라미드가 있었다. 집은 나무와 흙으로 만들었다. 지붕은 갈대로 엮었다. 하지만 피라미드, 사원, 궁전은 일반적으로 돌로 만들었다.

3. (B)

전자음악

전자음악은 장치를 사용해 만든다. 이 모든 장치를 전기로 움직인다. 이 장치들은 소량의 전력을 사용한다. 전자음악이 나오기 전에 많은 작곡가들은 새 기술을 사용하고 싶어했다. 그들은 이 기술을 이용해 음악을 만들려고 애썼다. 새로운 전자 디자인과 기계 디자인을 사용한 몇 가지 악기가 만들어졌다. 무그 키보드도 그러한 악기 중의 하나이다. 이 키보드는 1970년대 영화 "시계태엽 오렌지"에 쓰인 베토벤 곡을 녹음하는 데 사용되었다. 이것이 최초의 전자음악 녹음이다. 1990년대 말기에는 전자음악이 여러 장르로 갈라졌다. 종류와 세부 종류가 너무 많아 일일이 다 열거할 수 없을 정도다. 전자음악은 엄격한 규칙이 없다.

4. (D)

해류

지구의 대양으로 흘러 들어가는 물의 자속적인 운동으로 해류가 발생한다. 해류는 수천 킬로미터를 흐르기도 한다. 해류는 바다와 접한 지역에서 보다 빈번히 발생한다. 멕시코만류가 가장 좋은 예다. 멕시코만류 때문에 북서유럽은 같은 위도에 위치한 다른 지역보다 기후가 훨씬 온화하다. 하와이제도도 또 다른 예다. 이 곳의 기후는 동일한 위도에 위치한 섬들에 비해 시원하다. 이것은 캘리포니아 해류 때문이다. 표층 해류를 피악하는 것은 중요하다. 그러한 정보들로 인해 선박 운임이 대단히 절감된다. 이는 해류의 움직임이 배를 밀어주기 때문이다. 이 때문에 연료비를 크게 절감시킬 수 있다.

Practice with Long Passages

A **1.** (C) **2.** (B) **3.** (D) **4.** (A)

[1]Megabats / [2]Microbats

박쥐와 음파탐지법

박쥐는 앞다리가 날개로 진화한 포유동물이다. 이 때문에 박쥐는 포유동물 가운데는 유일하게 비행이 가능하다. 전 세계적으로 약 1,100종의 박쥐가 있다.

박쥐는 큰박쥐아목과 작은박쥐아목의 두 가지 아목으로 나눈다. 큰박쥐아목의 박쥐라고 해서 작은박쥐아목의 박쥐보다 반드시 크지는 않다. 이 두 종류 박쥐 사이에는 두 가지 중요한 차이가 있다. 작은박쥐는 방향을 알아내기 위해 음파탐지법을 사용한다. 또한 이러한 능력으로 먹이를 찾기도 한다. 큰박쥐는 음파탐지 능력이 없다. 대신 두 번째 발가락에 발톱이 있고 앞다리가 있다. 작은박쥐는 이 발톱이 없다.

큰박쥐는 과일, 꿀, 꽃가루를 먹는 것으로 알려져 있다. 작은박쥐는 곤충, 큰 동물의 피, 작은 포유동물, 어류를 잡아먹는다. 작은박쥐가 사용하는 음파탐지법은 일종의 생물학적 음파탐지장치이다. 돌고래나 고래도 이 방법을 사용한다.

음파탐지법은 동물이 주위로 소리를 내는 방법이다. 그들은 그 지역에 있는 여러 가지 물체에 부딪쳐 되돌아오는 소리를 듣게 된다. 이 메아리를 사용해 물체의 위치, 거리, 정체를 확인한다. 자기가 낸 소리와 돌아온 메아리 사이의 시간 차를 이용해 거리를 알아낸다. 작은박쥐는 귀를 이용해 음파탐지를 한다.

1794년 한 과학자가 박쥐와 관련한 일련의 실험을 했다. 그는 박쥐가 청각을 이용해 길을 찾는다고 결론지었다. 하지만 과학계는 그의 연구 결과를 신뢰하지 않았다. 1938년 또 다른 과학자가 박쥐가 사용하는 초음파 음파탐지법을 설명했다.

작은박쥐는 완전한 어둠 속에서도 음파탐지법을 사용해 길을 찾고 먹이를 사냥한다. 그들은 해가 지면 동굴이나 보금자리에서 나온다. 그들은 어둠 속으로 먹이 사냥에 나선다. 음파탐지 능력 덕분에 특별한 틈새를 차지할 수 있다. 어둠이 내리면 많은 곤충들이 눈에 띈다. 이 곤충들은 상대적으로 포식자가 활동하지 않는 밤을 택해 밖으로 나온다. 이 시간대에는 경쟁도 훨씬덜 한데다 박쥐 자신들을 잡아먹는 종도 훨씬 적다.

B **1.** (B) **2.** (D) **3.** (C) **4.** (B)

[1]Emphasized the new over the traditional / [2]Eduard Manet, Claude Monet, and Gustave Eiffel

모더니즘

모더니즘은 진보를 위한 운동이었다. 모더니즘은 20세기의 모든 영역에 불이 닥쳤다. 모더니즘은 인간의 능력을 강조했다. 또한 전통적인 방법을 버리도록 조장했다. 모더니스트들은 자기 자신의 삶과 세계를 만들고 개선하고 고쳐나갈 수 있다고 믿었다. 그들은 과학과 기술의 도움으로 이것이 가능하다고 생각했다.

모더니즘은 사고의 변화를 알렸다는 점에서 매우 중요하다. 모더니즘은 산업혁명이 인간의 지성에 끼친 영향을 표현했다. 또한 예술, 철학, 기술의 합류점이기도 했다.

모더니즘의 역사는 여러 가지 운동으로 이루어진다. 이런 운동에 참여했던 사람들은 진보를 원했다. 첫 시작은 1800년대 중반 프랑스의 화가들이었다. 초창기에 활동했던 사람들은 에두아르 마네나 클로드 모네 같은 인상파 화가들이었다. 인상파 화가들은 사람이 그림의 대상을 보는 대신 사람들 눈에 모양이 나타나게 하는 빛과 음영만 본다는 것을 보여 주었다. 또 다른 초기 모더니스트로는 귀스타브 에펠을 들 수 있다. 그가 만든 에펠탑은 건축과 건축의 가능성에 대한 사람들의 생각을 변화시켰다.

하지만, 모더니스트들의 한 가지 문제는 그들이 종종 다른 모더니스트들의 진실성을 부인했다는 점이다. 이러한 충돌은 종종 대단히 상대적인 문제를 둘러싸고 발생했다. 그들은 어떤 스타일을 누가 시작했고 누가 다른 유명한 모더니스트를 더 따라 했느냐 하는 것을 둘러싸고 논쟁을 하곤 했다. 이러한 논쟁은 답이 없는 경우가 많았다. 단지 시간과 노력만 낭비될 뿐이었다.

어떤 역사가들은 20세기를 근대와 후기근대로 나눈다. 그들은 포스트모더니스트들이 소비재에는 모더니즘 스타일과 원칙을 사용했다고 말한다. 모던 스타일은 레코드 앨범 재킷이나 잡서, 런던 지하철의 상징 도안에도 사용되었다.

하지만 다른 이들은 모더니스트들과 포스트모더니스트들을 같은 부류로 본다. 그들은 모든 것을 회의적으로 보았다. 그들의 목표는 "진보"를 막고 있는 모든 것을 찾아내는 것이었다. 그 명분에 맞는 것이라면 무조건 갈아치웠다. 이러한 방식은 새로웠기 때문에 더 낫다고 여기졌다.

C **1.** (B) **2.** (A) **3.** (C) **4.** (B)

[1]ancient India and Greece / [2]the church in the Middle Ages / [3]Germany and Britain

음악극

음악극은 노래, 대사, 춤 등을 통해 이야기를 들려주는 일종의 오락물이다. 이것이 시작된 것은 수천 년 전이다. 최초의 뮤지컬은 고대 인도와 그리스에서 시작되었다. 그리스인들은 인기 있는 극에 음악과 춤을 가미했다. 위대한 그리스 극작가들은 자신들의 희곡과 어울릴 음악도 작곡했던 것으로 알려져 있다.

수백 년이 지나, 기원전 3년에 이 형태가 부활했다. 로마의 희극작가인 플라우투스가 자신이 쓴 극에 음악과 춤, 관현악 연주를 가미했다. 배우들은 큰 극장에서 관객들이 들을 수 있을 만큼 스텝 소리를 크게 하기 위해 신발에 금속침을 부착했다. 이것이 초기 형태의 탭 슈즈이다.

중세 동안에는 희극이 교회의 가르침을 전파하는 수단이 되었다. 찬송가에 맞춰 만들어진 종교극을 통해 기도서를 가르쳤다. 이러한 희극은 대단히 인기가 있어서 교회와는 상관없는 일종의 오락물이 되었다. 이 극에서는 산문체의 대화와 기도시의 찬송가가 번갈아 나와 관객의 흥미를 끌었다.

이러한 형태는 르네상스까지 이어져 이탈리아의 전통이 되었다. 우스꽝스러운 광대가 일반 백성들이 다 알고 있는 이야기를 이끌어나갔다. 이 희극적 오락은 오페라 부파라고 알려져 있다. 이 새로운 전통은 1600년대 프랑스로까지 전해졌다. 프랑스의 위대한 작가인 몰리에르가 그의 희극을 뮤지컬로 개작했다. 이 뮤지컬에는 장 밥티스트 륄리가 쓴 음악이 연주되었다.

이 형태의 오락물은 유럽 국가 사이에 널리 퍼졌고 변화를 거듭했다. 독일과 영국에서는 1700년대에 가서 두 가지 다른 종류의 음악극이 나타났다. 첫 번째는 발라드 오페라이다. 이 극적인 형태의 극은 당시의 인기곡을 빌려와 필요에 따라 가사를 개사했다. 하지만 코믹 오페라는 낭만으로 가득 찬 원래 악보와 줄거리가 있다는 점에서 차이가 있다.

D 1. Ⓓ 2. Ⓓ 3. Ⓒ 4. Ⓐ

[1]speed and control / [2]small movements / [3]momentum / [4]turning

어류의 지느러미

모든 어류는 몸이 유선형으로 되어 있어 물에서 쉽게 헤엄을 칠 수 있다. 몸의 일부가 진화해 지느러미가 되었는데, 이는 연골 조직으로 이루어진 부속 기관으로서 비늘로 덮여있다. 모든 어류는 몸에 몇 가지 종류의 지느러미가 있어 이를 이용해 헤엄을 친다. 지느러미는 방향 전환을 할 때도 쓰이고 속도를 높추거나 올리고, 정지해 물 속에서 한 장소에 머무를 때도 사용된다.

등지느러미는 등의 중앙에 위치해 있는데 뾰족하거나 뭉툭하다. 뾰족한 등지느러미는 속도를 증가시키는 반면 뭉툭한 지느러미는 센 물살에서 작은 물고기가 조절을 더 잘 할 수 있도록 해 준다. 등에 최고 세 개의 지느러미가 있는 경우도 있다. 이 지느러미 안에는 뾰족하거나 부드러운 두 종류의 지느러미 가시가 있다. 한 지느러미에는 이 두 가지 모두 또는 한 종류의 가시가 있다. 뾰족한 지느러미 가시는 끝이 날카롭고 심지어 독이 있는 경우도 있어 방어용 무기로 사용하기도 한다.

뒷지느러미, 가슴지느러미, 배지느러미에도 가시가 있다. 이 작은 지느러미들은 순식간의 이동과 같은 재빠른 이동을 가능하게 해 미세한 운동을 조절하게 해 준다. 이 지느러미들을 사용해 물고기는 먹이를 잡아먹거나 다른 물고기들과 대형을 이룰 때 몸의 위치를 조절한다. 뒷지느러미는 항문 아래쪽 제일 밑에 있다.

가슴지느러미는 새의 날개처럼 옆쪽에 있다. 이 연골 구조는 형태 면에서 육상동물의 앞다리에 해당된다. 짝을 이룬 배지느러미는 가슴지느러미의 아래쪽 뒤쪽에 있다. 이것은 육상생물의 뒷다리와 비슷하다. 이 지느러미를 펄럭거려서 물고기는 몸을 헤치고 나갈 수 있는 힘을 얻는다.

꼬리지느러미는 미기(尾鰭)라고도 불린다. 꼬리지느러미는 방향 전환이나 추진에 사용된다. 헤엄치는 속도가 대단히 빠른 일부 물고기는 꼬리지느러미 앞에 수병의 꼬리 용골 지느러미가 있다. 이것은 꼬리에 일종의 용기를 형성해 속도와 안정성을 높이는 역할을 한다.

E 1. Ⓐ 2. Ⓒ 3. Ⓐ 4. Ⓒ

[1]parietal lobe / [2]occipital lobe / [3]cerebellum

인간 뇌의 기능

인간의 뇌는 열구에 의해 두 부분으로 확실히 나누어진다. 한쪽에 있는 모든 구조는 반대쪽에도 대칭적으로 나타난다. 하지만 양쪽은 서로 주요 기능이 다르다. 그래서 사람들이 좌뇌 또는 우뇌만 사용한다는 잘못된 믿음이 생겨난 것이다. 하지만 완전한 기능을 하는 인간이라면 모든 기술과 기능을 선보이기 위해 뇌의 양쪽을 다 사용하기 때문에 이는 사실이 아니다.

인간의 뇌는 다섯 부분으로 되어 있다. 소뇌뿐만 아니라 두정엽, 전두엽, 후두엽, 측두엽이 그것이다. 두정엽은 신체의 각 부분에서 온 감각 정보를 결합시키는 부분이다. 또한 시각을 통한 공간 판단을 하는 데도 쓰인다. 이 부분은 뇌 가운데 가장 밑 밝혀진 부분이다.

전두엽에는 뇌의 회와 운동 피질 조직이 있다. 이 부분을 통해 신체의 수의적 운동을 조절한다. 전두엽은 또한 충동 제어, 판단, 기억, 언어, 운동 기능, 문제 해결, 성적 행동, 사회화, 자발성 등을 지배하는 것으로 알려졌다.

후두엽은 시각 정보를 처리하는 부분이다. 네 개의 엽 가운데 크기가 가장 작으며 뇌의 뒷부분에 위치해 있다. 이 부분은 색깔, 공간, 운동 인지 등을 담당한다. 이 부분이 손상을 입으면 시력을 손상하게 되거나 아예 잃게 되기도 한다.

측두엽은 뇌의 양쪽 아래쪽에 위치해 있다. 이 부분은 후각 피질이 있다. 측두엽은 청각 능력을 제어하고 청각 정보를 처리한다. 또한 말하기와 같은 고도의 처리 작업을 제어한다. 이해, 장두 기억, 명명, 언어와 같은 기능도 이 부분에서 담당한다.

소뇌는 뇌의 아래쪽에 위치해 있으며 척수와 연결되어 있다. 이 부분은 감각 인지와 신경계를 통한 근육 제어가 만나는 곳으로 기능한다.

F 1. Ⓓ 2. Ⓒ 3. Ⓐ 4. Ⓑ

[1]Cotton and cattle / [2]Northern areas / [3]Hogs and corn

미국의 농업

미국 경제의 기초는 농업이다. 농업은 미국의 모든 시민을 먹여 살린다. 또한 전 세계 다른 국가에 식량을 수출하기도 한다. 전체 인구를 먹이 살릴 수 있는 농업 기반을 마련하기 위해 수 세기 동안의 노력이 필요했다.

식민지의 서부 이동으로 인해 농장이 미국 전역에 퍼지게 되었다. 정착자들은 새로운 지역에 이주해 농장을 만들었다. 그들의 노력으로 새로운 마을과 도시가 탄생했다. 이러한 새로운 지역을 낳은 공급망은 미국 전역을 가로지르는 도로가 되었다.

북부 지역에서는 밀을 경작하는 경우가 많았다. 그것은 밀이 추운 지역에서도 잘 자랐기 때문이다. 밀은 일반적으로 새로 정착한 땅에 심었다. 이러한 새로운 지역은 "밀 전선"으로 알려졌다. 새로 만들어진 밀 농장 지역은 수년에 걸쳐 서쪽으로 이동했다. 밀 농장이 이동하면서 보다 다양화된 농장이 대신 들어서게 되었다.

중서부 지역에서는 주로 옥수수와 돼지를 함께 길렀다. 옥수수와 돼지는 서로 보완작용을 했다. 수로와 철로가 있기 전이었기 때문에 곡식을 시장까지 팔러 가기가 힘들었다. 그래서 돼지에게 곡식을 먹이면 돼지는 운반하기가 훨씬 용이했다.

따뜻한 남부 지방에서는 면화와 소가 가장 인기 있는 작물이었다. 그 이유는 두 가지 다 더위에 강하기 때문이었다. 담배 농사도 인기가 있었다. 남북전쟁 때까지는 노예를 이용해 담배농사를 지었다. 북동부에서도 노예를 이용해 농사를 지었다. 이런 관행은 1800년대 초반까지 계속되었다. 하지만 중서부 지역에서는 노예가 금지되었다. 1787년의 "자유법령"으로 노예제도가 금지되었다.

대공황 동안 중서부 지역의 많은 지역에서 사람들이 떠났다. 이는 먼지 폭풍이 휩쓸고 지나가 토양을 농사에 쓸 수 없는 상태로 만들어 버렸기 때문이다. 이 지역은 그 뒤 국유림이 되었다. 하지만 1940년 2차 대전을 지원하기 위한 노력으로 이 지역을 농장으로 바꾸려는 노력이 있었다.

Building Summary Skills

1. Bats and Echolocation

Bats are [1]the only mammals that can fly. There are two suborders of bats: [2]megabats and microbats. These bats are different from each other. Megabats have a claw on their legs and are typically [3]herbivorous. Microbats use [4]ultrasound echolocation to get around and hunt insects, small animals, and fish. They usually [5]hunt at night when there are a lot of insects, much less competition for food, and fewer enemies.

2. Modernism

[1]Modernism was an important movement in [2]the twentieth century. It encouraged people to forget about traditional ways and to try to [3]improve their lives. Its members, like [4]Eduard Manet and Gustave Eiffel, wanted to create progress. But sometimes they got into [5]useless arguments. Still, the effects of modernism can be seen everywhere today.

3. Musical Theater

The musical theater is a kind of [1]entertainment that is very old. It goes back to [2]ancient India and Greece. Over the years, it has undergone a number of different changes. The church in the Middle Ages used it to tell [3]religious stories. Other cultures created [4]musical theater productions that were [5]comedies or dramas.

4. The Fins of Fish

An important evolutionary development in fish is their fins. [1]Dorsal fins are located on the back and help the fish [2]control its speed. The anal, pectoral, and pelvic fins let the fish [3]dart quickly through the water. The pectoral fins [4]on the side of fish help give them momentum. And the tail fins let the fish [5]turn in the water.

5. The Functions of the Human Brain

The human brain is divided into two separate halves, [1]the left and right. There are five different sections: the parietal, frontal, occipital, and temporal lobes and the cerebellum. [2]The parietal lobe controls sensory information, while the frontal lobe controls [3]the body's movements. [4]The occipital lobe controls vision, and the temporal lobe controls hearing. The cerebellum controls [5]the senses and muscles.

6. Agriculture in America

[1]Agriculture has long been important in America for a number of reasons. As people [2]moved west across the country, they lived by [3]farming the land. Various regions in the country raised different [4]crops and animals, including cotton, wheat, corn, hogs, and cattle. Some parts of the country have gone back and forth between being [5]farmed and unfarmed.

Mini TOEFL iBT

1. (A) **2.** (B) **3.** (C) **4.** (D) **5.** (B)
6. Endoparasites (B), (D), (F) / Ectoparasites (A), (E)
7. (A) **8.** (D) **9.** (C) **10.** (C) **11.** (D)
12. (B), (C), (E)

기생

기생관계란 두 가지 다른 종 사이의 관계를 말한다. 기생관계에서는 한 종이 다른 종에게 피해를 입히게 된다. 기생관계라는 말을 쓰기 위해서는 두 생물이 오랫동안 함께 살아야 한다. 여기에는 먹이를 사냥하거나 잡아먹는 동물 또는 숙주에게서 피를 빨아먹는 모기 등은 해당되지 않는다.

기생충에는 체내기생충과 외부기생충의 두 가지가 있다. 체내기생충은 숙주의 몸 속에 기생한다. 그 예는 십이지장충으로 사람이나 동물의 위 안에 산다. 이 기생충의 대부분은 수동적 방법으로 숙주를 찾는다. 그들은 장에 산다. 장에서 알을 낳아 배설물을 통해 외부 환경으로 나가게 된다. 일단 숙주의 몸 밖으로 나가게 되면 비위생적인 환경에서 다른 사람이나 동물에 의해 몸 속으로 들어가게 된다.

외부기생충은 숙주를 찾는 복잡한 방법들을 개발했다. 어떤 바다거머리는 운동 감각기관을 사용해 숙주를 찾는다. 그들은 피부의 온도와 화학적 단서를 통해 숙주의 정체를 파악한다. 일단 마음에 드는 숙주라는 사실을 확인하면 고리와 같은 이빨을 움직이 달라붙는다. 달라붙은 뒤에는 피부에 구멍을 뚫고 피를 빨아먹기 시작한다.

기생충은 숙주에게서 영양분을 얻는 방법에 따라 크게 사물영양체와 활물영양체의 두 가지로 구분된다. 사물영양체란 숙주가 죽을 때까지 숙주의 조직을 소비하는 기생충이다. 이 관계에서는 숙주가 조직이나 영양분의 손실로 보통 죽게 된다. 활물영양체는 숙주가 죽으면 숙주에 기생해 살 수가 없다. 자신들이 살아남기 위해서는 숙주를 살려야 한다. 많은 바이러스들이 활물영양체이다. 그들은 숙주의 유전적 세포 과정을 이용해 번식한다.

활물영양 기생은 생물이 생존하는 아주 흔한 방법이다. 전체 동물 가운데 적어도 절반 이상이 생의 어느 시점에서는 기생생활을 한다. 여기에는 태아가 어머니의 자궁 속에서 사는 시기도 해당된다. 이런 습성은 식물과 균류에서도 흔히 일어난다. 자유생활을 하는 모든 동물들은 한 종류 이상의 기생충의 숙주가 된다.

일부 기생충은 사회성이 있다. 이들은 사회성이 있는 숙주 종의 습성을 이용하는 법을 안다. 선충 같은 일부 기생 곤충은 개미나 흰개미 군락에 빌붙는다. 그들은 그 군락이 너무 약해 더 이상 존재할 수 없게 될 때까지 군락의 구성원을 잡아먹는다. 많은 종의 뻐꾸기들은 숙주가 잡은 먹이를 훔친다. 심지어 자신의 알을 다른 새의 둥지에 낳아 다른 새에게 유모 역할을 시키기도 한다. 뻐꾸기 어미는 스스로 살아가는데 비해 뻐꾸기 새끼는 다른 종의 어미 새에 의해 키워진다.

판게아

1900년대 초반의 과학자들은 대륙이동설을 생각해냈다. 그들은 오늘날 우리가 알고 있는 일곱 개의 대륙이 아주 옛날에는 하나의 거대한 대륙이었다고 말했다. 알프레드 베게너라는 사람은 그 대륙을 판게아라고 불렀다. 판게아라는 이름은 "전지구"를 뜻하는 그리스어에서 나왔다.

이 이론은 엄청난 논쟁을 불러 일으켰다. 이 이론의 시간표는 지구의 나이가 수천 살에 불과하다는 일반적인 생각과 상충되었다. 사람들은 자연의 힘으로 지구가 형성되었다기보다는 신이 지구를 만들었다고 믿고 싶었다. 1920년 베게너는 대륙이동설을 지지하는 주장을 했다.

판게아는 적도를 가로질러 C자 모양으로 생긴 땅이었다. 초생달 모양 안쪽으로 있는 거대한 바다는 테티스해라고 불렀다. 대륙 주위의 거대한 해양은 판탈라사라고 불렀다.

판게아는 대단히 광대했을 것이다. 내륙 지방은 수분 부족으로 극도로 건조했을 것이다. 동물들은 북극에서 남극 사이를 자유롭게 이동할 수 있었다.

판게아의 분열에는 세 개의 주요 단계가 있었다. 분열은 약 1억 8천만년 전에 시작된 것으로 생각된다. 이것은 쥐라기 때에 해당된다. 수백만 년에 걸쳐 판게아는 오늘날 우리가 알고 있는 일곱 개의 대륙으로 분열되었다.

분열의 첫 단계는 약 1억 8천만 년 전에 시작되었다. 이 변화는 커다란 단층선이 단절되면서 시작되었다. 원인은 아마도 지진이나 화산 폭발이었을 것이다. 판게아에 테티스해에서 동쪽으로 뻗은 단층이 생겼다. 이 단층은 지금의 북아메리카와 아프리카 사이에 생겼다. 첫 번째 분열로 처음보다 작은 두 개의 대륙이 생겼다. 남쪽 대륙은 곤드와나, 북쪽 대륙은 로라시아라고 알려졌다.

분열의 두 번째 단계는 약 1억 5천만 년과 1억 4천만 년 사이에 시작되었다. 이 때에 작은 쪽이었던 곤드와나 대륙이 네 개의 대륙으로 쪼개졌다. 이 대륙들이 아프리카, 남아메리카, 인도, 오스트레일리아이다.

분열의 세 번째이자 마지막 단계는 약 6천만 년에서 5천 5백만 년 전에 일어났다. 북아메리카가 유라시아에서 갈라져 나왔다. 이로 인해 노르웨이해가 생겼다.

하지만 이 이론을 지지하는 사람들은 판게아가 최초의 초대륙이 아니었다고 말한다. 그들은 지구의 지질 역사를 추적해 일곱 개의 다른 대륙 면들을 재구성했다. 판게아 이전의 가장 최근의 대륙은 판노시아라고 한다. 학자들은 이 대륙이 약 6억 년 전에 생겼을 것으로 생각한다. 그들은 이 대륙이 5천만 년 후에 갈라졌을 것으로 믿는다. 이보다 더 오래된 대륙은 로디니아라고 한다. 학자들은 11억년 전에 생겨 7억 5천만 년 후에 갈라졌을 것이라고 생각한다. 가장 빠른 초대륙은 아마 콜롬비아일 것이다. 학자들은 이 대륙이 18억 년에서 15억 년 전 사이에 존재했다고 믿는다.

Vocabulary Review

A

1. (A)	2. (C)	3. (B)	4. (B)	
5. (A)	6. (D)	7. (B)	8. (D)	

B

1. d	2. f	3. i	4. c	5. j
6. h	7. e	8. b	9. a	10. g

Unit 8 Insert Text

Skill & Drill

1. C

분자

분자란 두 개 이상의 원자가 모인 것이다. 이 물질은 항상 더 작은 동일 물질로 쪼개지지는 않는다. 분자는 어떤 물질의 가장 작은 입자라고 생각된다. 분자 상태에서는 구성과 화학적 특성이 유지된다. 많은 물질들이 원자나 이온들로 이루어져 있다고 생각하는 편이 더 맞는 얘기다. [이 편이 개념을 이해하기가 더 쉽다.] 과학자들은 물질을 분자 단위보다는 차라리 이런 식으로 생각한다. 분자는 2개 이상의 원자로 이루어진 안정된 실체이다. 분자에 대한 개념이 처음 등장한 것은 1811년이었다. 아보가드로라는 과학자가 분자의 개념을 소개했다.

2. C

식(蝕)

"식(蝕)"을 뜻하는 영어 단어 "eclipse"는 "사라지다"라는 뜻의 그리스어에서 나왔다. 식은 천문학적 현상이다. 한 천체가 다른 천체의 그림자 안으로 들어가면 식이 생긴다. "식"이라는 용어는 주로 일식을 설명할 때 자주 사용된다. 일식은 달의 그림자가 지구 표면 위에 드리워지는 것이다. 또 월식도 있는데, 월식이란 달이 지구의 그림자 안에 들어오는 것이다. [하지만, 태양계 전체에 "식"이 일어난다.] "식"은 또한 지구와 달 바깥에서 일어나는 현상을 언급할 때도 사용되며 위성 중의 하나가 드리운 그림자를 통과하는 행성을 묘사할 때도 사용된다. 위성이 자기가 돌고 있는 행성이 드리운 그림자 안으로 들어가는 경우도 "식"이고 위성이 또 다른 위성의 그림자 속으로 들어가는 것도 "식"이다.

3. A

재즈

재즈는 미국에서 시작된 음악 예술이다. 재즈는 20세기 초경 뉴올리언즈

에서 처음 연주되었다. 재즈는 뿌리는 흑인음악에서 나왔다. [하지만 다른 영향도 많이 받았다.] 나중에는 서양 음악 기술 및 이론과 결합되었다. 재즈에는 블루노트, 스윙, 선창과 후창, 즉흥연주 등이 있다. 재즈는 흑인 사회에서 시작되어 1920년 대에 널리 퍼지게 되었다. 재즈는 많은 다른 음악 스타일에도 영향을 주었다. 20세기 초에 행진이나 댄스밴드에서 사용했던 악기가 재즈의 기본 악기가 되었다. 베이스, 갈대 피리, 드럼 등을 서양의 12음계와 함께 사용했다. 재즈라는 용어를 누가 어디서 처음 썼는지는 확실하지 않다.

4. B

소포클레스

소포클레스는 고대 그리스의 위대한 3명의 비극작가 중의 한 명이다. 한 문건에 의하면 그는 123편의 희곡을 썼다. 그는 희곡 경쟁 부분에서 다른 어떤 극작가보다도 많이 우승했다. 희곡 페스티벌에는 네 편의 희곡을 제출했다. 세 편은 비극이었다. 마지막 하나는 사튀로스극이었다. [이것은 드라마라기보다는 코메디에 가까웠다.] 그는 또한 참가했던 다른 모든 경쟁 부문에서 2위를 했다. 학자들은 그가 처음 참가를 했던 것은 아니라고 생각하지만 기원전 468년 첫 우승을 했다. 소포클레스의 비극 가운데 7편만이 완전한 형태로 전해진다. 이 가운데 가장 유명한 것은 오이디푸스와 안티고네에 관한 세 편의 희곡이다. 이 희곡들은 "오이디푸스 신화"로 잘 알려져 있다.

Practice with Long Passages

A **1.** (D) **2.** (C) **3.** 1A **4.** 2C

[1]Astronomy Precinct / [2]Clean, dry air / [3]12 telescopes

마누아 케아의 관측소들

마누아 케아에는 11개의 연구기지가 있다. 이곳은 전 세계에서 별을 관찰하기 가장 좋은 곳이다. 마누아 케아는 하와이말로 "하얀 산"이라는 뜻이다. 이 산은 하와이 섬에 있는 휴화산이다. 이곳은 태평양 해분에서 가장 높은 지점이다. 또한 섬에 있는 산 가운데 세계에서 가장 높은 산이기도 하다. 마누아 케아는 해저에서부터 9,750m의 높이에 위치해 있다. 해발 고도는 4,205m에 이른다. 정상은 지구 대기의 약 40% 위에 있다.

마누아 케아 위의 대기는 대단히 건조하고 깨끗하다. 이것은 정상 위의 구름 층 때문이다. 이 구름은 위층의 대기와 아래쪽의 촉촉한 해양 대기를 분리시킨다. 그래서 정상의 하늘은 깨끗하고 건조하다. 구름 때문에 정상 주위의 대기는 오염물질이 없다.

이런 청명함 때문에 마누아 케아는 별을 연구하기에 더없이 좋은 장소이다. 세상에서 맑은 하늘을 볼 수 있는 날이 가장 많은 곳이기도 하다. 이 곳에서는 모든 것이 눈에 잘 들어온다. 여기는 가시 인자도 꽤 높은 편이다. 별이 그토록 밝고 깨끗하게 보이는 또 다른 요소는 이 산에서부터 도시 불빛까지의 거리이다. 섬 전체에 적용되는 엄격한 조명법 덕분에 새까만 하늘을 볼 수 있다.

마누아 케아의 천문학 구역은 1967년에 만들어졌다. [만들어진 지 거의 40년이 되었다.] 천문학 구역은 보호 지역 내에 있다. 이 지역은 하와이에서 신성한 장소로 여겨지기 때문에 보호를 받는다. 이 구역은 천문학자들이 와서 별을 연구할 수 있는 국제 센터로 지어졌다.

과학자들의 기숙사는 정상 아래에 있다. 기숙사는 해발 약 3,000m 높이에 있다. 방문객 정보 센터는 그보다 100m 더 아래에 있다. 과학자들과 다른 방문객들에게는 30분간 더 낮은 높이에 머무르도록 한다. 이렇게 함으로써 정상에 오르기 전 적응 과정을 거치도록 하는 것이다. 그래야 고산병을 예방할 수 있다.

정상에는 12개의 망원경이 있다. 이 망원경들은 여러 국가의 회사와 기관에서 후원하고 있다. 하와이 대학은 두 대의 망원경을 관리한다. 두 대의 쌍둥이 망원경은 퀵천문대에서 관리한다. 수바루가 또 한 대의 망원경을 소유하고 관리한다. 영국은 적외선 망원경을 가지고 있으며, 캐나다와 프랑스는 공동 소유의 망원경을 가지고 있다. 또 다른 망원경은 캘리포니아 공과대학에서 소유 및 운영한다. [나머지들은 다른 곳에서 관리하고 있다.] 이러한 노력을 한 단체들은 인류가 지 바깥 세상을 더 잘 이해하도록 하는 데 일조하고 있는 것이다.

B **1.** (C) **2.** (D) **3.** 1A **4.** 2C

[1]element 104 / [2]element 106 / [3]element 105

원소 명명 논쟁

1960년대에는 미국과 소련 사이가 대단히 팽팽했던 때가 있었다. [이것은 냉전이 한창일 때였다.] 미국과 소련의 과학자들도 서로 논쟁을 했다. 이 때쯤, 많은 과학자들이 원소를 최초로 합성해 내려는 경쟁을 하고 있었다. 그들은 원소를 명명할 수 있는 권리를 갖는 순서에서 최초가 되고 싶어했다. 큰 논쟁이 일어났고 이 논쟁은 1997년까지 계속되었다. 이 문제는 몇 그룹의 학자들이 동일한 시기에 동일한 원소를 만들었다고 주장하면서 시작되었다. 이 사태와 관련된 주요 연구 기관은 버클리에 있는 미국 연구소와 두브나에 있는 소련 연구소였다.

소련 과학자들이 104번 원소를 만들었을 때 그들은 이고르 쿠르차토프의 이름을 따서 원소를 명명했다. 그는 소련 원자폭탄의 아버지였다. 미국인들은 이에 강력히 반대를 표명했다. 그들은 어떤 원소가 자기 나라를 파괴하기 위한 무기를 발명한 적의 이름을 따서 명명되는 것을 원치 않았다. 하지만 이미 핵무기를 만들었던 아인슈타인의 이름을 따서 한 원소를 명명했기 때문에 그들은 위선자라는 비난을 받았다.

그러자 국제원소명명위원회가 미국이 106번 원소를 시보기움으로 명명하는 것에 반대했다. 이것은 과학자 글렌 T. 시보그가 여전히 살아있었기 때문이었다. 그는 자기 서명이 든 주기율표를 나눠주고 있었다. 이것은 위원회 규칙에 어긋나는 일이었다. [그래서 사람들은 이 이름이 원소명이 되는 것을 허락하지 않았다.] 1994년 위원회는 새로운 원소 이름들을 제안했다. 그들은 이 논쟁을 해결하고자 했다. 그들은 104번 원소를 소련의 두브나 연구센터 이름을 따라 명명하기로 했다. 106번 원소는 시보그의 이름을 따르지 않기로 했다.

미국화학협회는 이 안에 반대했다. 그들은 106번 원소에 대한 명명권을 자신들이 가져야 한다고 느꼈다. 그들이 원하는 대로 명명할 수 있어야 했다. 국제위원회는 106번 원소에 대한 권리는 미국과 소련이 공동으로 갖기로 결정했다. 하지만 두브나 측에서는 아직 이름을 내놓지 않은 상태였다. 게다가, 이미 미국에서 출판된 책에는 이전 이름을 사용하고 있었다.

마침내 1997년 원소 이름에 합의를 보았다. 하지만 1999년 시보그는 105번 원소의 명칭 변경을 문제 삼았다. 이 원소는 하늄에서 두브늄으로 이름이 변경된 상태였다. 그는 두브나 측이 이 원소를 만든 것이라고 하지만 사실은 그렇지 않다고 주장했다. 하지만 두브나 측은 그들의 주장을 깎

으려 하지 않았다. 버클리에 있는 일부 과학자들은 아직도 105번 원소를 하늄이라고 부른다.

C 1. Ⓒ 2. Ⓓ 3. 1B 4. 2A
[1]Aristocles / [2]the early dialogues / [3]the *Republic*

플라톤

플라톤은 고대 그리스의 황금기에 태어났다. 그의 실제 이름은 아리스토클레스이다. 하지만 역사가들은 그가 우람한 체격 때문에 플라톤이라고 불렸을 것이라 생각한다. 그리스어로 "플라토"라는 말은 "넓은"이라는 뜻이다. 또한 플라톤은 이마가 크고 넓었던 것으로 전해진다. 그의 부모는 아테네에서 영향력이 있는 편이었다. 플라톤은 소크라테스의 제자로 시작했다. [그는 스승의 사상과 사고에 크게 영향을 받았다.] 스승이 죽자, 플라톤은 이집트와 이탈리아에서 공부했다. 그런 다음 아테네로 돌아가 직접 학교를 세웠다. 거기에서 플라톤은 소크라테스식 사고를 전수하려고 애썼다. 그는 학생들이 진리를 발견하도록 이끌었다.

플라톤은 소크라테스의 가르침을 전하려고 했다. 그는 스승의 대화를 기록하는 방법을 사용했다. 이 대화는 소크라테스에 관한 역사적 정보를 얻는 중요한 자료가 된다. 초기의 대화는 한 가지 주제만 다루었다. 하지만 이런 주제들에 관해 결론을 내리는 일은 거의 없었다. 플라톤의 대화편 중의 하나인 "에우티프론"은 윤리적 판단을 옹호하기 위해 권력에 호소하는 것에 대한 설명을 지적한다. "변명"은 철학적 삶을 묘사하고 있다. 이 설명은 소크라테스가 아테네 법정에서 자신을 변호하는 상황으로 제시되었다.

플라톤의 대화편은 소크라테스를 허구적 인물로 나타냈다. 하지만 중기 대화편은 철학적 문제에 관한 플라톤 자신의 견해를 피력했다. [여기에서는 소크라테스가 주인공이 아니다.] 플라톤은 "메논"에서 아무도 알면서 잘못된 행동을 하지는 않는다는 소크라테스의 견해를 적었다. 그는 또한 상기론을 소개했다. 이것은 미덕을 가르칠 수 있는지 없는지를 발견하려는 시도에서 이루어진다. "파이돈"에는 플라톤의 견해가 전개되어 있다. 이 저술은 형설론에 대해 설명한다. 그는 이러한 논쟁들을 통해 인간 영혼의 영원성을 주장하고 있다.

중기 대화편 가운데 걸작은 "국가론"이다. 이 저술은 정의의 본질에 대한 대화로 시작된다. 그런 다음 바로 정의, 지혜, 용기, 절제 등의 폭넓은 주제를 다룬다. 그는 이러한 요소들이 개인 각자 그리고 전체로서의 사회에 나타나는 방식에 대해 언급한다. 동굴의 비유는 인간 생활의 가능성에 대한 강력한 이미지를 전해준다. 대화편은 다양한 형태의 정부에 대한 개관으로 끝을 맺는다. 여기에는 이상국가에 대한 명백한 설명이 있다. 이상국가는 철학자만이 통치를 할 수 있는 국가이다. 또한 저술을 통해 정의가 부정보다 낫다는 것을 보여주고자 했다.

D 1. Ⓑ 2. Ⓐ 3. 1C 4. 2A
[1]modern dance / [2]new dance movements / [3]French fans

로이 풀러

로이 풀러는 현대무용 분야의 개척자이다. 또한 조명 기술 분야의 혁신가이기도 했다. 그녀는 시카고에서 출생해 아역배우로 출발했다. 나중에 빌 레스크, 보드빌, 서커스 등의 공연에서 춤을 추었다. 그녀는 자유무용 기법을 처음으로 시도한 사람이었다. 또한 그녀는 자신이 개발한 자연스러운 춤을 추었다. 뿐만 아니라 춤 동작과 흘러내리는 듯한 비단 의상을 결합시켜 독특한 공연을 선보이기도 했다. 그녀가 고안한 유색 조명으로 이것들에 조명을 주었다.

풀러는 미국에서 유명해졌다. 그녀는 "뱀 춤"과 같은 작품으로 유명했다. 하지만 그녀는 대중이 자신을 진지하게 여기지 않았기 때문에 행복하지가 않았다. 그녀는 사람들이 자신을 여전히 여배우로 여긴다고 느꼈다. [하지만, 유럽에서는 다르게 느꼈다.] 파리의 시민들은 그녀를 따뜻하게 맞아주었다. 그녀는 프랑스에 머물며 일을 계속했다. 그녀는 폴릭 베르제르에서 정기적으로 공연했다. 거기에서 그녀는 "불의 춤"과 같은 작품을 공연했다. 그녀는 아르 누보 운동의 신이 되었다.

많은 프랑스 예술가들과 과학자들이 풀러의 혁신적인 공연에 매료되었다. 그녀의 팬들 중에는 쥘 세레, 앙리 드 툴루즈-로트렉, 퀴리 부인과 같은 유명인들도 있었다. 풀러는 또한 무대 조명과 관련한 많은 특허를 신청하기도 했다. 여기에는 컬러 젤을 만드는 화학적 화합물도 있었다. 그녀는 심지어 프랑스천문학협회의 회원이기도 했다.

풀러는 초기의 현대무용가로서 많은 유럽 순회 공연을 가졌다. 그녀는 유럽에서 공연한 최초의 미국 현대무용가로 알려졌다. 또한 이사도라 던컨을 파리의 관객들에게 소개하기도 했다. 던컨은 현대무용을 진정한 예술 형태로 만든 것으로 유명하다.

풀러는 가끔씩 미국으로 돌아오곤 했다. 그녀는 저자들 곁에서 무대에 서기 위해 돌아왔다. 그들은 "풀리렛" 또는 뮤즈라고 불렸다. 하지만 마지막 순간에 그녀는 파리에 머물렀다. 1928년 그녀는 유방암 진단을 받았다. 그녀는 화장되었고 재는 파리에 묻혔다.

E 1. Ⓐ 2. Ⓒ 3. 1D 4. 2A
[1]Norman Lockyer / [2]Gerald Hawkins / [3]Alexander Thom / [4]Euan Mackie

고대천문학

많은 고대 사회에서 별을 연구했다. 이제는 많은 과학자들이 그 고대 사회의 별 관측 행태를 연구한다. 또한 그들은 별을 보기 위해 초기 사회에서 만들었던 도구들을 연구한다. 이런 형태의 고고학과 천문학은 현재 진지한 학문 분야로 연구되고 있다. 하지만 지옴에는 많은 논쟁이 있었다. 많은 사람들이 원시인들이 천문학을 이해할 수 있었다는 사실을 믿으려 하지 않았기 때문이다.

19세기 말에 천문학자 노먼 로키어는 이 분야에서 활발한 활동을 했다. 스톤헨지와 이집트의 피라미드는 그의 연구 대상이었다. 그는 이 분야를 진지한 학문 분야로 인정받게 만들려고 애썼다. 하지만 영국제도에서는 이 분야의 관심이 사그라 들었다. [사람들은 그것을 연구하는 데는 관심이 없었다.] 그러다가 1960년대가 되자 새로운 관심이 일었다. 천문학자 제럴드 호킨스에 의해 부활된 것이다. 그는 스톤헨지가 석기시대의 컴퓨터라는 주장을 했다. 이 흥미로운 주장은 다시 사람들의 관심을 끌게 되었다.

알렉산더 톰이라는 기술자가 한 연구 결과를 발표했다. 그의 글에는 고대 문명에도 정확한 천문학이 널리 통용되었다고 적혀 있었다. 그는 고대에 영국제도에서 스톤헨지가 사용되었다고 했다. [그의 결론은 많은 사람들을 깜짝 놀라게 했다.] 호킨스의 주장은 널리 배척된 상태였다. 하지만 톰의 분석은 문제를 불러일으켰다. 이것은 당시의 역사에 대한 학문적 믿음을 흔들어 놓았다. 글리브 러글스가 행한 톰의 실지연구조사 재평가는

그의 주장이 근거가 없다는 것을 보여주기 위한 것이었다. 하지만 이 석기 유적지들에서는 천문학에 관한 광범위한 관심을 보여주는 증거들이 나왔다.

유안 맥키라는 단 한 명의 과학자만 봄의 이론이 실함을 해 볼 필요가 있다는 데 동의했다. 그는 1970년과 1971년 아길서에 있는 킨트로 석상 유적으로 갔다. 여기에서 그는 돌 위에 있는 관찰대의 정확성에 관한 봄의 예견이 맞는지를 확인했다. 봄이 내린 결론은 사실로 밝혀졌다. 이 사실은 영국의 새로운 선사시대 설명에 발표되었다. 이러한 집요한 과학자들의 노력으로 인해 오래 전 사람들은 정확한 결과를 가지고 별을 연구했었음이 밝혀졌다. 역사는 완전히 바뀌게 되었다.

F 1. (B) 2. (C) 3. 1A 4. 2D

[1]the Calvin cycle / [2]photosynthesis / [3]carbon-14

멜빈 캘빈

멜빈 캘빈은 위대한 화학자로 영원히 기억될 것이다. 그는 발견을 위해 일생을 바쳤다. 그와 그의 팀은 캘빈 회로를 발견했다. 이 회로는 탄소가 식물 안에서 이동하는 경로이다. 이 발견은 식물의 "광합성의 비밀을 푼" 것으로 전 세계적으로 유명하다. 이 발견으로 그는 1961년 노벨 화학상을 받았다.

캘빈은 1937년 캘리포니아 주립대학 버클리 분교의 교수가 되었다. [거기에서 그는 아주 짧은 시간에 중요한 교수가 되었다.] 1963년 그는 분자생물학 교수가 되었다. 그는 화학 생물역학 연구소의 창설자이자 감독이 되었다. 또한 동시에 버클리 방사선 연구소의 부감독이 되었다.

전해오는 이야기에 따르면, 2차 대전에서 일본이 항복을 하던 날 연구소의 소장이 캘빈을 찾아왔다. 그는 "이제야말로 방사성 탄소로 뭔가 유용한 것을 해 볼 때요"라고 말했다. 그는 1940년에 발견된 탄소의 동위원소를 말하고 있었다. 일본에 떨어뜨린 원자폭탄에 이 동위원소를 사용했던 것이다. 캘빈은 그에 대한 응답으로 방사선 연구팀을 조직했다. 그들은 광합성 과정을 연구하기 시작했다. 광합성은 녹색식물이 태양 에너지를 화학에너지로 전환시키는 과정을 말한다.

캘빈과 그의 팀은 탄소14 동위원소를 추적물질로 사용했다. 그들은 탄소가 식물에서 이동하는 경로를 완전히 그려냈다. 이 경로는 공기 중에서 이산화탄소를 흡수하는 것으로부터 탄수화물로 바뀌는 순간까지의 경로였다. 이렇게 하는 과정에서 캘빈팀은 햇빛이 식물의 엽록소에 작용한다는 것을 보여주었다. 햇빛이 유기 화합물을 만드는 연료 역할을 한다는 것이다. 이 발견이 있기 전까지는 햇빛이 식물 내의 이산화탄소에만 작용하는 것으로 생각되었다. [하지만 이제 과학자들은 이 과정을 훨씬 더 잘 이해한다.]

캘빈은 그 연구 덕분에 평생 에너지 생산에 관심을 가졌다. 또한 생물의 화학적 진화를 연구하는 데 많은 세월을 바쳤다. 그는 그것에 관련된 책을 저술했는데 이 책은1969년에 발표되었다. 캘빈은 노년까지 과학 연구에 매진했다. 그는 기름을 만드는 식물에 대한 연구를 했다. 그는 그 식물을 재생가능한 에너지원으로 보았다. 캘빈은 달의 암석을 연구하기도 했다. 그는 과학을 사랑한 사람이었다. 그것은 그가 받은 많은 상보다 그에게 훨씬 소중한 것이었다.

Building Summary Skills

1. The Observatories at Mauna Kea

There are many research stations located on [1]Mauna Kea in Hawaii. These observatories are located there because of [2]the air quality and the fact that the night skies are [3]very dark and clear. The Astronomy Precinct there was established in [4]1967. There are [5]twelve telescopes located there that are run by different countries or corporations.

2. The Element Naming Controversy

[1]In the 1960s, tensions between [2]the USA and Soviet Union even caused problems between scientists. There were [3]naming controversies over various elements that different laboratories created. The Americans objected to [4]the Soviet name, and the Soviets objected to the American name. Finally, an agreement on the name was arrived at, but some [5]American scientists still use the old name.

3. Plato

Plato was a great [1]Greek philosopher who lived in Athens and studied with Socrates. After Socrates died, Plato opened his own school and tried to imitate [2]the Socratic method of philosophy. Many of [3]his early dialogues looked at single issues but never came up with answers. His middle dialogues stopped using Socrates as a character and expressed [4]Plato's own thoughts. [5]The *Republic* was one of Plato's greatest works.

4. Loie Fuller

Loie Fuller was a pioneer in the field of [1]modern dance. She created many new dance movements through [2]improvisation. She became famous in America, but she [3]felt unappreciated, so she moved to France, where she had many fans. She had many [4]important French fans, including Jules Cheret, Henri de Toulouse-Lautrec, and Marie Curie. She toured Europe and also [5]helped other artists to do so.

5. Ancient Astronomy

Nowadays, many scientists study [1]the stargazing practices of ancient societies. [2]Norman Lockyer was an early scholar who looked into these practices. Gerald Hawkins also looked at [3]Stonehenge and noticed how it was connected to astronomy. Most people discounted Hawkins's work, but [4]Alexander Thom produced

new evidence to support it. Euan Mackie went to Stonehenge and proved that [5]Thom's conclusions were correct.

6. Melvin Calvin

Melvin Calvin was [1]a great chemist who won a Nobel Prize. He discovered [2]the Calvin cycle, which helped to unlock [3]the secrets of photosynthesis. He worked at [4]UC Berkeley, where he was a professor. He used [5]the carbon-14 isotope to trace the route of carbon through the plant. He studied many different things through the course of his life.

Mini TOEFL iBT

1. Ⓒ **2.** Ⓑ **3.** Ⓓ **4.** **Ⓑ** **5.** Ⓐ **6.** Ⓒ
7. Ⓐ **8.** Ⓑ **9.** **Ⓒ** **10.** Ⓒ **11.** Ⓓ **12.** Ⓓ

포틀래취 의식

포틀래취 의식은 일부 아메리카 인디언 사이에서 행해지는 종교의식이다. 이 의식은 그들의 사회 구조에 대단히 중요하다. 이 종족들은 태평양 북서 해안 지역 출신이다. 이 지역은 미국에서부터 캐나다의 브리티시 컬럼비아까지 걸쳐 있다. 여기에 해당되는 종족으로는 하이다족, 누트카족, 살리시족, 틀린깃족 등이 있다.

"포틀래취"라는 말은 치누크어에서 나왔다. 이 의식에 참여하는 모든 그룹은 이 의식을 다르게 말한다. 치누크 말은 영어 단어인 "포트(pot)"와 "래취(latch)"라는 말을 합친 것처럼 들린다. 하지만 영어의 뜻과는 아무 상관이 없다.

원래, 포틀래취는 중요한 사건을 기념하기 위해 거행된다. 대단히 존경받던 인물의 사망 또는 아기의 출생 등이 해당된다. 아메리카 인디언 사회에서의 사회적 계급은 제한되어 있다. 그래서 어떤 사람이 더 높은 계급으로 올라가게 되면 여러 사람들이 받아들이도록 하기 위해 증인이 있어야 한다.

포틀래취는 의식적 축제의 형태를 띤다. 전통적으로 물개 고기나 연어가 대표 음식이 되었다. [하지만 다른 많은 특별 음식도 있었다.] 축제에서는 그룹들 간의 서열 관계가 생기고 선물 교환, 춤 공연, 다른 의식 등을 통해 강화되었다. 주인이 되는 가족은 재산을 나누어줌으로써 자신들의 부를 과시하려고 노력했다. 이로 인해 유력한 손님들은 답례로 그들 자신의 포틀래취 의식을 열어 감사의 표시를 했다.

유럽인들이 도착하기 전에 포틀래취 선물은 보관했던 음식, 배, 노예 등이었다. 18세기와 19세기 들어 담요나 구리 등 새로운 종류의 선물이 등장하면서 포틀래취는 부정적인 변화를 보이기 시작했다. 어떤 그룹은 포틀래취를 전쟁터로 사용했다. 여기에서 대단히 경쟁적인 계급 대항이 벌어졌다. 어떤 경우에는 받은 선물을 부수어 버리는 경우도 있었다.

선교사들과 정부요원들의 요구로 1885년에는 캐나다에서, 19세기 후반에는 미국에서 포틀래취이 불법으로 금지되었다. 그들은 이것이 어리석은 전통이라고 생각했다. 그들의 눈에는 이 의식이 낭비적이고 비생산적이며 의식을 행하는 사람들에게 악영향을 미친다고 생각했다. 법으로 금지했음에도 불구하고 포틀래취은 수년 간 비밀리에 계속되었다.

여러 해가 지나 수많은 부족들이 정부에게 그 금지조치를 철회해 달라고 요청했다. 그들은 이 의식을 크리스마스에 비유했다. 그들은 포틀래취 의식은 친구들이 선물을 교환하는 크리스마스와 같은 축제라고 말했다. 20세기에는 포틀래취이 덜 문제가 되었다. 그래서 금지조치가 해제되었다.

오늘날에는 민족지연구가들이 포틀래취 의식을 연구한다. 그들은 이 축제에 매료된다. 포틀래취 의식의 후원자들은 많은 귀중품들을 나누어준다. 그 대가로 명예를 얻는다. 포틀래취 의식이 풍요로울수록 이 명예는 커진다.

문학 비평

전 세계의 학생들은 학교에서 위대한 문학을 배운다. 하지만 읽는 내용을 더 잘 이해하기 위해서 때로는 전문가의 도움이 필요하기도 하다. 문학 작품을 연구하고 토론하는 것이 문학 비평가가 하는 일이다. 그들은 작가가 무엇을 의도하는지에 관해 생각하고 판단을 내린다. 이런 종류의 작업은 문학 이론에 기초를 두고 있다. 하지만 모든 비평가들이 이론가는 아니라는 사실이 중요하다.

요즘에는 에세이나 책에 종종 문학 비평이 등장한다. 학문적 비평가들은 이 주제에 관하여 강의를 한다. 또한 결과를 학술지에 발표한다. 아이러니컬하게도 비평문이 원래 책보다 더 길어지는 경우도 있다. 보다 많은 유명한 비평가들이 잡지에 비평문을 발표한다. 문학 비평을 싣는 유명한 잡지로는 〈뉴욕 타임즈 북 리뷰〉, 〈네이션〉지, 〈뉴요커〉지 등이 있다.

문학이 존재했을 때부터 문학을 토론하는 비평가가 존재했다. 아리스토텔레스와 플라톤은 그리스 시가에 대해 상당히 비판적인 글을 썼다. 중세에는 고전적 비평가들이 종교적인 글에만 초점을 맞추었다. 하지만 이 당시에 성경을 비판한다는 것은 위험한 일이었다. [그래서 사람들은 비평을 할 때는 위험을 감수해야 했다.] 성경과 같은 성스러운 책에 대한 비판은 교회 지도자의 공식적 의견을 염두에 두고 이루어졌다.

르네상스 때에는 문학 작품에 대한 많은 새로운 사고들이 나왔다. 형태와 내용에 관한 이러한 사고들은 새로운 그룹의 비평가들을 낳았다. 이 비평가들은 문학 작품이야말로 모든 문화의 중심이라고 보았다. 그들은 시인과 작가들은 긴 문학 전통의 수호자라고 주장했다. 이러한 고귀한 시인들 중 일부는 과거의 위대한 작품을 복원하기 시작했다. 그래서 되살아난 고전 작품 하나가 아리스토텔레스의 〈시학〉이다.

영국의 낭만주의 운동으로 문학 비평과 관련해 문학에 관한 보다 많은 새로운 사고들이 등장했다. 19세기 초의 이런 비평가들은 문학 작품의 대상이 반드시 아름다울 필요는 없다고 생각했다. 평범하거나 걸고넘어질 추해도 문제가 될 것이 없었다. 그들은 문학을 창조 하는 일 자체가 평범한 대상을 고귀하게 만들 수 있다고 생각했다. 한 문학 작품이 얻을 수 있는 가장 높은 수준은 "숭고함"이었다.

그러다가 20세기 초, 새로운 그룹의 비평가들이 작품을 발표하기 시작했다. 미국과 영국 출신의 이 비평가들은 자신들의 비평을 "신비평"이라고 불렀다. 이 비평가들은 문학작품을 연구하는 데 가장 중요한 것은 아주 자세하게 읽는 것이라고 했다. 그들은 사람들에게 "단어 하나하나"에 집중하도록 했다. 이 방법은 지금도 많이 애용되는 독서 방법이다.

신비평은 1960년대 후기까지 문학작품을 연구하는 가장 일반적인 방법이었다. 이 즈음, 대학 교수들은 대륙철학의 영향을 많이 받았다. 이 새로운 사고방식은 새로운 스타일의 비평을 낳았다. 철학과 비평 방법 두 가지 다 정보의 형태에 초점을 맞추었다. 그들은 정보가 어떻게 제시되고 있는

지를 아주 자세히 관찰했다. 비평가는 작품을 분석하는 과정을 거쳐야 했다. 이 과정을 "해체"라고 한다.

Vocabulary Review

A 1. (B) 2. (C) 3. (D) 4. (C)
5. (A) 6. (A) 7. (C) 8. (D)

B 1. d 2. f 3. a 4. i 5. b
6. j 7. g 8. c 9. h 10. e

Unit 9 Prose Summary

Skill & Drill

1. (B), (D)

초상화

초상화는 미술의 일종이다. 초상화는 주제의 시각적 이미지를 보여주는 것이 목적인데, 주제는 보통 사람이 된다. 초상화는 주제의 진실된 모습을 나타내야 한다. 초상화가들은 돈을 받고 자신의 초상화를 그려달라는 사람들의 초상화를 그린다. 때로는 주제가 주는 강한 느낌에 영감을 받기도 한다. 자화상은 화가가 직접 자기 자신을 그리는 것을 말한다. 초상화에는 주제의 전신 또는 반신, 혹은 흉상만 그릴 수도 있다. 흉상이란 머리 끝에서부터 어깨 부분까지를 말한다. 동물이나 애완동물, 심지어는 집이 초상화의 주제가 되기도 한다.

2. (B), (C)

편형동물

편형동물은 대단히 부드러운 몸을 가진 간단한 생물을 말한다. 이 동물들은 척추가 없다. 편형동물은 바닷물, 민물, 습한 곳에 산다. 편형동물은 대부분 자유생활을 하지만 몇몇 종은 기생동물이라 다른 동물에 붙어 산다. 편형동물에는 흡충강, 촌충강, 단생흡충아강, 와충강의 네 가지가 있다. 편형동물의 부드러운 몸은 리본 모양으로 되어 있다. 편형동물은 동물 가운데 가장 간단한 구조를 가지고 있는데, 기관들이 세 개의 배엽으로 이루어져 있다. 외배엽과 내배엽이 있고 그 사이에 중배엽이 있다. 이 동물은 잠을 빼고는 진정한 체강이 없다. 몸 안은 느슨한 조직으로 채워져 있다.

3. (A), (D)

삼각주

삼각주는 강이 해양, 바다, 사막, 호수로 흘러 들어가는 곳에 생기는 지형이다. 여기에는 물이 흐르는 바깥쪽으로 삼각형 모양의 퇴적물이 생긴다. 삼각주는 강이 운반한 침전물에 의해 형성된다. 강물이 흘어지면서 이 침전물은 퇴적된다. 침전물이 많은 보다 큰 강의 삼각주 퇴적물은 강물의 수로를 여러 개의 지류로 나눈다. 이들 지류는 다시 나누어지고 합쳐져서 활동성 및 비활동성 수로를 형성한다. 강어귀에 있는 퇴적물은 거의 삼각형 모양이 된다. 침니로 강어귀를 막아 삼각형 모양이 생기는데, 삼각주의 밑변 부분에서 폭이 넓어진다.

4. (B), (C)

사회심리학

사회심리학 분야는 사람들이 무리 속에서 어떻게 행동하는가를 지속적으로 연구한다. 사회심리학은 사람들이 어떻게 다른 사람을 인식하고 다른 사람에게 영향을 주며 관계를 가지는지에 초점을 맞춘다. 고든 올포트는 이 학문의 고전적 정의를 내린 사람이다. 그는 사회심리학이란 사람들이 어떻게 다른 사람들의 영향을 받는지를 이해하고 설명하기 위한 시도라고 했다. 이것은 다른 사람이 있다고 하는 상상이나 가정 하에 이루어진다.이 분야의 연구는 대부분 소규모 그룹의 관찰을 통해 이루어진다. 이 그룹들은 함께 모여 해야 할 과제를 받는다. 연구자들은 이들이 주어진 과제를 해결하려고 시도하는 과정에서 그룹 내 상호작용을 관찰한다.

Practice with Long Passages

A 1. (A) 2. (B) 3. (A), (C), (F)
[1]the mouths of rivers / [2]freshwater and seawater / [3]marine species

하구

하구는 강의 조수 어귀에 형성된다. 하구는 반만 육지로 둘러싸인 해안 지역을 말한다. 하구는 또한 자유롭게 바다로 흘러 들어가기도 한다. 하구의 주요 특성은 민물과 바닷물이 만나는 연결 부위에서 나타난다. 강이나 시내에서 온 민물과 바닷물이 만나면서 약간 짠 맛이 나는 물이 생긴다. 두 물이 만나는 지점에서 운동이 생기기 위해서는 조수가 반드시 필요하다. 조수가 없는 바다의 경우에는 강은 자연스럽게 삼각주를 형성한다.

강의 조수 어귀가 하구의 일반적 장소이다. 여기에는 종종 내륙에서 흘러 들어온 빗물이 운반한 침니로 이루어진 침전 퇴적물이 다량 존재한다. 어귀는 해수면이 올라가 땅이 더 낮은 위치에 있는 침하해안에 더 자주 생긴다. 이 과정에 의해 분지가 범람하게 되면 리아스식 해안이나 피오르드 해안이 생긴다. 만약 시내나 강물이 여기로 흘러 들어올 경우 하구가 형성된다.

하구에서 만들어진 약간 짠 맛이 나는 물은 바닷물만큼 짜지는 않다. 하지만 민물보다는 짜다. 이 물 덕분에 하구는 훌륭한 생태계가 된다. 가장 잘 알려진 하구는 런던을 관통하는 템즈강이다. 템즈강은 런던에서 서쪽으로 몇 마일 떨어진 테딩턴까지 이어진다. 이 지역은 템즈강의 조수가 끝나는 부분이다. 멀리 서쪽으로 배터시까지도 강물은 민물이다.

템즈강의 이 지역의 동물군은 주로 민물 어종으로 이루어져 있다. 잉어, 황어, 농어, 강꼬치고기 등 많은 민물 어종이 서식한다. 배터시와 그레이브샌드 사이에서 템즈강은 약간 짠 물로 변한다. 이 지역에는 제한된 수의 민물 어종과 해양 어종이 서식한다. 염분은 약간 더 동쪽으로 갈수록 증가되어 해양 어종이 민물 어종을 완전히 대체하게 된다.

B 1. Ⓐ 2. Ⓒ 3. Ⓑ, Ⓓ, Ⓕ

[1]Weeks 1~4 / [2]Weeks 5~6 / [3]Week 8

배아

배아란 다세포 생물의 발달 초기 단계를 이르는 말이다. 배아의 발달은 생식작용에서 시작된다. 일단 생식이 일어나면 정자는 난자를 수정시킨다. 이 과정에서 일어나는 세포를 접합체라고 한다. 두 부모의 모든 DNA가 이 안에 들어 있다. 이 초기 단계에서 인간의 배아는 의식이 없다. 이 시점은 낙태 권리를 찬성하거나 반대하는 사람들이 격렬하게 논쟁을 하는 부분이다.

인간의 배아는 세 가지 주요 발달 단계가 있다. 1~4주까지는 배아가 자궁 벽에 달라붙을 장소를 찾기 시작한다. 만약 적당한 장소를 찾으면 거기에 착상을 한다. 엄마와 배아는 연결 고리가 생기게 된다. 이 시기에 탯줄이 생긴다.

5~6주 사이에 배아는 화학물질을 내보낸다. 이 때문에 엄마의 생리가 멈춘다. 뇌가 발달하기 시작한다. 6주쯤 되면 뇌파 활동이 시작된다. 이 즈음에 심장이 뛰기 시작한다. 팔다리가 자라게 될 뭉툭한 부분이 나타난다. 주요 기관이 자라기 시작한다.

7~8주 사이 태아의 혈액형이 결정된다. 배아는 움직이기 시작하고 눈이 생긴다. 대부분의 기관은 완전히 발달하거나 발달 단계에 있다. 8주 말이 되면 배아기가 끝난다. 이 때부터 태아기가 시작된다.

인간 배아를 둘러싼 많은 논쟁과 논란이 있었다. 문제는 어느 시점에 배아가 의식과 정신이 있는 인간으로 되는가 하는 것이다. 이 문제는 미국에서 낙태 문제의 핵심을 이룬다. 많은 사람들이 배아도 인간이며 보호 받아야 한다고 믿는다. 그들은 배아에 대한 실험과 낙태가 일종의 살인 행위로서 법으로 금지해야 한다고 생각한다. 하지만 반대론자들은 배아는 아직 미발달된 조직에 지나지 않는다고 믿는다. 그들은 태아가 태아기에 들어가기 전에 배아를 낙태할지 말지를 스스로 결정할 수 있는 권리가 여성들에게 있어야 한다고 믿는다.

C 1. Ⓒ 2. Ⓑ 3. Ⓑ, Ⓔ, Ⓕ

[1]movable metal type / [2]an information explosion / [3]to own books / [4]Johann Fust

요하네스 구텐베르크와 금속활자

요하네스 구텐베르크는 발명가였다. 그는 활자를 이용한 인쇄기를 발명한 것으로 잘 알려져 있다. 그 인쇄기에는 활자 함금, 유성 잉크, 활자 주형 등이 있었다. 이 발명으로 인해 일반인들도 책을 이용할 수 있게 되었다.

구텐베르크의 인쇄기의 정확한 시작은 알려져 있지 않다. 그는 유럽에서 활자를 발명한 사람이라고 알려져 있다. 이것은 이미 사용되고 있던 목판 인쇄에서 한 발짝 진보한 것이었다. 그는 이러한 요소들을 생산 시스템으로 결합해 문서자료의 빠른 인쇄를 가능케 했다. 이로 인해 르네상스 시대 유럽 전역에서 정보의 폭발이 일어났다.

구텐베르크는 1430년경에 고향인 마인츠에서 스트라스부르로 이사했다. 그는 이사를 하고 난 후 금속 활자를 실험하기 시작했다. 그는 목판 활자는 손으로 새겨야 했기 때문에 만드는 데 시간과 비용이 대단히 많이 든다는 것을 알았다. 그는 금속 활자는 일단 주형을 하나만 만들면 훨씬 빨리 복제할 수 있다고 결론지었다.

1455년 구텐베르크는 인쇄기 시연회를 열었다. 그는 2권짜리 성경을 권당 300독일 플로린에 팔았다. 이것은 평균 노동자의 3년치 임금에 해당했다. 하지만 손으로 쓴 성경보다는 훨씬 저렴했다. 보통은 수사 한 명이 손으로 책 한 권을 쓰는 데 20년이 걸렸다.

구텐베르크는 요한푸스트라는 동업자가 있었다. 구텐베르크가 인쇄기로 번 돈은 푸스트가 투자한 돈을 갚기에는 충분하지가 않았다. 푸스트는 구텐베르크를 고소했고 소송에서 승소했다. 법원의 판결로 구텐베르크는 파산했다. 또한 금속 활자와 인쇄 장비에 대한 권리는 푸스트에게 넘어갔다. 구텐베르크는 죽기 직전에 작은 인쇄 가게를 했다. 하지만 푸스트는 자기 이름이 찍힌 책을 발간한 최초의 인쇄공이 되었다.

D 1. Ⓓ 2. Ⓐ 3. Ⓐ, Ⓓ, Ⓔ

[1]diseases and insects / [2]A wheat variety / [3]International controversy

유전자 형질 변환 식물

유전자 형질 변환 식물은 다른 종에서 나온 유전자들을 공유한다. 1800년대 후반 최초의 유전자 형질 변환 식물이 기록되었다. 그것은 밀과 호밀의 교배 종이었다. 두 식물 종을 이종교배함으로써 농업의 새로운 시대가 열렸다. 한 식물에서 다른 식물로 유전자를 옮김으로써 농부는 질병에 훨씬 내성이 강한 농작물을 키울 수 있었다. 이 식물들은 식량과 소득원인 많은 농작물을 파괴시켰던 풍토병에 걸리지 않았다.

1930년대에 E.S. 백패든은 야생잡초에서 나온 형질 전환 유전자를 가진 다양한 밀 품종을 개량했다. 이 품종은 희망을 뜻하는 "호프"로 불렸다. 이 종은 미국 전체의 밀농사를 위협했던 줄기녹병에 내성을 가지고 있었다. 이 새 품종의 밀은 농부들의 생명의 은인이 되었다. 또한 많은 사람들이 기아로부터 보호를 받을 수 있었다.

유전자 형질 변환 식물의 성장은 정상적인 이종교배 방법으로 시작되었다. 하지만 1970년대에 과학자들은 식물과 심지어 동물 사이에 DNA 이식을 시도하고 있었다. 1985년에는 벨기에에 있는 한 연구소에서 곤충 내성을 가진 유전공학 담배를 개발했다. 이것은 곤충을 죽이는 단백질을 암호화한 유전자를 첨가해 탄생했다.

이러한 발전으로 유전자 형질 변환 재조합 식물 분야의 길이 열렸다. 이 분야는 여러 국제 단체 사이에서 논쟁의 대상이 되었다. 이들은 유전자 변형 농작물이나 식품을 찬성 또는 반대했다. 식물 DNA의 사용 여부를 둘러싼 이 싸움으로 인해 새로운 생물학적 분류가 탄생했다. 이 부류에 속하는 물질들은 유전자 변형 농산물(GMO)이라고 알려지게 되었다.

유용한 유전자 형질 변환 식물의 예로 황금쌀을 들 수 있다. 이 쌀은 실험실에서 탄생했다. 일반 백미보다 23배나 많은 비타민A가 함유되어 있다. 비타민A는 전 세계 많은 곳에서 부족한 중요 영양소이다. 이 쌀은 이러한 지역에 있는 사람들을 돕기 위한 인도주의적 도구로 탄생되었다. 하지만 유전자 형질 변환 작물에 반대하는 다양한 그룹의 반대에 부딪쳐 이 쌀은 사용되지 않고 있다.

E 1. Ⓐ 2. Ⓒ 3. Ⓐ, Ⓓ, Ⓔ

[1]psychoanalysis / [2]free association / [3]inaccurate and too subjective

지그문트 프로이드

지그문트 프로이드는 오스트리아의 신경학자였다. 그는 새로운 종류의 심

리학을 창시했다. 그는 성욕과 꿈에 대한 이론으로 가장 유명하다. 또한 억압과 무의식에 대한 연구로도 잘 알려져 있다. 많은 사람들은 그를 "심리분석의 아버지"라고 부른다.

프로이드는 1856년 프라이브룩에서 출생했다. 그의 가족은 여러 사람이 많이 사는 아파트에서 살았다. 부모는 그의 지성을 키워주기 위해 노력했다. 그는 학창 시절 8년 중에서 6년간 우등을 했다. 그는 17세에 비엔나 대학에 입학했다.

프로이드는 신경질환과 뇌질환을 가진 환자들을 직접 진료했다. 그는 대단히 신경질적이고 신경과민인 환자들을 대상으로 최면요법을 시행했다. 하지만 결국 이 치료를 그만 두었다. 그는 훨씬 더 쉬운 방법으로 환자가 입을 열도록 만들 수 있다는 것을 알게 된 것이다. 그는 환자들을 소파에 앉히고 마음 속에 떠오르는 아무 것이나 말하도록 했다. 이 과정을 "자유연상"이라고 한다.

프로이드는 40대에 들어서자 스스로가 많은 정신적 문제가 있다고 느꼈다. 그는 자신의 꿈을 연구하기 시작했다. 또한 자기 자신의 기억들과 성격의 심리역학에 대해서도 연구했다. 이러한 자기 분석 과정에서 그는 아버지에 대해서 느꼈던 적대감을 깨닫게 되었다. 또한 어머니에 대한 아동기 때의 느낌들도 회상했다. 어머니는 매력적이고 따뜻하고 보호적이었다. 프로이드를 연구한 학자들은 감정적 어려움을 겪었던 이 시기가 그의 인생에서 가장 창의적인 시기였다고 생각한다

프로이드의 이론과 연구 방법은 그의 일생 동안 논란의 대상이 되었다. 리디아드 H. 호튼이 쓴 논문은 프로이드의 꿈 해석을 "위험할 만큼 부정확하다"고 평했다. 프로이드를 비판한 다른 사람으로는 줄리엣 미첼이 있다. 그녀는 우리의 의식적 사고가 무의식적 공포나 욕구에 의해 생긴다는 프로이드의 기본적 주장은 인정할 수 없다고 말했다. 프로이드의 주장은 세상에 관해 보편적이고 객관적인 주장을 할 수 없게 만들기 때문에 그녀는 이렇게 말을 한 것이었다. 많은 비평가들은 프로이드의 사고가 심한 코카인 흡입의 부작용이라고 생각한다.

F **1.** (C) **2.** (B) **3.** (B), (C), (E)

[1]land ownership / [2]latitude and longitude / [3]Nautical charts

지도 제작의 역사

지도나 지구의를 만들고 그 방법을 연구하는 것을 지도제작법이라고 한다. 지도제작법은 기록이 남아 있는 한 옛날부터 인류 역사의 중요한 부분을 차지했다. 지금까지 알려진 최초의 지도는 지구의 지도가 아니라 별자리 지도였다. 기원전 16,500년 밤하늘에 점이 박혀 있는 모습으로 그린 그림이 발견되었다. 이 그림은 프랑스의 라스코 동굴 벽에서 발견되었다. 이 벽화에는 세 개의 밝은 별인 직녀성, 견우성, 데네브가 그려져 있었다. 이 동굴 벽화에는 또한 플레이아데스 성단도 그려져 있었다.

고대 바빌론에서는 매우 정확한 조사 기법을 이용해 지도를 만들었다. 1930년 오늘날의 이란 북쪽의 키르쿠크 근처에 있는 가수르에서 발견된 점토판에는 좋은 예가 되는 지도가 있다. 두 언덕 사이에 있는 강 분지 지도였다. 이 점토판에 새겨진 글씨에는 그 지역이 아잘라라는 사람의 것이라고 적혀 있다. 학자들은 이 점토판을 기원전 2300년에서 2500년 사이의 것으로 추정한다.

고대 이집트에서는 지도가 꽤 귀한 편이었다. 하지만 현존하는 지도에는 기하학적 계산법과 조사 기법이 나와 있다. 기원전 1300년 것으로 추정되는 투린 파피루스에는 나일강 동쪽의 산들이 표시되어 있다. 이 지역은 금과 은이 채굴되는 중요한 지역이었다.

지도제작에 있어 초기 학명은 클라우디우스 톨레미 때에 일어났다. 그는 90년과 168년 사이 희랍 이집트 도시인 알렉산드리아에서 살았다. 그는 지구를 구로 그리기 시작했고 오늘날 우리가 사용하는 평행한 위도선과 경도 자오선 개념의 윤곽을 잡기도 했다.

중세 내내 지도제작법은 진보했다. 르네상스에 이르자 포르투갈에서 온 지도제작자들이 선박 항해를 위한 항해지도를 만들고 있었다. 가장 오래된 항해지도는 페드로 레이넬이 1485년에 제작한 것이다. 이 지도는 위도가 표시되어 있다.

1569년경에는 게라루스 메르카토르라는 플랑드르 지리학자가 메르카도르도법에 기초한 최초의 지도를 제작했다. 이것은 둥근 구 모양의 지구의를 평면에 펼쳐 놓은 정확한 세계 지도였다.

1900년대에는 지도가 훨씬 많이 제작되었다. 이것은 인쇄와 사진술의 발달 때문이었다. 이러한 요소들 덕분에 지도 생산은 훨씬 저렴하고 쉬워졌다. 비행기를 사용해 넓은 지역을 한번에 촬영할 수도 있게 되었다. 비행기 덕분에 사람들은 과거 어느 때보다 높은 고도에서 지구를 볼 기회를 갖게 되었다.

Building Summary Skills

1. Estuaries

Estuaries are semi-enclosed bodies of water that form near [1]the tidal mouth of a river. They combine [2]both saltwater and freshwater. The water formed is [3]somewhat salty. Mostly freshwater species live in estuaries, but [4]marine species live in them closer to the ocean. [5]The River Thames is among the most famous estuaries in the world.

2. The Embryo

The embryo is the earliest stage of development for [1]multi-celled life forms. There are [2]three major stages of development in the human embryo. These stages include the connection forming stage, the brain forming stage, and [3]the organ forming stage. This marks the point at which the embryo becomes a fetus. After [4]eight weeks, the fetal stage begins. There is much controversy around the development of the embryo because of [5]abortion rights.

3. Johannes Gutenberg and Metal Type

Johannes Gutenberg invented [1]movable type. This revolutionized Europe and led to [2]an information explosion. He used [3]metal type instead of wood-block type. In 1455, he sold copies of a two-volume Bible that were much cheaper than [4]handwritten ones. However, Gutenberg's partner [5]Johann Fust sued him and took the rights to his invention. Gutenberg died in poverty.

4. Transgenic Plants

Transgenic plants share [1]the genes of other species. Scientists [2]transfer genes from one plant to another to give the plants better resistance to disease or insects or to make them [3]more nutritious. Wheat, tobacco, rice, and even animals have had their genes [4]modified. Some people are opposed to transgenic plants, which they call [5]genetically modified organisms.

5. Sigmund Freud

Sigmund Freud was [1]a neurologist who founded a new kind of [2]psychology. He is often referred to as [3]the father of psychoanalysis. He had his own practice and soon began to use free association methods with his patients. He also interpreted his dreams and his relationships with [4]his parents. He did, however, have [5]many critics during his life and afterwards.

6. The History of Cartography

Making maps or globes is called [1]cartography, and people have been making them for thousands of years. Early maps just showed [2]the stars and constellations as in the wall paintings of the Lascaux Caves. There were also early maps in [3]Babylon and Egypt. Mapmaking improved in the Middle Ages and [4]the Renaissance. Later mapmakers showed lines of latitude and longitude and made maps for sailors. By the 1900s, advancements in photography as well as the advent of airplanes and later, satellites, led to giant leaps forward in the [5]accuracy and efficiency of mapmaking.

Mini TOEFL iBT

1. (B) **2.** (C) **3.** (A) **4.** (A) **5.** (D)
6. (A), (D), (E) **7.** (C) **8.** (A) **9.** (C)
10. (B) **11.** (D) **12.** (B), (C), (D)

고대 그리스 도기

학자들은 현존하는 도기를 통해 고대 그리스 예술에 대해 알게 되었다. 그리스 회화나 공예품은 거의 만나볼 수 없는 반면 10만 점이 넘는 그리스 항아리가 발견되었다. 항아리의 대부분은 그리스 문자나 그림으로 장식되어 있다. 이 항아리들은 그리스 시대에 흔히 볼 수 있었다. 이는 음료수나 음식을 담는 일상용품으로 그리스인들이 많은 항아리를 만들었기 때문이다.

그리스 문명의 초기에는 작은 도시국가들이 그들만의 독특한 도기를 만들었다. 하지만 나중에는 코린트와 아테네에서 이 항아리들을 거의 다 만들었다. 이 도시에서 나온 도기가 모든 그리스 세계의 표준이 되었다. 이 도기들이 너무 널리 수출되는 바람에 다른 지역의 도기들은 더 이상 생산되지 않게 되었다.

고대 그리스의 중요한 두 시기는 흑색인물기법 시기와 적색인물기법 시기다. 흑색인물기법 시기는 기원전 약 700년경이다. 이 기법은 코린트에서 시작되었다. 이 방법을 사용해 철 성분이 많은 점토로 항아리를 만들었다. 구우면 붉은 오렌지빛이 났다. 항아리의 표면에 밑그림을 그렸다. 그런 다음 정제된 점토를 이용해 밑그림을 색칠했다. 조각 도구를 사용해 보다 세부적인 부분을 그려 넣었다. 항아리를 두 번째로 구우면 그림이 광택이 나는 검정색을 띠었다.

적색인물기법의 도기들은 기원전 530년경에 등장했다. 이 도기들은 대단히 인기가 있어 흑색인물기법 도기보다 선호되었다. 심지어 오늘날에도 이 기법은 그리스 도기 예술의 걸작으로 여겨진다. 가장 가치가 높은 그리스 항아리도 이 양식의 것이다. 이 양식의 도기를 만들기 위해서는 도공과 화가 사이의 협동 작업이 필요했다. 이 과정에서 화가는 항아리를 굽기 전에 항아리에 밑그림을 그린다. 항아리가 아직 구워지지 않은 상태이기 때문에 그림과 점토는 같은 색을 띤다. 화가는 그림이 보이지도 않는 상태에서 그림을 그려야 한다. 도공이 항아리를 굽고 나면 그림이 보이게 된다. 이 과정에서 화가는 기억에 의존하면서 대단히 빠르고 정확하게 작업을 해야 한다.

항아리에 그림을 그린 화가들은 자기 서명을 남기는 법이 거의 없었다. 따라서 오늘날의 학자들이 이 화가들을 알 수 있는 유일한 방법은 그들이 반복적으로 그린 모양들을 통해서이다. 예를 들어, 가장 위대한 항아리 화가 중의 한 사람은 그가 가장 자주 그린 주제가 아킬레스라는 인물이었기 때문에 "아킬레스 화가"라고 불려진다. 화가를 알 수 있는 또 한 가지 방법은 그들이 함께 일했던 도공의 이름을 통해서다. 도공들은 종종 항아리에 서명을 남겼는데, 클레오프라데스와 함께 작업했던 화가는 "클레오프라데스 화가"라고 하는 식으로 부른다.

절벽과 침식작용

절벽은 뾰족하게 수직으로 서 있는 암벽 지형이다. 절벽은 침식과 풍화작용에 의해 생긴다. 절벽은 해안이나 산간 지역에서 흔히 볼 수 있다. 절벽 밑의 튼튼한 기부는 보통 침식이나 풍화에도 견디는 암석으로 되어 있다. 사암, 석회암, 백악, 백운석과 같은 퇴적암은 절벽을 형성하기 쉽다. 화강암, 현무암 같은 화성암 역시 발견된다.

침식작용은 바람, 물, 얼음 등의 요인에 의해 고형물질이 깎이는 것을 말한다. 이러한 고형물질로는 흙, 진흙, 바위 그리고 다른 입자들이 있다. 침식 과정은 중력에 의한 내리막 운동 때문에 생긴다. 또한 생물체 때문에 침식이 생기는 경우도 있다. 이것을 생물침식작용이라고 한다. 침식작용은 풍화작용과는 다른데, 풍화작용은 아무런 운동이 관여되지 않은 과정을 통해 암석이나 입자가 분해되는 것이다. 하지만 같은 장소 같은 시간에 이 두 가지 작용이 동시에 일어날 수도 있다.

침식작용은 자연적으로 일어나는 과정이다. 하지만 많은 지역에서 인간이 땅을 사용하면서 침식작용이 심해지기도 한다. 나무를 베어내거나 동물들이 과도하게 풀을 뜯어먹게 하거나 바람직하지 않은 토지 사용을 통해 침식작용을 가속화시킨다. 계대로 관리가 이루어지지 않은 건설 작업이나 도로 또는 철도 건설 역시 마찬가지다. 올바르게 토지를 사용함으로써 침식작용을 막을 수 있다. 단지(梯地)를 만들거나 나무를 심음으로써 손상된 지역을 되살릴 수 있다.

단층의 움직임이나 산사태로 형성된 절벽을 단층절벽이라고 한다. 대부분의 절벽은 밑 부분에 애추사면이 있다. 애추사면은 보통 건조한 지역이나 높은 절벽 아래에 떨어진 암석 덩어리들이 드러난 것이다. 공기 중에 수

분이 보다 많은 지역에서는 토양 사면에 가려 애추사면이 잘 보이지 않는다.

폭포나 석굴 역시 절벽에 잘 나타나는 특징이다. 때로는 절벽이 산등성이 끝에서 점점 약해지기도 한다. 그래서 뒤에 차상이나 다른 모양의 암석 기둥이 생기기도 한다. 절벽은 정의된 대로 반드시 수직으로 서 있어야 하는 것은 아니다. 그렇기 때문에 어떤 사면이 절벽인지 아닌지가 모호할 때가 있다.

세계 각지에는 독특한 절벽들이 있다. 가장 높은 절벽은 그레이트 트랭고의 동쪽 면이다. 이 절벽은 파키스탄 북부의 카라코람 산맥에 있으며 높이는 약 1,340m 정도이다. 하와이의 카라우파파에는 가장 높은 해안절벽이 있다. 이것은 높이가 1,010m 이다. 캐나다 북극지방에 있는 배핀 섬의 토르산은 전체적으로 1,370m 높이의 가장 높은 수직절벽이다. 여기에는 지구상에서 가장 긴 순수 수직 절벽이 있는데, 길이가 1,250m이다.

Vocabulary Review

A **1.** C **2.** D **3.** A **4.** C
5. B **6.** D **7.** B **8.** A

B **1.** i **2.** f **3.** h **4.** j **5.** b
6. g **7.** c **8.** d **9.** a **10.** e

Unit 10 Fill in a Table

Skill & Drill

1. Individual Classism (A), (D)
Structural Classism (C), (F)

계급주의

"계급주의"라는 말은 일종의 편견을 나타내는 말이다. 계급주의란 사회 계급이 더 낮은 사람을 상대로 발생한다. 이것은 일종의 사회적 엘리트 의식이다. 개인적 계급주의는 사람들에 의해 행해진다. 이것은 부자가 자기보다 돈을 덜 버는 사람을 무시할 때 생긴다. 또 부자가 중산층이나 빈민층보다 혜택을 받을 때도 생긴다. 구조적 계급주의는 제도 안에서 일어난다. 이것은 보다 낮은 계급 출신의 사람들을 배제시키는 방식으로 일이 진행될 때 생긴다. 많은 사람들은 미국 정치에서 이런 종류의 계급주의를 본다. 선거 때 가장 큰 역할을 한 사람이 정부에 가장 큰 영향력을 갖는 것처럼 보이기 때문이다. 이러한 관행 때문에 노동자 계급이 동일한 정도의 영향력을 발휘할 수 없게 된다.

2. Causes (A), (E) / Effects (B), (F)

메소포타미아

메소포타미아는 인류 사회가 최초로 시작된 곳이기 때문에 "문명의 요람"이라고 불린다. 이 지역은 두 강 사이의 비옥한 지대에 위치해 있다. 그래서 인류의 농작물 경작이 가능했다. 이 지역이 번성하면서 도시들이 생겨났다. 일단 도시들이 생겨나자 많은 발견들이 이루어졌다. 최초의 문자가 등장했다. 이 도시에 사는 사람들은 또한 금속세공을 발명했다. 이들은 최초의 청동기인에 속했다. 그들은 구리, 청동, 금을 사용해 궁전과 사원을 장식했다. 또한 천문학도 이용했다. 별을 연구해 지구 년의 길이를 계산할 수 있었다. 이로 인해 오늘날 우리가 사용하는 60분으로 된 1시간과 24시간으로 된 하루의 정확한 계산이 가능했다.

3. Positive Effects (B), (D)
Negative Effects (C), (E)

녹색혁명

"녹색혁명"이라는 말은 농업 분야의 큰 변화를 이르는 말이다. 녹색혁명은 1940년대와 60년대 사이에 많은 개발도상국에서 일어났다. 이로 인해 곡물 생산이 크게 증가했다. 이런 변화는 농업 연구 프로그램의 결과였다. 녹색혁명은 사회와 지구 전체에 긍정적인 효과와 부정적인 효과를 미쳤다. 긍정적 효과는 기아가 해결되었다는 것이다. 하지만 이로 인해 일부 지역에서는 인구과잉이라는 부정적 효과가 나타났다. 녹색혁명은 또한 성공적인 대규모 농사를 가능하게 만들었다. 하지만 이러한 성공으로 인해 소규모 농업이 이익을 내기가 대단히 어려워졌다. 경제에서 이러한 변화는 사회주의 운동에 큰 타격을 가했다.

4. Physical Phenomena (B), (E)
Geological Phenomena (C), (D)

자연 현상

자연현상이란 인간에 의하지 않은 현상을 말한다. 자연현상은 자연에서 일어난다. 하지만 인간에게 영향을 미칠 수는 있다. 일부 자연현상은 물리적으로 설명 가능하다. 이런 것을 물리적 현상이라고 한다. 번개가 이런 예다. 중력 때문에 일어나는 행성의 궤도도 마찬가지이다. 지구 내부로부터 일어나는 자연재앙은 지질학적 현상으로 간주된다. 화산 분출이 그 예다. 해일도 마찬가지다. 이러한 현상들은 제어가 불가능하다. 인간이 이런 현상을 일어나게 할 수도 없고 멈출 수도 없다. 하지만 과학을 통해 이런 현상을 보다 잘 이해할 수는 있다.

Practice with Long Passages

A **1.** (A) **2.** (B)
3. Structural Emergence (B), (E), (G) /
Cultural Emergence (C), (F)
[1]a flock of birds / [2]an ant colony / [3]the World Wide Web

창발성

창발성이란 복잡한 형태가 나타나게 되는 것을 말한다. 이 형태는 기본 부분에서 생긴다. 창발성의 특성은 이러한 부분들 사이의 관계에서 나온다. 창발성은 끊임없이 변화하는 과정이다. 긴 시간에 걸쳐 일어날 수도 있다. 인체의 진화가 좋은 예다. 인간의 모습은 수천 세대를 지나오면서 변화했다. 인체는 대단히 복잡하다. 하지만 복잡하지 않은 수백만 개의 세포들로 이루어져 있다.

창발성은 이질적 요소 사이에서 일어난다. 한 예가 뉴런과 인간의 뇌 사이의 창발성이다. 뇌는 사고를 할 수 있다. 하지만 뇌를 구성하는 뉴런은 사고를 할 수 없다. 수많은 뉴런으로 구성된 뇌는 뇌를 구성하는 하나하나의 뉴런 부분보다 훨씬 크다.

자연 속에서 창발성을 관찰하는 쉬운 방법은 구조를 살펴보는 것이다. 창발성은 유기물질 또는 무기물질에서 생길 수 있다. 생물 구조의 좋은 예가 새 떼이다. 새 떼는 모양과 행동적인 복성을 갖는다. 하지만 이런 특징은 새 한 마리 한 마리에 의해서는 나타나지 않는다. 또 다른 유기 창발성 구조의 예는 개미 군락이다. 개미 군락이 창발적인 이유는 아무리 개미라도, 심지어 여왕개미라 할지라도 혼자서는 그렇게 효과적인 일개미 군락을 조직화할 수 없기 때문이다. 하지만 집합적으로는 군락 구조가 생겨난다. 유기 창발성 구조의 예로는 허리케인을 들 수 있다. 이 폭풍은 여러 가지 요소의 작용 결과 생긴다. 이런 요소들로는 기압, 기온, 습도 등이 있다. 이 요소들이 길합해 맹렬한 폭풍이 생긴다. 이는 한 요소만으로는 그런 폭풍이 생길 수가 없다.

창발성은 인간 문명에도 일어난다. 이런 종류의 창발성이 대표적으로 일어나는 한 장소가 주식시장이다. 주식시장은 전 세계적으로 회사들의 가격을 조정하는 하나의 시스템이다. 하지만 전체 시장을 조절하는 한 사람의 지도자는 없다. 주식중개인은 제한된 수의 회사에 관해서 알 뿐이고 주식시장의 엄격한 규칙을 따라야 한다. 이러한 상호작용을 통해 주식 시장 전체의 복잡성이 생겨난다. 이 창발성의 또 다른 예는 월드와이드웹(WWW)이다. 이 경우 중심적 웹사이트도 없지만 크고 작은 웹사이트 간의 연결은 WWW이라고 알려진 복잡한 구조를 만들어낸다.

B 1. ⓒ 2. ⓓ
3. Advocates Ⓐ, Ⓔ, Ⓕ / Critics Ⓓ, Ⓖ
[1]Entertainment companies / [2]control the entertainment industry / [3]availability of weapons

미디어 영향 이론

미국 오락 산업은 많은 비평을 받았다. 비평가들은 거짓 폭력 장면의 양을 못마땅하게 여긴다. 미디어 영향 이론은 이 문제를 설명해준다. 이 이론에 따르면 실제 폭력 행위의 증가율이 오락물과 관계가 있다.

이 이론은 많은 폭력 행위를 다룬다. 고등학교 총격 사건이 가장 흔한 경우다. 이 이론은 이것이 미디어의 폭력 장면이 많은 탓이라고 한다. 이것은 인기 있는 오락물에서 여러 형태로 나타난다.

이 이론의 기초를 이루는 것은 많은 사람들이 미디어에 나오는 높은 수준의 폭력에 노출되어 있다는 가정이다. 이 사람들 중의 일부는 그들이 보는 폭력에 관해 가상과 현실을 구별하는 데 어려움을 겪는다. 이 사람들은 폭력 행위를 해도 괜찮다고 생각한다.

이 이론의 지지자들이 가장 흔히 공격 목표로 삼는 것이 비디오게임 회사이다. 이 회사들은 직접 하는 사격 게임을 많이 만들어낸다. 이런 게임은 대부분 폭력과 살인이 난무하다. 그들은 이런 게임들이 싸움 같이 보이게 만든다고 말한다. 이런 게임에서는 폭력 행위를 한 것에 대해 보상을 받는다.

또한 그들은 증오에 찬 노래를 부르는 가수들을 목표로 삼는다. 그들은 이 예술가들이 폭력을 선동한다고 주장한다. 폭력영화도 비난을 면할 수 없다. 그들은 이런 종류의 영화들은 폭력을 멋지게 포장한다고 말한다. 이 모든 것이 일종의 오락물이고 사람들은 회사들이 그들의 상품에 대해 더 많은 책임을 지기를 바란다. 그들은 회사측이 대단히 폭력적인 상품에는 라벨을 붙이기를 바란다. 또한 그들은 미성년자에게는 이런 상품에 접근을 제한하거나 아예 불가능하게 만들기를 바란다.

하지만, 이 이론을 비판하는 사람들은 정부가 미디어를 규제해서는 안 된다고 말한다. 그들은 그런 규제는 미국 시민의 언론 자유에 피해를 준다고 말한다. 그들은 미국과 다른 나라간의 폭력 관련 통계 자료를 비교했다. 이 나라들 중 일부는 미국과 동일한 종류의 폭력적인 미디어가 있다. 하지만 폭력 행위는 적게 일어난다. 그래서 이들은 미국의 폭력 문제는 미디어 때문이 아니라고 말한다. 그들은 원인이 무기 소지가 가능하기 때문이라고 말한다.

C 1. Ⓑ 2. Ⓒ
3. Reported Causes Ⓑ, Ⓒ, Ⓖ /
Effects Ⓐ, Ⓔ
[1]Oct. 8th to 10th / [2]Catherine O'Leary's cow/
[3]Louis M. Cohn

시카고 대화재

시카고 대화재는 1871년 10월 8일부터 10일 사이에 발생했다. 이 화재가 남긴 결과는 끔찍했다. 수백 명이 목숨을 잃었다. 도시의 상당 부분이 잿더미로 변했다. 이 화재는 19세기 미국에서 일어난 가장 큰 재앙 가운데 하나였다. 하지만 시카고 사람들은 곧바로 도시를 다시 짓기 시작했다. 이 때문에 시카고는 경제적으로 가장 중요한 미국 도시 가운데 하나로 자리잡게 되었다.

화재는 10월 8일 일요일 저녁 9시경 발생했다. 데코벤 스트리트의 골목길에 있는 작은 헛간에서 불길이 시작되었다. 가장 널리 알려진 이유는 헛간 안에 있던 소가 손전등을 발로 차서 화재가 시작되었다는 것이다. 이 헛간의 소유자는 패트릭과 캐서린 오리리 부부였다.

지금은 오리리 부인이 희생양으로 이용되었다는 사실이 밝혀졌다. 역사가들은 그녀가 여성이었으며 이민자였으며 카톨릭 교도였다는 사실 때문에 비난 받았다고 생각한다. 이 모든 그룹이 미국 역사의 이 시점에서는 박해를 받고 있었다. 〈시카고 트리뷴〉이 화재 발생 후 최초로 발행한 신문에서 오리리 부인의 부주의가 원인이라고 주장했다. 하지만 나중에 그 이야기를 썼던 기자는 그 기사를 조작했음을 시인했다. 그는 그것이 흥미진진하다고 생각해 그렇게 했다고 말했다.

리처드 베일즈는 아마추어 역사가이다. 그는 그 불이 다니엘 설리번에 의해 시작되었다고 믿는다. 그는 그 화재를 최초로 신고했던 사람이었다. 베일즈는 이 사람이 헛간에서 건초에 불을 붙였다는 견해를 내놓았다. 그는 소가 우유를 훔치는 과정에서 방화를 저질렀다고 말했다.

하지만 인소닉 드바르톨로는 최근에 〈시카고 트리뷴〉에 몇 가지 새로운 증거를 내놓았다. 그는 루이스 M. 콘이라는 노름꾼이 그 불을 냈을지도 모른다는 주장을 했다. 드바르톨로는 주사위 노름을 하다가 불을 질렀다고 말한다. 엘런 와익스가 쓴 책에 따르면 사망한 콘의 유언장에 그가 불을 질렀다는 고백이 적혀 있다고 한다.

D 1. Ⓒ 2. Ⓑ
3. Matrifocal Family Ⓒ, Ⓖ /
Consanguineal Family Ⓐ, Ⓕ /
Conjugal Family Ⓑ, Ⓔ, Ⓘ
[1]Matrifocal / [2]Consanguineal / [3]Conjugal

가족 개념의 차이

가족은 함께 사는 사람들로 구성된다. 가족은 출생이나 결혼으로 연결된다. 또한 다른 밀접 관계로 이어지기도 한다. 가정적 동반자 관계나 입양 등이 이에 해당된다.

많은 사람들이 가족은 "혈연"으로만 가능하다고 생각한다. 하지만 많은 사회학자들은 "혈연"이라는 말은 은유적으로 받아들여야 한다고 말한다. 많은 사회에서는 다른 개념을 사용해 가족에 대한 정의를 내린다. 세계인권선언 16조는 사회의 자연적 집단 단위를 가족이라고 정의한다. 또한 가족은 사회와 국가의 보호를 받아야 한다고 되어 있다.

가족 구조는 부모와 자녀 간의 관계에 기초를 두고 있다. 또한 배우자간의 관계에 기초하기도 한다. 또는 두 가지 다에 기초를 두기도 한다. 가족의 주요 형태에는 세 가지가 있다.

모계중심가족은 어머니와 자녀들로 구성된다. 자녀들은 보통 어머니의 생물학적 후손을 말한다. 하지만 입양의 경우를 배제하지는 않는다. 이 형태의 가족은 여성이 혼자서 가족을 부양할 충분한 재원이 있는 곳에서 생긴다.

핵연가족은 여러 가지 형태가 있다. 가장 흔한 형태는 어머니와 자녀들 그리고 그 어머니의 가족으로 구성된다. 아버지가 없는 경우가 종종 있다. 이는 특히 재산이 상속될 때 그렇다. 남자가 재산을 소유할 경우는 이 형태의 가족에 남편의 가족이 포함될 수도 있다.

부부가족은 한 사람 이상의 어머니와 자녀들로 구성된다. 여기에는 한 명 이상의 아버지도 포함된다. 이 종류의 가족은 분위과 관련이 있다. 이 형태의 가족에서는 남자와 여자 모두 다른 종류의 노동을 해야 한다. 여기에 속하는 가족은 유동성이 매우 높다.

핵가족은 부부가족의 하위 집단이다. 이 가족에는 한 명의 여자와 한 명의 남편이 있다. 두 사람은 함께 자녀를 키운다. 이 종류의 가족은 현대 산업 사회에서 가장 흔한 경우이다.

E 1. (A) 2. (D)
3. Topics (A), (E), (F) / Functions (C), (D)
1morality / 2cloning / 3public policy

생명윤리학

생명윤리학은 응용철학의 한 분야이다. 생명윤리학은 과학과 의학을 자세히 관찰한다. 연구와 치료의 도덕성에 대해 의문을 제기하는 기능을 한다. 또한 과학을 규제하는 법의 윤리를 평가하기도 한다. 이 분야는 인류를 보호하는 기능을 하기 때문에 대단히 중요하다. 생명윤리학이 없이는 과학과 의학의 진보가 인간을 위험에 빠뜨리고 말 것이다.

생명윤리학 연구는 많은 법률에 영향을 미친다. 많은 과학자들이 이런 이유로 생명윤리학을 연구하는 사람들에게 등을 돌린다. 이들은 자신들의 일이 천성적으로 윤리적이라고 믿는다.

생명윤리학은 빠른 성장을 보이고 있는 학문 분야이다. 정식 학문으로 인정 받은 것은 불과 30년 전의 일이다. 많은 학교에서 지금은 생명윤리학 분야의 학위를 주고 있다. 1990년대에 일단의 사회과학자들이 담론의 틀을 마련했다. 여기에서 윤리적 문제에 관한 연구 방법을 정했다. 이 방법은 사회와 함께 이런 문제를 해결하려고 시도한다. 생명윤리학자들이 수집한 이 자료는 다른 사회과학과 마찬가지로 동료들의 심사를 받는다.

생명윤리학에는 중요한 몇 가지 문제가 있다. 학문적 탐구 분야로서의 타당성에 의문의 여지가 있다. 왜 철학과 별개로 존재해야 할까? 모든 사람들이 윤리학자는 아닌가? 제도적 요구가 이러한 질문에 대한 답을 줄 수 있다. 생명윤리학은 엄청난 연구와 역사를 연구의 대상으로 삼는다. 그들은 이것을 생명윤리 문제에 적용한다. 그들은 공정하고 정직하며 지식인 방법으로 이 작업을 행한다. 그들은 이 목표를 위해 공동으로 노력한다.

생명윤리학자들은 여러 주제를 연구한다. 종종 사회에서 논쟁을 일으키는 주제에 초점을 맞춘다. 그들은 자료를 수집하고 보고서를 발표한다. 이 보고서는 여론을 형성하는 데 사용된다. 또한 정책 수립에도 이용된다. 생명윤리학자들이 다루는 주제 가운데는 낙태와 복제가 있다. 그들은 또한 줄기세포 연구의 배아 사용도 다룬다. 이것들은 만만치 않은 윤리적 문제이다. 이 문제들은 인간에 대한 질문에서부터 비롯된다. 생명윤리학자들은 입법자들과 권력자들을 교육시키려 애쓴다. 이들이 기계를 정하는 사람들이기 때문이다. 그들은 의학과 과학 분야에서 수용 가능한 것이 무엇인지를 결정한다.

F 1. (C) 2. (J)
3. Kenya (A), (F) / Tanzania (D), (G) / Germany (C)
1early hominid skull / 2Homo erectus / 3Homo habilis

고인류학

인류 화석과 진인류 화석을 연구하는 것을 고인류학이라고 한다. 이것은 체질인류학의 한 분야이다. 이 학문은 여러 시대에 걸친 인간의 진화 추적에 초점을 맞춘다. 이 분야의 과학자들은 해부학적, 행동적, 유전적 연관성을 추적한다. 이러한 연관성을 통해 인류가 어떻게 전인류로부터 발전했는지를 알 수 있다. 과학자들은 이러한 연관성을 이용해 인류 출현의 시각표를 재구성할 수 있다. 이 시각표는 선사시대부터 현대까지 이어진다.

고인류학자들은 화석 잔해를 파내 초기 원인을 연구할 수 있다. 그들은 작은 흔적들을 찾아 발굴 작업을 한다. 그들이 발견하는 작은 단서들은 고대 생물에 대한 정보를 준다. 보존된 뼈, 도구, 발자국 등은 이런 화석 증거를 제공해 준다.

고인류학은 인류 진화에 관한 연구를 가져온 몇 가지 발견이 있었던 1800년대 후반에 시작되었다. 첫 번째 발견은 1856년에 있었다. 독일에서 네안데르탈인이 발견되었다. 이것은 중요한 사건이었다. 그래서 고인류학이 탄생하게 되었다. 다른 중요한 사건으로는 이 주제에 관한 중요 저서 두 권의 출판을 꼽을 수 있다. 첫 번째는 토머스 헉슬리의 〈자연에서의 인간의 위치〉였고 두 번째 중요한 책은 찰스 다윈의 〈인간의 유래〉였다.

이 분야에서 가장 중요한 발견 가운데 일부는 리키 가족이 한 것이었다. 대단히 많은 중요 화석 발견의 시작은 루이스 리키였다. 그는 아프리카 케냐의 올두바이 협곡에서 발굴 작업을 시작했다. 1959년에 그와 그의 아내는 초기 원인의 두개골 잔해를 발견했다.

1972년 루이스가 사망한 뒤 아내 메리 리키는 그의 뒤를 이어 연구를 계속했다. 그녀의 유명한 발견 가운데 하나는 라이언리 발자국을 발견한 것이었다. 그녀는 이 발자국을 1976년 탄자니아에서 발견했다. 이 발자국은 3백 7십만 년 전의 것이었다. 이 발자국은 초기 전인류가 두 발로 걸었다는 가장 결정적인 증거였다.

리키의 아들 리처드 역시 몇 가지 중요한 화석을 발견했다. 1972년 그의 팀은 탄자니아에서 호모 하빌리스의 두개골을 발견했다. 그리고 1975년에는 케냐에서 호모 에렉투스의 두개골을 발견했다.

Building Summary Skills

1. Emergence

Emergence is the concept that describes how [1]a complex pattern forms from lesser parts. A good example is the human body, which has developed over thousands of successive generations. Emergence is evident in all forms of [2]organic and inorganic structures. Scientists who study emergence look at the characteristics of organic emergent structures such as [3]ant colonies or flocks of birds and at inorganic structures such as hurricanes. Another form of emergence is [4]cultural, in which some form of human organization results in a highly complex structure that is more than the sum of its parts. [5]The World Wide Web and the stock market are prime examples of the sort of phenomenon in which simple components combine to form a complex whole.

2. The Media Influence Theory

The Media Influence Theory states that [1]rising levels of violence in society are attributable to individuals who see violence depicted in entertainment and are unable to distinguish it apart from [2]reality. Advocates of this theory target video games, music with hateful lyrics, and movies as being responsible for [3]many acts of violence. They want to see these forms of entertainment heavily [4]regulated by the government. On the other hand, critics of this theory think the government should not control the entertainment industry and that rising levels of violence are due to [5]the availability of weapons.

3. The Great Chicago Fire

From October 8th to 10th in [1]1871, the Great Chicago Fire burned down much of the city and killed hundreds of people. The fire was originally blamed on [2]Mrs. O'Leary's cow kicking down a lantern in the barn. But the reporter who wrote this story later said he made it up because it sounded interesting, which led people to believe that Mrs. O'Leary was made a target because she was [3]a Catholic, female immigrant. Some other possible causes of the fire were Daniel Sullivan, who may have started it while trying to [4]steal some milk, or Louis M. Cohn, who is said to have started it during [5]a game of craps.

4. Differences in the Concept of Family

A family consists of people who live together and are linked by [1]genetic or other types of bonds. Although [2]blood relation defines many families, it is not the only thing that can link people together. There are three major types of families: [3]matrifocal, consanguineal, and conjugal. The most common type of family in modern society is a sub-group of [4]the conjugal family called [5]the nuclear family.

5. Bioethics

Bioethics is a branch of applied philosophy that looks closely at [1]the ethics of scientific and medical practices. This field is very important because it asks questions about and examines policies and treatments that greatly affect [2]the human race. It is also an area of academic growth, as many universities have created [3]bioethics programs. Although bioethicists' roles are often questioned, they do many activities such as researching and compiling reports that greatly affect [4]public opinion and the policies made by [5]politicians.

6. Paleoanthropology

The study of human and pre-human fossils is paleoanthropology. This field began with several important discoveries and publications in [1]the late 1800s, including the discovery of Neanderthal man fossils. Some of the most important discoveries in this field have been made by a family named [2]the Leakeys. Their long list of discoveries began in the 1950s when Louis and Mary Leakey found [3]the skull of a hominid in Kenya. But Mary Leakey's most important discovery came after her husband's death, when she found [4]the Laetoli footprints in 1976. These footprints offered conclusive evidence that early man walked upright on two legs. Their son, Richard, also found the skulls of [5]a Homo habilis and a Homo erectus.

Mini TOEFL iBT

1. (C) **2.** (B) **3.** (C) **4.** (D) **5.** (A)
6. Criteria (C), (D), (H), (I) / Forms (B), (E), (G)
7. (A) **8.** (C) **9.** (D) **10.** (B) **11.** **D**
12. Storage Room (A), (F) / Kiva (B), (D) / Tower (E)

비즈니스의 파트너십

파트너십이란 비즈니스의 일종이다. 파트너십에서 파트너는 두 명 이상의 회원들끼리 이익과 손실을 함께 나눈다. 파트너란 동일한 비즈니스에 참여하기 위해 모인 사람들을 말한다. 이러한 형태의 비즈니스는 자기가 신뢰하는 친구나 사람들과 함께 일하고 싶어하는 사람들에게 좋다. 또한 전문 분야가 다른 두 명 이상의 사람들에게도 도움이 된다. 그들은 파트너십

을 맺어 자신들의 기술을 결합할 수 있다. 파트너십은 기존 회사 간에도 맺을 수 있다.

파트너는 파트너십 계약을 할 수도 있다. 아니면 파트너십 공표를 할 수도 있다. 일부 사법권에서는 그런 계약을 등록해야 한다. 그렇게 한 뒤에는 대중의 열람이 가능해진다. 많은 국가에서 파트너십은 합법적인 실체이다.

파트너십은 종종 세금 문제로 법인회사보다 선호된다. 이런 이유로 무거운 세금을 매기는 비즈니스에서는 파트너십이 더 유용하다. 파트너십 구조에서는 배당소득세가 없을 수도 있다. 배당소득세란 법인회사의 소유주가 번 이익에 부과하는 세금이다.

합명회사는 가장 기본적인 형태다. 여기에서는 모든 파트너들이 비즈니스를 관리한다. 그들은 모두 회사의 부채에 대해 개인적 책임을 진다. 비즈니스 파트너십은 두 가지 종류가 있다. 한 가지는 합자회사이다. 여기에서는 특정 "유한 파트너"가 비즈니스 관리 능력을 포기한다. 그들은 파트너십의 부채에 대한 유한 책임을 지기 위해 이 능력을 포기하는 것이다. 다른 종류는 유한책임회사이다. 여기에서는 모든 파트너들이 동일한 정도의 책임을 진다.

1958년에 제정된 조합령에 따르면 파트너십이 존재하기 위한 네 가지 기준이 있다. 첫 번째는 두 당사자 간의 유효한 계약이 있어야 한다. 두 번째는 두 사람이 한 비즈니스를 해야 한다. 이에 관해 계약서 안에 어떤 장사나 어떤 직업인지를 규정해야 한다. 세 번째는 공동으로 되어 있어야 한다. 다시 말해, 권리에 대한 상호관계가 있어야 한다. 여기에는 이권과 책무 등이 포함된다. 이런 이유 때문에 자선단체는 파트너십이 될 수 없다.

파트너십 관계를 맺으려는 사람들은 어떤 형태가 자신들에게 가장 잘 맞는지를 결정해야 한다. 어떤 파트너는 더 많은 권한을 갖고 싶어 한다. 그들은 기꺼이 더 큰 책임을 지려고 할 것이다. 또는 책임을 덜 지려고 하는 사람도 있을 수 있다. 이런 사람들은 비즈니스를 관리할 수 있는 권한을 기꺼이 포기하려고 할 것이다. 새 파트너들은 관리 권한과 이권, 책무 사이의 균형을 찾아야 한다. 하지만 성공적인 파트너십 관계를 위해서 가장 중요한 요소는 바로 신뢰이다.

절벽 궁전의 아나사지 건축

북아메리카에 있는 가장 큰 절벽 주택은 절벽 궁전이다. 이것은 고대 푸에블로 건축물이다. 이 궁전은 메사버드국립공원 안에 위치해 있다. 이것은 고대 아나사지족의 보금자리였다.

절벽 궁전은 많은 이들이 경탄한 거대 유적이다. 이 궁전은 사암 절벽의 빈 공간에 지어졌다. 움푹 들어가 있는 이 곳은 깊이가 약 40m, 높이가 약 25m에 이른다. 이 석조건축물은 길이가 약 130m이다. 절벽 궁전에는 150개의 방이 있다. 하지만 모든 방에 난로가 있지는 않다. 방에 불을 피우는 데 사용되는 난로가 있다는 것은 사람들이 생활하는 공간이었다는 것을 말해준다. 절벽 궁전의 방들 가운데 난로가 있는 방은 25개에서 30개 정도에 불과하다. 나머지 방은 아마도 저장실로 사용되었을 것이다.

절벽 궁전은 아직까지 기능이 밝혀지지 않은 개방 공간과 방이 많다. 9개의 저장실은 위층에 지어졌다. 이 저장실은 높게 지어졌다. 그래서 수분이나 해충으로부터 안전하다. 추수한 곡식의 잉여분을 아마 여기에 저장했을 것이다. 이동식 사다리를 이용해 이 방에 올라갔을 것이다.

과학자들은 얼마나 많은 사람들이 여기에서 생활했을까를 짐작했다. 그들은 난로가 있는 방의 수에 기초해 계산을 했다. 아마 100에서 150명 정도의 아나사지족 사람들이 이 절벽 궁전에 살았을 것으로 추정된다.

절벽 궁전에는 몇 개의 탑이 있다. 이 탑은 몇 층짜리 원형 또는 사각형 구조물이다. 이 유적에서 가장 훌륭한 석조건물 중의 일부가 이 탑 안에 있다. 이 복합 구조물의 남쪽 끝에 있는 4층짜리 건물의 내부에는 몇 가지 추상적 그림이 있다. 이 그림들은 탑 내의 원래 벽토 위에 그린 것이다.

절벽 궁전에는 또한 의식적 중요성을 가진 원형 침하실들이 있다. 이 방들은 키바라고 한다. 한 키바는 유적의 한가운데 위치해 있다. 이 지점에서 전체 구조물은 여러 개의 벽에 의해 나뉘어져 있다. 출입구도 없고 기타 다른 출입 통로도 없다. 키바의 벽은 양쪽 벽이 서로 다른 색깔로 칠해져 있다. 고고학자들은 이 이상한 구조물을 연구했다. 그들은 두 공동체가 여기에 살았을 것으로 생각한다. 이 키바는 두 공동체를 통합하는 역할을 했을 것이다. [그 불가사의한 구조물을 잘 아는 일부 고고학자들은 이 곳이 포로를 가둬두는 공간이었을지도 모른다고 말한다.]

고고학자들은 나무의 나이테를 이용한 연대 측정을 통해 절벽 궁전의 나이를 알아낼 수 있다. 이로 인해 절벽 궁전의 건축과 개조가 지속적으로 진행되었다는 것이 밝혀졌다. 궁전의 건축과 개조는 1190년부터 1260년까지 계속되었다. 그들은 또한 건축물의 대부분이 20년의 기간 동안 지어졌다는 것도 알아내었다. 1300년경 절벽 궁전은 아직까지 밝혀지지 않은 이유로 버려졌다.

Vocabulary Review

A

1. A 2. C 3. D 4. B
5. D 6. C 7. D 8. A

B

1. g 2. i 3. a 4. j 5. h
6. e 7. f 8. b 9. c 10. d

Actual Test

1. C 2. D 3. D 4. B 5. A
6. B 7. B 8. C 9. A 10. D
11. C 12. A, B, F 13. B 14. D
15. B 16. A 17. B 18. C 19. D
20. A 21. A 22. B 23. C
24. Place value A, C, E / Zero D, G
25. A 26. C 27. C 28. C 29. D
30. B 31. A 32. B 33. A 34. C
35. D 36. D 37. B, C, E

주가율표

인간은 항상 지연 속에 존재하지만 다른 물질로 분해되지 않는 금이나 은과 같은 특정한 기본 물질들에 관해 알고 있었다. 1669년 독일의 상인인 헨닉 브란트가 보다 일반적인 금속들로부터 금을 만들어내는 방법을 찾으

려고 시도하는 과정에서 우연히 인을 발견하면서부터 다른 화학 원소들이 점점 발견되기 시작했다. 1809년경에는 알려진 원소의 수가 47가지로 늘어났다. 원소를 연구하는 화학자들은 화학물질이 반응하는 방식에서 어떤 패턴들을 알아내기 시작했다. [하지만 아무도 이런 패턴들을 보여주는 형식으로 원소들을 조직하는 데 성공한 적은 없었다.]

최초의 현대적인 화학책은 1789년 앙뜨완 로랑 드 라부와지에가 쓴 책이다. 그는 밝혀진 원소를 나열하고 이 원소들을 금속과 비금속으로 구분했다. 목록에는 기체가 빠져 있고 빛이나 열량과 같이 물질이 아닌 것도 일부 포함되어 있다. 그래서 그가 만든 목록은 정확한 조직표로 인정되지 않고 있다.

원소의 중요한 특징은 주기성이다. 주기성이란 원자량(핵 안의 양성자와 중성자를 합한 수)에 따라 배열했을 때 비슷하게 반응하는 원소들이 규칙적인 간격으로 나타나는 성질을 말한다. 프랑스의 지질학자인 알렉산드로 에밀 베기이에 드 샹쿠르투아는 이런 주기성을 최초로 발견했다. 그는 주기율표의 전신이라 할 수 있는 헬릭스 나선을 만들었다. 이 시스템은 원자를 원자량의 순서로 나선형 기둥 모양으로 배열했다. 비슷한 물리적 특성을 갖는 원소들이 원주에서 수직으로 나타났다. 하지만 샹쿠르투아의 1862년 논문은 지질학적 용어를 사용했고 그림이 포함되어 있지 않았기 때문에 화학 분야에서는 그의 주기 시스템을 인정하지 않고 있다.

1800년대 전반기에 걸쳐 여러 가지 새로운 원소가 발견됨에 따라서 화학자들은 원소의 물리적 특성이 규칙적으로 반복된다는 사실을 알게 되었다. 화학자들은 이런 주기성을 나타내기 위해 원소들을 분류하는 방법을 연구했다. 1863년 영국의 화학자인 존 뉴랜즈는 그 당시까지 알려진 56개의 원소를 동일한 특징을 가진 그룹으로 나누었다. 각 그룹에는 8개의 원소가 포함되었는데, 피아노의 한 옥타브가 8개의 음으로 되어 있는 것을 따 그는 이 시스템을 "옥타브의 법칙"이라고 불렀다. 사람들은 뉴랜즈의 아이디어을 조롱했고 이론을 받아들이지 않았다. 1919년이 되어서야 원소가 8개 단위로 그룹이 지어진다는 것이 받아들여지게 되었다.

그러나 원소 주기성의 기본 개념은 1869년 러시아 화학자인 드미트리 멘델레프에 의해 보다 효과적으로 수정되었다. 원자량과 원자 번호(핵의 양성자 수)라는 두 가지 중요한 특징을 하나의 표 안에 결합할 수 있음을 발견한 것은 그가 이룬 위대한 업적이다. 그의 표는 "주기율표"라고 불리게 되었다.

멘델레프의 표는 솔리테르라는 카드 게임에서 영감을 받았는데, 이 게임에서는 카드를 가로로는 같은 무늬의 한 조끼리, 세로로는 숫자에 따라 배열을 한다. 동일한 조직 패턴을 이용해 멘델레프는 원소를 7개의 그룹으로 나누었다. 그는 가로로는 원자 번호가 올라가는 순서대로, 세로로는 일곱 개의 그룹으로 비슷한 성질을 가진 것끼리 배열했다. 그래서 금, 은, 동 같은 비슷한 금속이 동일한 세로 칸에 나타나게 된다. 헬륨, 아르곤, 네온과 같은 반응성이 비슷한 기체들이 또 다른 칸에 나타나게 된다. 가장 일반적인 원소(수소, 헬륨, 탄소)들은 원자 번호가 작아서 첫 번째 가로 열의 앞부분에 나타난다. 가장 희귀한 원소들(우라늄과 플루토늄)은 핵에 있는 양성자의 수가 가장 크다. 이 원소들은 주기율표의 끝 부분에 위치한다.

멘델레프의 시대에는 발견된 원소가 63개밖에 되지 않았다. 하지만 그의 표는 훌륭해서 원래 표의 빈 자리에 들어갈 새로운 원소들이 발견될 것이라고 예측할 수 있었다. 오늘날에는 120개의 원소가 발견되었는데, 92개는 자연 상태에서 존재하고 28개의 원소는 실험실에서 탄생했다. 과학자들은 훨씬 더 많은 원소들이 발견될 것으로 믿는다. 주기율표는 "이제까지 고안된 가장 훌륭한 조직표"라는 이름을 얻었다.

멘델레프의 표는 오늘날까지도 유용하게 쓰인다. 하지만 새로운 원소의 발견과 제조에 따라 수정이 되었다. 1914년에 헨리 모슬리는 원소의 X레이 파장과 원자 번호 사이의 관계를 발견했다. 그래서 그는 원소들을 원자량에 따라서가 아니라 전하량(그리고 원자 번호)에 따라서 재배열했다. 또 다른 중요한 발전을 한 사람은 1946년 글렌 T. 시보그있다. 그는 악티늄족이라고 하는 무거운 원소로 이루어진 족을 추가했다.

계산의 역사

계산의 가장 이른 증거는 고대 사냥 공예품에서 발견된다. 기원전 30,000년 전부터 동물 뼈에 새겨진 흠은 일종의 기록 표시였다. 이러한 기록은 물건의 수를 세기 위해서였다. 양치기는 양 한 마리가 풀을 뜯으러 나갈 때마다 지갈을 하나씩 쌓곤 했다. 양이 밤에 집으로 돌아오면 지갈을 하나씩 치웠다. 지갈이 하나라도 남아 있으면 남아 있는 만큼 양이 없어졌다는 것을 의미했다. 하지만 그러한 셈은 진정한 의미의 계산이 아니었다. 그것은 단지 사물의 두 집합을 비교한 것뿐이었다.

이집트는 실수 개념을 사용한 최초의 문명이다. 기원전 약 3,000년 전부터 시작해 이집트인들은 상형문자 또는 수를 나타내는 기호로 수를 표시했다. 그래서 1부터 9까지의 숫자들을 세로 획의 조합으로 나타내었다. 10은 U자를 거꾸로 해서 나타내었고 100은 고리 모양의 코프로, 1000은 연꽃으로 나타내었다.

문화마다 계산에 사용하는 기본 수가 각기 다르다. 이집트인의 징우와 마찬가지로 많은 문화에서는 양 손의 손가락 수인 10을 밑으로 하는 십진법을 사용했다. 바빌로니아인들과 같은 다른 문화에서는 60진법을 사용했다. 하지만 이 시스템은 60까지의 각 숫자 또는 10 단위의 숫자를 위한 또 다른 기호를 필요로 했기 때문에 불편했다. 하지만 60진법은 오늘날 기하학(각에서의 60분과 60초, 원은 360도, 직시각형은 180도)과 시간 기록(1분은 60초, 1시간은 60분)에서 사용되고 있다.

계산에서의 최초의 놀라운 발전은 자릿수 개념이다. 바빌로니아인이 발명한 자릿수 개념은 기수법에서 각 자리의 값을 나타내기 위해서 사용되었다. 예를 들어, 236이라는 숫자는 대부분의 시스템에서 쓰기가 복잡하다. 왜냐하면 여러 개의 기호와 획이 필요하기 때문이다. 하지만 (10진법에서) 각 자리에 매겨진 값들이 다르기 때문에 우리는 6이 6을, 3이 30을, 2가 200을 나타낸다는 것을 알 수 있다.

자릿수가 정확한 수를 나타내기 위해서는 그 수가 236인지, 2360인지, 2036인지, 2306인지 혼란이 생기지 않도록 "0"이라는 숫자가 필요했다. 처음에는 2306이라는 숫자를 나타내기 위해서는 23_6에서처럼 숫자 사이에 빈 공간을 남겨 놓아서 0이라는 자릿수를 표시했다. 그러다가 오늘날 우리가 사용하는 "0"을 위한 특별한 기호가 만들어졌다. 이 기호는 아랍 수학에서 만들어졌으며 650년경 널리 사용되었다.

0과 자릿수가 수학에서 유용하게 쓰이기 위해서는 밑이 되는 숫자까지의 각 수들을 위한 기호를 만들어야 했다. 그래서 1부터 9까지의 수를 위한 다른 기호들이 만들어졌고 10 간격(10, 20, 30, 40 등등)의 숫자를 표시하기 위해 각 숫자 뒤에 0이 추가되었다. 그리고 이보다 훨씬 큰 숫자를 나타내기 위해서는 0을 여러 개 사용했다(100, 1000, 10,000).

아라비아 숫자는 17세기까지 서양 유럽 역사를 지배했던 로마 숫자를 대체하게 되었다. 지금 현재 대부분의 나라에서는 이러비아 숫자를 사용하고 있다. 초기 형태의 아라비아 숫자는 기원전 200년경 인도에서 선을 보였다. 인도 수학자들은 0을 사용한 자릿수를 사용해서 숫자를 기록하고 조작해서 수학적 연산을 할 수 있다는 사실을 발견했다. 이는 셈을 하는

데 사용했던 장치인 주판보다 훨씬 빨랐다. 숫자를 이용해 셈을 하는 방법은 9세기까지는 인도에서만 사용되다가 아랍 수학자인 알-콰리즈미가 수에 관한 논문을 발표하면서 인도 외의 국가에도 소개가 되었다. 하지만 그의 작품은 12세기까지 라틴어로 번역이 되지 않았기 때문에 그때까지 유럽 사람들은 이 방법에 대해서 알지 못했다. 이탈리아 사람인 레오나르도 피보나치가 부기 계원들과 상인들이 읽는 책에 ("십진법"이라고 하는) 아라비아 계산법을 소개하면서 십진법이 보편화되었다. 그들은 상거래에 이 방법을 사용하기 시작했다.

피보나치 이후로 몇 백 년 동안 학자들과 상인들은 십진법과 주판의 장점에 대해 논쟁을 했다. 인쇄 기술이 발달하면서 십진법에 관한 책이 널리 소개되어 약 1,500년부터 그 이후로 일반적인 계산법으로 자리잡게 되었다. 약 1,600년경에는 대부분의 계산에서 로마 숫자가 아라비아 숫자로 대체되었다.

광물

광물은 지구의 지질 운동에 의해 자연적으로 생기는 단단한 물질을 말한다. 광물의 주요 성질로는 1) (무생물로 이루어진) 무기물질이어야 하고, 2) 결정 구조가 있어야 하며, 3)고유한 화학적 조성이 있어야 한다는 점을 들 수 있다. 광물의 형태는 결정 구조의 화학적 조성에 따라 결정된다. 결정 구조는 광물 내의 원자들이 광물 전체에 반복되는 기하학적 무늬로 배열될 때 생기게 된다. 모든 결정 구조는 원자의 14가지 "격자" — 규칙적인 모양 — 배열 중 하나에 해당된다. 이 격자는 X레이로 확인할 수 있다.

광물의 물리적 특징은 결정 형태에 의해 영향을 받는다. 예를 들어, 다이아몬드와 흑연은 동일한 원소(탄소)로 이루어져 있지만 광물 가운데 가장 단단한 반면 흑연은 부드럽다. 이것은 흑연의 결정 구조가 서로 미끄러질 수 있는 판 모양으로 배열되어 있기 때문이다. 한편 다이아몬드의 탄소 원자는 튼튼한 망상 조직으로 되어 있다.

동일한 결정 구조를 가진 두 가지 광물도 화학적 조성이 다를 수 있다. 그래서 암염과 방연광은 동일한 결정 구조를 가졌지만 다른 화학물질로 이루어져 있다. 역으로 두 광물이 동일한 화학 성분을 가지고 있으면서도 결정 구조가 다른 경우도 있다. 예를 들어, 황철광과 백철광은 둘 다 황화철로 되어 있지만 원자 배열이 다르다.

국제광물학회연합에 따르면 오늘날까지 확인된 광물은 4,000여 종이다. 이 가운데 150가지만이 풍부하고 50가지는 "비정기적 광물"로 분류된다. 나머지는 희귀해서 암석의 아주 일부분을 구성하고 있다.

광물은 종종 암석을 구성하고 있는데, 암석에는 광물뿐만 아니라 유기물질도 함유되어 있다. 방해석만으로 된 석회암의 경우처럼 어떤 암석은 한 가지 광물로만 이루어진 경우도 있다. 그런가 하면 여러 가지 광물이 함유된 경우도 있다. 오늘날 발견되는 대부분의 암석은 석영, 운모, 장석 등을 포함한 약 15가지 광물 가운데 한 가지 이상으로 되어 있다.

어떤 암석에 어떤 광물이 포함되어 있는지는 세 가지 요소에 의해 결정된다. 첫 번째로 암석의 화학적 조성이 특정 광물에 유리해야 한다. 예를 들어, 규소가 들어있는 암석은 석영이 함유된 경우가 많다. 두 번째로 암석의 형성 조건이 암석 안의 광물의 종류에 영향을 미친다. 그렇기 때문에 고온 고압 상태에서 화산 운동에 의해 형성된 암석에는 화강암이 들어 있다. 세 번째로 광물의 분포가 암석이 현 상태에 이르기까지 거치는 지질학적 단계의 영향을 받는다. 예를 들어, 수분과 산에 노출되면 일부 광물이 부식하고 다른 광물들이 생기게 된다. 지질 단계에 따라 암석이 모래나 흙으로 분해되기도 한다.

광물학자들은 물리적 성질이나 화학적 조성에 따라 광물을 분류한다. 광물은 여러 가지 측정 가능한 물리적 성질이 있다. 경도는 "모스 경도계"로 측정하는데, 0부터 10까지의 경도가 있다. 모든 광물은 모스 경도계에서 높은 경도를 가진 광물로 절단하거나 선을 그을 수 있다. 그래서 경도 10인 다이아몬드로 경도 7인 석영을 절단할 수 있다. 광택이란 광물의 면에 의한 빛의 반사율을 측정하는 것이다. 광물은 미공질 면을 가진 석고보다는 높은 광택을 갖고 있다. 조개짐은 어떤 광물이 자연적인 결을 따라서 갈라지는 방법을 말한다. 깨짐은 자연적인 벽개면으로 깨지는 것을 말한다. 조흔이란 광물을 특수한 면에 문질렀을 때 생기는 잔류물의 색깔을 말한다. 비중은 광물의 밀도를 말한다. 비중은 일정 부피를 가진 물의 질량과 동일한 부피를 가진 광물의 질량을 비교해 계산한다.

광물은 또한 화학적 특성에 따라 분류되기도 한다. 규산염은 가장 흔히 볼 수 있는 광물인데, 그 이유는 규소와 산소가 많이 함유되어 있기 때문이다. 거의 모든 암석이 여기에 해당된다. 두 번째로 흔한 광물은 탄산염으로 탄소와 산소로 이루어진다. 탄산염은 부패한 플랑크톤의 퇴적물로서 해저에서 발견된다. 또 다른 부류인 할로겐 화합물은 건조한 호수 바닥이나 유타의 그레이트 솔트 레이크와 같은 육지로 둘러싸인 바다에서처럼 수분이 증발하면서 만들어진다. 나머지 흔한 종류로는 황산염, 이산화물, 황화물, 인산염 등이 있다.