SECOND EDITION

INTRO

INSIDE READING

The Academic Word List in Context

Arline Burgmeier

SERIES DIRECTOR:
Cheryl Boyd Zimmerman

OXFORD

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Contents

An Insider's Guide to Academic Reading

Develop reading skills and acquire the Academic Word List with ***Inside Reading Second Edition.***

Student Books

iTools for all levels

Authentic video available on iTools and the Student Website.

Getting Started

Each unit in *Inside Reading* features

- **Two high-interest reading texts** from an academic content area
- **Reading skills** relevant to the academic classroom
- Targeted words from the **Oxford 3000** and the **Academic Word List**

URBAN PLANNING

UNIT 5

Cities Are Growing Up

In this unit, you will

- read about skyscrapers and what makes them possible.
- read about growing populations in cities.
- review cause and result.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Examples

Identifying the unit's goals focuses students on the **reading skill** and academic topic.

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL area						
construct						
design						
height						
AWL major						
previous						
restrict						
AWL structure						
support						
vertical						

Self-assessment prepares students for the vocabulary in the readings.

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about urban planning? Watch the video on the student website to find out more.

Pre-unit videos engage students in the topic and activate prior knowledge.

High-interest Texts

READING 1

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What is the tallest building you have visited? Where was it?
2. Would you like to work in a very tall building? Why or why not?
3. What kinds of buildings are often very tall?

Discussion questions activate students' knowledge and prepare them to read.

Read

Information in this article is from a popular online technology magazine.

SKYSCRAPERS

About 2,800 years ago, the tallest **structure** in the world was the Great Pyramid of Giza in ancient Egypt. It was 146 meters (479 feet) tall. Today, the Burj Khalifa building in Dubai is nearly six times that **height**. It is 828 meters (2,717 feet) tall and has 163 stories.

The Burj Khalifa is one of many skyscrapers **constructed** in different **areas** of the world recently. Even though the Great Pyramid was very tall, it was not a skyscraper because people did not live or work inside. There is no exact definition of a skyscraper. It is simply a very tall building. Today, millions of people live and work in skyscrapers.

EARLY BUILDINGS

Until the end of the 19th century, few buildings were taller than ten stories. One reason was because people could not easily climb any higher on stairs. Also, the entire **structure** of an old building was **supported** by its four outside walls. These walls were made of **vertical** piles of bricks or stones. The piles had to be very thick or they would fall over. This **restricted** the **height** of the walls.

STEEL BEAMS

Two **major** inventions in the 19th century made the **construction** of taller buildings possible. One was a new process for making steel. This process was used to create strong beams (long, thin pieces) of steel. Tall **structures** could be built with these beams. These **structures** used a new **construction design**. The walls were not made of stone or brick. Instead, thin steel beams were used to build a strong **vertical** framework for the walls. Later, the **vertical**

The Burj Khalifa

High-interest readings motivate students.

Oxford 3000 and Academic Word List vocabulary is presented in context.

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. Millions of skyscrapers have been constructed in the area near Dubai in recent years.

___ 2. Two major inventions in a previous century made the construction of tall buildings possible.

___ 3. The tallest structures in the world are restricted to 146 meters in height.

___ 4. Today, strong steel beams form the vertical support of skyscrapers.

___ 5. The design of a skyscraper must include plans for a system to pump water to high stories.

___ 6. The vertical space where elevators travel increases the valuable space inside a building.

Comprehension activities help students understand the text and apply the targeted academic vocabulary.

Explicit Reading Skill Instruction

READING SKILL Identifying Steps in a Sequence

LEARN

Articles often describe the steps necessary to complete an action. Sometimes these steps describe how a famous person was able to do something special. Sometimes these steps tell you how to build something. Sometimes these steps relate the progress of a historical event.

Often the order of the steps begins with words like *first, the first thing,* or *to begin with.* Sometimes the next steps are identified with words like *second, next, then,* or *after that.* The last step often begins with words like *finally* or *at last.* Sometimes the separate steps are not labeled.

APPLY

Work with a partner. Answer the questions below. Then follow the directions given.

1. In Paragraph 2 there is a description of the steps that checkout clerks had to take before bar codes were used. How many steps were there? ___
2. Paragraph 2 also describes the steps to check out customers after bar codes were used. How many steps are there? ___ How many of these steps are done by the checkout clerk? ___
3. Follow the directions to create a sample bar code digit.

   First, draw a square on a piece of paper. Make the square about one inch wide and one inch high. Next, draw six vertical lines inside the square. The lines should divide the square into seven equal spaces. Now you are ready to create a digital 9. After that, use a pencil to blacken in the first three spaces on the left. Then leave the fourth space white. Next, blacken in the fifth space. Finally, leave the last two spaces white. You have just created a digital 9.

   Number the six steps that are included in the directions.

Explicit reading skills provide the foundation for effective, critical reading.

Practice exercises enable students to implement new reading skills successfully.

READING SKILL Identifying Contrast Signals

APPLY

1. These ideas are from sentences in Paragraph 2 in Reading 2.

   About 29% of the earth's surface is land. However, only about 10% of that land is suitable for farming.

   Circle the two contrasting ideas. What signal is used to connect the two contrasting ideas?

   _____

2. These sentences are from Paragraph 2 in Reading 2.

   The rest of the Earth's land is in areas that are too hot or too cold for farming, or that have poor soil, not enough water, or not enough sun. Also, cities now occupy much of the land that was once farmland.

   The sentences describe six kinds of land areas where farming is not possible. Circle the six kinds of land areas.

   Write the sentence from Reading 2 that has information that contrasts with the above information.

   _____

REVIEW A SKILL **Using a Dictionary** (See p. 116)

These words appear in Paragraph 3.

Artificial lighting inside of greenhouses would allow food plants to grow throughout the year.

Look up the word *artificial* in your dictionary. Which of these are examples of artificial lighting?

candlelight sunlight light bulb moonlight neon light

Recycling of reading skills allows students to apply knowledge in new contexts.

The Academic Word List and the Oxford 3000

Based on a corpus of 3.4 million words, the **Academic Word List (AWL)** is the most principled and widely accepted list of academic words. Compiled by Averil Coxhead in 2000, it was informed by academic materials across the academic disciplines.

The **Oxford 3000™** have been carefully selected by a group of language experts and experienced teachers as the most important and useful words to learn in English. The Oxford 3000 are based on the American English section of the Oxford English Corpus.

Vocabulary Activities STEP I: Word Level

A. Work with a partner. Use the words below to complete the story. Use the words in parentheses (...) as clues.

analyze	behavior	created	linked	possible
average	complex	functions	located	wondered

In the early 19th century, phrenology (1) _____ (started) great interest among (2) _____ (typical) men and women. They visited phrenologists because they (3) _____ (wanted to know) about their talents and characters. Parents often asked a phrenologist to predict a child's future. Men and women in Europe used phrenology to help them choose among several (4) _____ (maybe suitable) marriage partners. Companies used phrenology to check the (5) _____ (way of acting) of people applying for jobs. The process was long and (6) _____ (made up of several steps). First phrenologists moved their hands over the skull of a customer. When they (7) _____ (found) a bump or dent, they would look at a phrenology map to see which personality trait was (8) _____ (connected) to that area. Finally, they would (9) _____ (look at details of)

Word level activities focus on meaning, derivations, grammatical features, and associations.

Instruction and practice with varying types of word knowledge helps students become **independent word learners**.

Vocabulary Activities STEP II: Sentence Level

The noun *effect* has the same meaning as *result*. It refers to a change or action that is caused by something.

*Being thirsty is one **effect** of eating too much salt.*

*The thunder had a strange **effect** on the animals.*

The adjective *effective* means that the change or action that happens is the result that was hoped for. The adverb form is *effectively*.

*The poison was **effective** in getting rid of the rats.*

*The poison **effectively** got rid of the rats.*

(See Oxford American Dictionary for learners of English, p. 232)

CORPUS

E. Rewrite each sentence to include the given form of *effect*. The first sentence is done for you.

1. Scientists have found a good way to prevent infections from germs. (effective)
   *Scientists have found an **effective** way to prevent infections from germs.*
2. They have developed a hand cleaner that can destroy germs on people's hands very well. (effectively)
3. Rubbing the hand cleaner on your hands helps in destroying germs. (effective)
4. The result of using a hand cleaner before eating is germ-free hands. (effect)
5. Hand cleaners have been useful in reducing the spread of germs. (effective)

Vocabulary work progresses to sentence level and focuses on collocations, register, specific word usage, and learner dictionaries.

From Research to Practice

The Oxford English Corpus provides **the most relevant and accurate picture of the English language**. It is based on a collection of over two billion carefully-selected and inclusive 21st century English texts.

To prevent something means "to stop something from happening." *To prevent a person from doing something* means "to stop a person from doing something."

*Brushing your teeth can **prevent** tooth decay.*

*My brother tried **to prevent** me from buying my own car.*

Certain words are often used with *prevent*, such as prevent diseases, prevent accidents, prevent damage, prevent crime, and prevent fires.

(See Oxford American Dictionary for learners of English, p. 552)

CORPUS

B. **Work with a partner. The phrases on the left tell how to prevent something. Match each one with the thing it will prevent. Take turns making sentences with the information.**

1. Brush your teeth — 1 — a. to prevent tooth decay.

   *Brush your teeth to **prevent** tooth decay.*

2. Drive carefully — ___ — b. to prevent spreading germs.
3. Wash all fruits and vegetables — ___ — c. to prevent a fire.
4. Cover your mouth when you cough — ___ — d. to prevent accidents.
5. Do not hang towels by a hot stove — ___ — e. to prevent a sick stomach.

Which of these might be signs on the wall of a restaurant kitchen?

The *environment* refers to the natural world in which we live. It includes the land, oceans, rivers, and lakes, and all of the plants and animals.

*Bacteria exist everywhere in our **environment**.*

The adjective form is *environmental*.

*Climate change could cause **environmental** problems.*

Environment can also refer to the conditions in a particular place, such as at work, at home, or at school.

*My work **environment** is very unfriendly.*

(See Oxford American Dictionary for learners of English, pp. 242–243)

CORPUS

C. **Below are some imaginary newspaper headlines. Work with a partner. Write an E in front of the headlines that are about an *environmental* problem.**

- E — Fires Destroy Forests in Asia
- ___ — African City Chosen for Olympics
- ___ — Rain Causes Floods in Canada
- ___ — Harmful Bacteria Spreads to Whales

Corpus-based examples from the **Oxford English Corpus** of American English. Real-life examples help students learn authentic English.

Resources

STUDENT SUPPORT

For additional resources visit:
www.oup.com/elt/student/insidereading

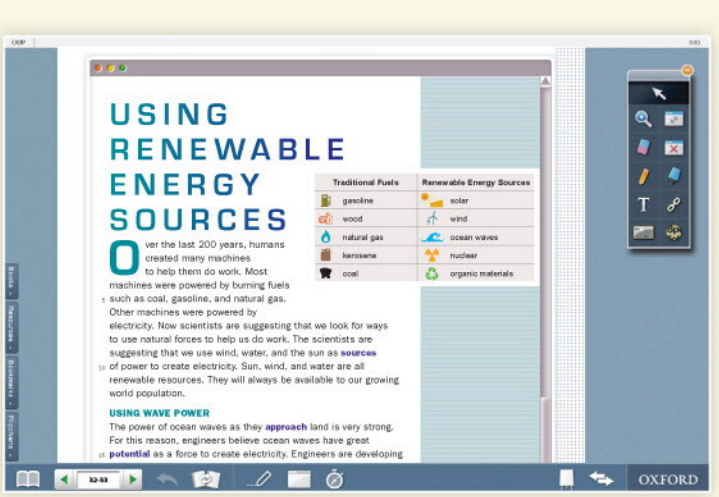
- **Reading worksheets** provide additional skill practice
- **Videos** set the stage for specific units
- **Audio recordings** of every reading text

TEACHER SUPPORT

The *Inside Reading* iTools is for use with an LCD projector or interactive whiteboard.

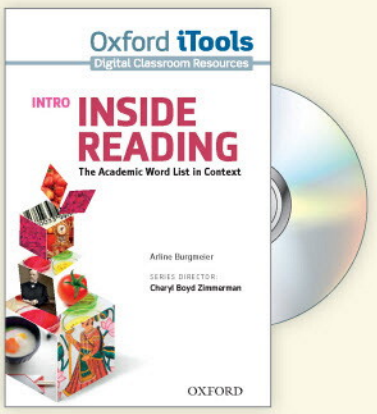
Resources for whole-class presentation

- Audio **recordings** of all **reading texts with "click and listen"** interactive scripts
- **Animated presentations** of reading skills for whole class presentations
- **Videos** for specific units introduce students to the reading text topic and activate prior knowledge.
- **Fun vocabulary activities** for whole-class participation



Resources for assessment and preparation

- Printable worksheets for **extra reading skill practice**
- Printable and customizable **unit, mid-term, and final tests**
- Answer Keys
- Teaching Notes
- Video transcripts



Additional resources at:
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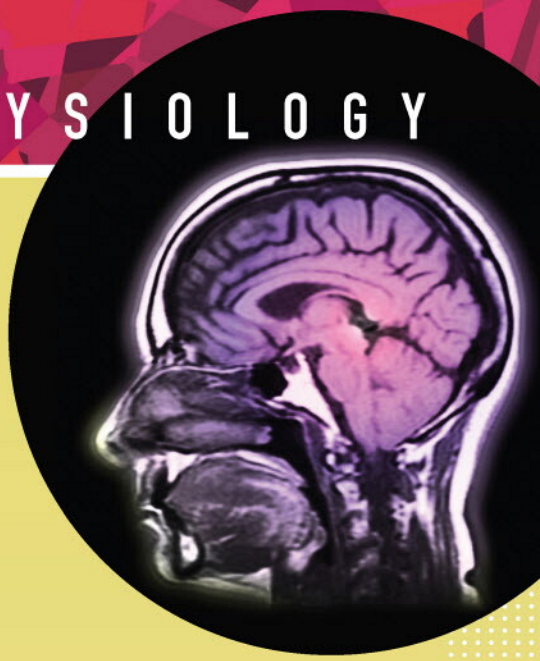
UNIT 1

PHYSIOLOGY



Mapping the Human Brain

In this unit, you will

- read how scientists of the past tried to learn about the human brain.
- read how modern technology helped scientists learn about the human brain.
- increase your understanding of target academic words for this unit.

READING SKILL Previewing

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL analyze						
average						
behavior						
complex						
AWL create						
AWL function						
link						
locate						
possible						
wonder						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about physiology? Watch the video on the student website to find out more.

READING 1

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What are some words that describe a person's personality or behavior?
2. Do you ever wonder why certain people behave as they do?
3. Is it possible for a person to change his or her personality?

READING SKILL Previewing

LEARN

Previewing a book or article means scanning it to get a general idea of what it will be about. It allows you to recall what you already know about a topic and what you can expect to learn. Most good readers spend a few minutes previewing before they begin to read academic texts.

APPLY

Work with a partner. Preview Reading 1 by answering these questions.

1. Read the title. Why would anyone need a map of the brain?
2. Look at the words just under the heading "Read" (on this page). Where did the information in the article come from?
3. Do you think this article will be about past or present time? Why?
4. Look at the pictures and the words under them. What information do they give you about the topic?
5. What do you expect to learn from this article?

Read

The information in this article is from a popular science magazine. Use your dictionary to find the meaning of words that you do not know.

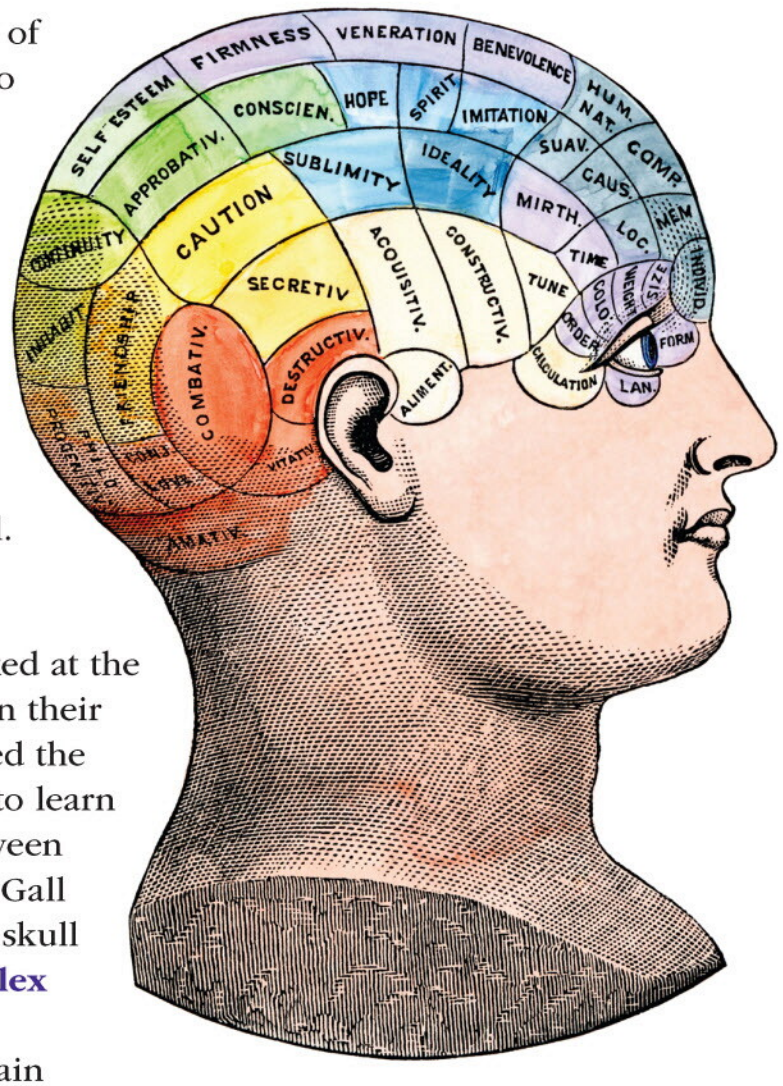
An Early Brain Map

Throughout history, human **behavior** seemed **impossible** to understand. Teachers **wondered** why some students were good at math but other students were not. People **wondered** why one neighbor was friendly but another was unfriendly. Parents **wondered** why one child **behaved** and another caused trouble. In the early 19th century, a German doctor thought he could answer these **complex** questions. His name was Franz Joseph Gall.

A NEW THEORY

Dr. Gall believed that the brain was the source of human **behavior**. He thought it was **possible** to understand human **behavior** if we understood how the brain **functioned**. He believed that each area of the brain was **linked** to a certain **behavior**, such as bravery. Furthermore, Dr. Gall **wondered** if the **functions** of the brain **created** bumps on a person's skull (the skull is the bone around a person's head). If so, a doctor could learn about a person's **behavior** by **analyzing** these bumps. He could **analyze** the location and size of the bumps on the skull. The bumps would tell the doctor about the person's **behavior**.

Dr. Gall began to test this idea. First he looked at the heads of many people. He **located** the bumps on their skulls. He measured these bumps. Then he asked the people questions about themselves. He wanted to learn about their **behavior**. He looked for a **link** between people's bumps and their **behavior**. Finally, Dr. Gall thought he could **link** every bump on a human skull to a certain brain **function**. He **created** a **complex** map of an **average** human head. The map had 27 areas. He labeled each of the areas with a brain **function**. Some of these **functions** were friendship, music, numbers, a love of children, bravery, humor, and memory. Dr. Gall named this mapping of the human skull "phrenology."



A phrenology "map"

THE GROWTH OF PHRENOLOGY

Phrenology **created** great interest around the world. Some people thought Dr. Gall's ideas were **wonderful**. They thought his phrenology map was a scientific way to understand human **behavior**. In fact, some people learned how to read head bumps. They became phrenologists. Customers went to them to have their head bumps **analyzed**. They asked the phrenologists for advice about their lives.

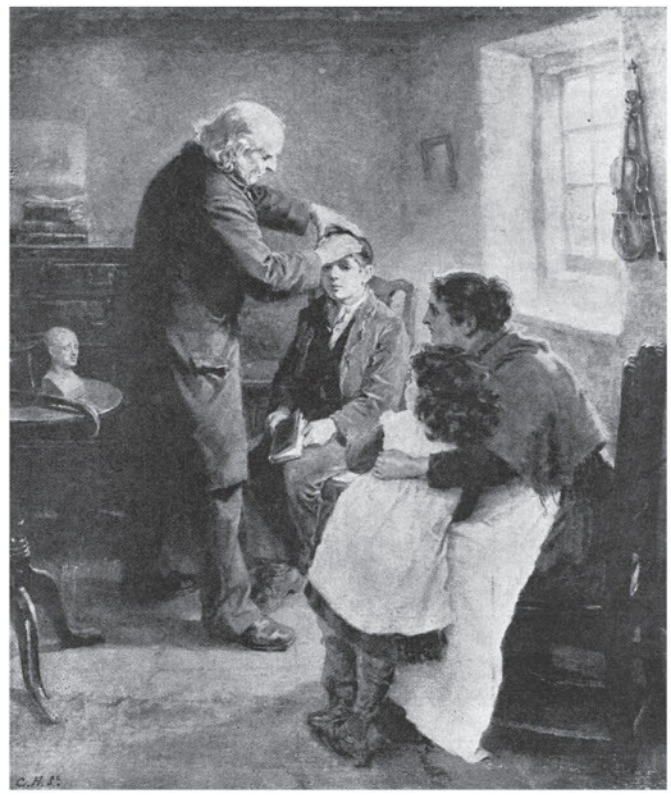
Phre-nol′o-gy (-nŏl′ŏ-jў), *n.* **1.** Science of the special functions of the several parts of the brain, or of the supposed connection between the faculties of the mind and organs of the brain. **2.** Physiological hypothesis that mental faculties, and traits of character, are shown on the surface of the head or skull; crainiology. — **Phre-nol′o-gist,** *n.* — **Phre-nol´o-log′ic** (fren´o-lojik), **Phren´o-log′ic-al,** *a.*

An early definition of phrenology

PHRENOLOGY'S CRITICS

In contrast, other people made jokes about phrenology and head bumps. They laughed at Dr. Gall and his ideas. They did not think phrenology was scientific. They said it was **impossible** to know a person's personality by **analyzing** head bumps.

In the early 20th century, the study of human **behavior** became important to scientists. They learned that head bumps could not explain how people behaved. They looked for other explanations. Soon everyone agreed that phrenology was not a science after all. It was only one man's attempt to understand human **behavior**. ■



A phrenologist analyzing head bumps.

Reading Comprehension

Mark each sentence as *T* (True) or *F* (False) according to Reading 1.

T 1. Dr. Gall believed that the brain was the source of human behavior.

___ 2. He thought it was possible to understand behavior by measuring the human brain.

___ 3. He wondered if people would laugh at his ideas.

___ 4. He looked for a link between the size of a person's head and his behavior.

___ 5. Dr. Gall created a complex map of an average human head.

___ 6. The map showed the location of 27 brain functions.

___ 7. Customers went to phrenologists to have their head bumps analyzed.

Vocabulary Activities STEP I: Word Level

A. Work with a partner. Use the words below to complete the story. Use the words in parentheses (...) as clues.

analyze	behavior	created	linked	possible
average	complex	functions	located	wondered

In the early 19th century, phrenology (1) created (started) great interest among (2) _____ (typical) men and women. They visited phrenologists because they (3) _____ (wanted to know) about their talents and characters. Parents often asked a phrenologist to predict a child's future. Men and women in Europe used phrenology to help them choose among several (4) _____ (maybe suitable) marriage partners. Companies used phrenology to check the (5) _____ (way of acting) of people applying for jobs. The process was long and (6) _____ (made up of several steps). First phrenologists moved their hands over the skull of a customer. When they (7) _____ (found) a bump or dent, they would look at a phrenology map to see which personality trait was (8) _____ (connected) to that area. Finally, they would (9) _____ (look at details of) all the findings and discuss each of the 27 brain (10) _____ (special uses) with the customer. Some customers were pleased and others were disappointed by what the phrenologists told them.

A *function* (noun) is the purpose or special duty of a person or thing.

*The nurse's main **function** is identify the nature of a medical problem.*

*The **function** of a lamp is to provide light.*

To function (verb) means "to work correctly" or "to be in action."

*My computer isn't **functioning** well.*

*My brain **functions** best after I've had a cup of coffee.*

(See Oxford American Dictionary for learners of English, p. 297)

CORPUS

B. **With a partner, match the body part on the left with its *function*. Take turns creating sentences with the words. Read them out loud.**

1. the heart — 1 a. to pump blood through the body

*The **function** of the heart is to pump blood through the body.*

2. the eyes — ___ b. to smell
3. the stomach — ___ c. to chew
4. the ears — ___ d. to digest food
5. the nose — ___ e. to see
6. the teeth — ___ f. to hear

Possible refers to something that has not yet happened. Something is *possible* if it could happen or if it could be done. Something is *impossible* if could not happen or it could not be done. These words are often used with *it is* in sentences such as those below.

*It is **possible** that I will visit my family next week.*

*It is **impossible** for me to go this week.*

(See Oxford American Dictionary for learners of English, p. 542)

CORPUS

C. **With a partner, decide which of these behaviors are possible. Write P if the behavior is possible and I if behavior is impossible.**

___ 1. The day a baby girl is born, she says, "Hello, Mother."
___ 2. A child cries when his cookie falls on the floor.
___ 3. A woman has not seen her sister for 20 years.
___ 4. A man takes cooking lessons.
___ 5. A boy teaches his horse to speak Japanese.
___ 6. A woman eats only foods that begin with the letter *A*.

Discuss why some of these behaviors are impossible.

The adjective *average* refers to something that is usual or typical.

*The **average** person must work hard to be successful.*

*Friends are important to the **average** teenager.*

The noun *average* is a mathematical term. An *average* is obtained by adding several figures then dividing the sum by the number of figures. *Average* is also the verb form.

*The **average** of 1, 3, and 14 is 6. (1 + 3 + 14 = 18 ÷ 3 = 6)*

*Most students **average** about six hours of sleep a night.*

(See Oxford American Dictionary for learners of English, p. 46)

CORPUS

D. ***Average*** **is used to describe things that are typical or usual. Work with a partner. Put an A in front of things that an average office worker does every day. Take turns making sentences with the items marked A.**

*The **average** office worker wakes up early every day.*

A wakes up early	___ flies in an airplane to work
___ eats lunch with a celebrity	___ eats dinner with family members
___ watches television at night	___ buys a new car
___ sits at a desk	___ talks to people at work

The adjective *complex* refers to something that is made up of several connected parts or steps and may be difficult to understand. The opposite of *complex* is *simple*.

*A foreign language has **complex** grammar rules that you must learn.*

*A subway is a **complex** system of train tracks underneath a city.*

(Oxford American Dictionary for learners of English, p. 145)

CORPUS

E. **Work with a partner. Look at the two lists below. Each item on the left is *simple*. It has few parts and is easy to use. The one opposite on the right is *complex*. Take turns making sentences about the pairs.**

1. a kite	an airplane

*A kite is simple, but an airplane is **complex**.*

2. a child's picture book	a university textbook
3. a wagon	an automobile
4. counting	averaging ten numbers
5. a family dinner	a wedding feast

Vocabulary Activities STEP II: Sentence Level

To analyze something means "to examine it carefully in order to understand or explain it."

*Students **analyzed** the results of the experiment.*

*A doctor **analyzed** the patient's problems.*

An *analysis* is a careful examination of the parts or details of something.

*The doctor wrote an **analysis** of the patient's problems.*

An *analyst* is a person who analyzes something.

*Our city hired an **analyst** to determine if a new school was needed.*

(See Oxford American Dictionary for learners of English, p. 24)

CORPUS

F. **Rewrite these sentences using the form of *analyze* in parentheses.**

1. A scientist made a study of climate changes in Europe. (analyzed)

   *A scientist **analyzed** climate changes in Europe.*

2. A salesman examined the December sales report. (analysis)
3. A technician failed to understand the computer's problems. (analyze)
4. A teacher spent the day examining students' test scores. (analyzing)
5. An airline hired someone to study passenger service. (analyst)

To *locate* something is to find its exact position, often after the position was unknown.

*I forgot where I parked my car, but I finally **located** it.*

The passive verb form is used to describe where something is.

*Beijing is **located** in China.*

The verb *to locate* something also means "to put or build something in a particular place."

*The university will **locate** the new library on top of the hill.*

A *location* is a place or position.

*The police reported the **location** of the fire.*

(See Oxford American Dictionary for learners of English, p. 423)

CORPUS

G. **Imagine that you are the owner of a beautiful new hotel in another country. A newspaper reporter is asking you questions about it. Answer the questions with the words in parentheses. Then compare answers with other students.**

1. Do you have a picture of your hotel? (locate)

   *Yes, I can **locate** a picture on my computer.*

2. Where is your hotel? (be located)

   _____

3. Why did you choose that place? (location)

   _____

4. A painting was stolen from your hotel. Where did the police find it? (located)

   _____

5. On what floor will your office be? (be located)

   _____

6. Where will you build your next hotel? (locate)

   _____

READING 2

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What is a map? Why do people need maps?
2. How can scientists study the brains of people?
3. Here are some expressions about the brain. What do you think they mean? "He sure is a brain." "Use your brain." "Some people are brainless."

READING SKILL Previewing

APPLY

With a partner, preview Reading 2 by answering these questions.

1. Look at the title of the article. Do you think the article is about the past, present, or future?
2. Look at the pictures in the reading. How are they different from the pictures in Reading 1?
3. How would you expect brain mapping today to be different from Dr. Gall's brain mapping?

Read

This article is from a science website. Use your dictionary to find the meaning of words you do not know.

BRAIN MAPPING TODAY

In the early 20th century, scientists studied the brain. They studied parts of the brain. They studied how the brain controls human **behavior**. They **wondered** if there was a **link** between the parts of the brain and human **behavior**. They **wondered** if all brains were the same. Scientists had many questions about the brain. However, they could not look inside a living brain. Scientists needed other ways to find the answers. New technology—computers—helped scientists study the brain.

An **average** human brain has 100 billion cells. The brain is very **complex**. It has many parts. These parts have many different **functions**. Before computers, people did not know how to describe these parts and **functions**. But computers made it **possible**. Computers and electronic scanning[1] machines helped people see how a living brain **functions**. Scanning machines take pictures of the inside of the brain. The pictures appear on a computer screen. Scientists can then see the pictures. They can **analyze** the pictures.

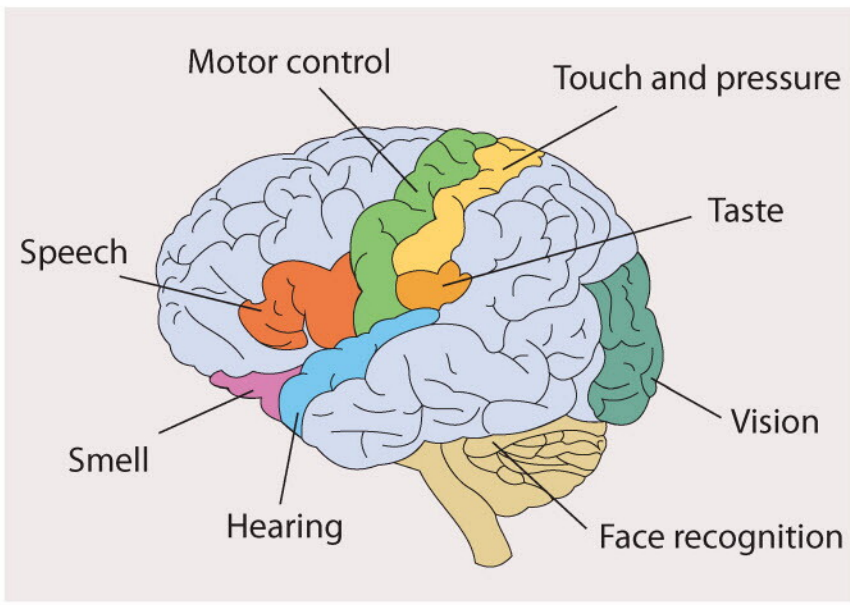
MRI SCANNING

One kind of scanning is MRI. These letters stand for Magnetic Resonance Imaging. MRI uses magnetic forces and radio waves. MRI **creates** computer images, or pictures, of the brain. The process is simple. A person lies on a table. An MRI machine scans his or her head. A computer that is **linked** to the scanner **creates** images. These images show the parts of the brain and their **locations**.

FMRI SCANNING

A **functional** MRI, called an fMRI, works the same way. However, it **creates** images of brain **functions**. For example, an fMRI scan is made while a person is doing an activity. The person can be listening to music or smelling different foods. When the person is doing these things, some areas of the brain are active. The computer images show which areas are active. When an area of the brain is active, more blood flows there. The scan shows this. Then scientists can see which parts of the brain control the different **functions**. For instance, scientists can see which parts control hearing or smell.

Scientists wanted to know what the **average** human brain looked like. They tried to use MRI and fMRI images to **create** a map of the **average** brain. However, brains are



Locations of brain functions

The MRI machine scans a person's brain.

[1] One meaning of the word *scan* is to read something quickly. Another meaning is to use a machine to produce a picture of the inside of a person's body on a computer screen.

very different. Scientists decided to collect many examples of brains. They thought this was the best way to show the parts of an **average** brain. First they scanned the brains of hundreds of people. They scanned brains of people from all over the world. Then computers **analyzed** the images from the scans. The computers collected measurements of the brain parts. Finally, computers **averaged** the measurements and **created** brain maps.

One map shows the parts of an **average** brain. Other maps show the **locations** of brain **functions**. Memory and speech are two of these **functions**. Special maps show brain images from different kinds of people. For example, there are images from sick and healthy people, male and female people, young and old people.

Doctors around the world can examine these maps online. They can compare these images with brain scans from their own patients. These online maps also help doctors who operate on brains. The doctors can see the exact **location** of important brain parts before they operate.

Brain mapping is a **wonder** of modern technology. It allows scientists to examine living human brains and answer questions about human **behavior**. ■

A doctor studies a brain scan.

Reading Comprehension

Mark each sentence as *T* (True) or *F* (False) according to Reading 2.

___ 1. Scientists used to wonder where the human brain was located.
___ 2. Brain mapping was not possible before computers were invented.
___ 3. Brain functions can be scanned by fMRI machines.
___ 4. All human brains are average.
___ 5. Computers analyze the images created from brain scans.
___ 6. A computer that is linked to the scanner creates images.
___ 7. fMRI scans can change human behavior.
___ 8. MRI scans create computer images of complex brain parts.

Vocabulary Activities STEP I: Word Level

A. Use the words below to complete the story. Use the words in parentheses as clues.

analyzes	behavior	complex	impossible	location
average	create	functions	links	wondered

Ken was a ten-year-old boy who couldn't read. His teacher said he was intelligent, but his classroom (1) _____ (*way of acting*) was a problem. His parents (2) _____ (*wanted to know*) what was wrong. A doctor suggested that Ken have an fMRI scan. The brain scan was made while Ken was trying to read a book. Afterward, the doctor looked at the scan of the left half of Ken's brain. This is the (3) _____ (*place*) of most language (4) _____ (*activities*). Three separate areas are related to the (5) _____ (*made of many parts*) task of reading. The first focuses on the sounds of words. The second area (6) _____ (*examines details of*) parts of words and (7) _____ (*connects*) sounds to printed letters. The third area links letters to words, and links words to ideas. In (8) _____ (*typical*) brains, all three areas work together. But Ken's scan showed brain activity only in the first area. There were no connections to the other two areas. This made it (9) _____ (*not able to happen*) for Ken's brain to use the functions of other two areas. The doctor realized that Ken had dyslexia. About 20% of children have this reading disorder. There is no cure, but reading experts can (10) _____ (*make*) special lessons to help these children become better readers. Ken began the lessons right away and is already a better reader.

B. Think about Reading 1 and Reading 2. Work with a partner. Write **P** if the idea is only in the reading about **p**hrenology, **M** if the idea is only in the reading about brain **m**apping, and **B** if the idea is in **b**oth readings.

___ located brain functions
___ analyzed bumps
___ used computers
___ used fMRI
___ created maps
___ people laughed
___ collected information from many people
___ wondered about behavior

Phrenology	fMRI examination
Done for curiosity of customer	Done as a medical procedure
Examines outside of head	Looks inside the brain
Not scientific	Scientific
Tries to explain behavior	Identifies affected brain areas

A *link* is a person or thing that connects two people or things. *To link* two people or things is to suggest a connection between them. The verb is often used in the passive.

*The Spanish language is a **link** between Mexico and Spain.*

*Some schools **link** reading and writing together in one class.*

*Reading computer screens for a long time **is linked** to headaches.*

(See Oxford American Dictionary for learners of English, p. 420)

CORPUS

C. **With a partner, match the items on the left that are linked with those on the right. Take turns making sentences with the information.**

1. reading ___ a. writing

*There is a **link** between reading and writing. Reading **is linked** to writing.*

2. exercise ___ b. disease
3. speeding ___ c. car accidents
4. education ___ d. winter
5. height ___ e. future earnings
6. rats ___ f. shoe size
7. snow ___ g. good health

Behavior is how a person or animal acts. It can refer to one-time actions or long-term habits.

*Mrs. Inoue was embarrassed by her daughter's **behavior** in the restaurant.*

*My uncle went to Africa to study the **behavior** of elephants.*

To behave means "to act in a certain way."

*Scientists have studied how people **behave** in emergencies.*

The adjective *behaved* always occurs with an adverb that describes how someone *behaved*. Usually the adverb describes something good or bad.

*Yuna was a **well-behaved** little girl.*

*A lot of the children we deal with are badly **behaved**.*

Parents often say to a child, "*Behave* yourself!" or ask, "Why can't you *behave*?"

(See Oxford American Dictionary for learners of English, p. 63)

CORPUS

D. **Work with a partner. Match the behavior on the left with the description on the right. Then one person reads the behavior and the other responds with the matching description.**

1. Jamal sat quietly through the concert.	1 a. He was well-behaved.
2. Jamal shared his ice cream with his sister.	___ b. His behavior was gentle.
3. Jamal thanked his grandmother for the present.	___ c. He behaved generously.
4. Jamal didn't say a word all day.	___ d. He behaved badly.
5. Jamal argued with his father.	___ e. He behaved politely.
6. Jamal held the baby on his lap.	___ f. His behavior was strange.

Vocabulary Activities STEP II: Sentence Level

To wonder something is to want to know something that you do not know. It can be used about past, present, or future events. It is usually expressed by *I wonder* followed by *whether* or *if*.

*I **wonder** if she received my email this morning.*

*I **wonder** whether the library will be open tomorrow.*

To wonder can also be used with *wh–* question words. Notice the subject-verb order after *wonder*.

*I **wonder** who won the game yesterday.*

*I **wonder** where my book is.*

*I **wonder** when we're eating dinner.*

As a noun, *wonder* expresses a feeling of surprise and admiration.

*We watched in **wonder** as the baby horse stood up.*

*The computer is a **wonder** of modern technology.*

The adjective *wonderful* means "very good."

*I had a **wonderful** time.*

*The movie was **wonderful**.*

No wonder… is a common expression that means "I'm not surprised that…"

*I haven't had breakfast yet. **No wonder** I'm so hungry.*

***No wonder** it's so warm in here. The air conditioner is off.*

(See Oxford American Dictionary for learners of English, p. 840)

CORPUS

E. **Here are some questions you might still have about brain mapping. In your notebook, write five sentences that include a form of *wonder*. Use these ideas, or add your own.**

1. Does anyone still believe in phrenology?

   *I **wonder** if anyone still believes in phrenology.*

2. What does "phrenology" mean?
3. Does the average doctor have an MRI scanner?
4. Is it possible to go online to see a brain map?
5. Who invented the MRI scanner?
6. Are animal brains as complex as human brains?
7. Can animal brain functions be analyzed with an fMRI?
8. How are men's and women's brains different?

Word Form Chart			
Noun	**Verb**	**Adjective**	**Adverb**
creator creation creativity	create	creative	creatively

To create something is to make something new or cause something new to happen.

*Artists **create** beautiful pictures for us to enjoy.*

*Cara's job is to advise employees about cultural issues that sometimes **create** problems.*

The person who makes something or causes something new to happen is the *creator* of the new thing. The new thing that the person created is a *creation*.

*Walt Disney was the **creator** of many familiar cartoon characters.*

*His **creations** are known all over the world.*

A person who has many new or unusual ideas is said to be *creative*. Someone who finds a new or unusual way to do something is said to be doing it *creatively*.

*Mother always found **creative** ways to use leftover foods.*

*She often mixed meats and vegetables **creatively** to make a delicious soup.*

(See Oxford American Dictionary for learners of English, pp. 172–173)

CORPUS

F. **Rewrite these sentences in your notebook with the form of *create* in parentheses.**

1. Federico García Lorca created many plays. (creator)

   Federico García Lorca was the ***creator*** *of many plays.*

2. People admired the things he created. (creations)
3. They thought his ability to create was amazing. (creativity)
4. People thought his plays were filled with unusual ideas. (creative)
5. Lorca was also the creator of many poems. (created)

Writing and Discussion Topics

The Chinese word for *computer* translates into English as *electric brain*. In fact, there are many similarities between a computer and a human brain. Work in groups of three or four.

Read each sentence below. Decide if it is true. Then change the word *brain* to *computer*, or change *computer* to *brain*. Discuss whether the sentence is still true or not.

Computers

Brains have many functions. *True* ~~Brains~~ have many functions. *True*

Computers are very complex.

Brains can analyze difficult problems.

Brains control people's behavior.

The average person does not know very much about his computer.

People locate information that is stored in their computer's memory.

It is possible to add new programs to your computer.

There are links between the parts of the brain.

Brains are very creative.

People wonder what computers of the future will be like.

Choose one of the topics below. Write at least four sentences about that topic. Include some of the new vocabulary words from this unit.

1. Describe some ways that phrenology maps are like fMRI maps.
2. Describe ideas for new studies of the human brain. What would you like scientists to study?
3. What are some other simple tools or complex equipment that doctors use to learn more about what is inside a human body?

UNIT 2

It's About Time

In this unit, you will

- read about the history of telling time and the development of time-keeping devices.
- review previewing.
- increase your understanding of the target words.

READING SKILL Pronoun References

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
accurate						
appear						
confuse						
develop						
difference						
feature						
shift						
AWL similar						
system						
AWL vary						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about time?
Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Is it important for you to know what time it is? If so, why?
2. How many clocks and watches do you have?
3. Have you ever seen a clock that did not need electricity or batteries to work?

REVIEW A SKILL **Previewing** (See p. 2)

Preview Reading 1 before you begin reading it. Remember to

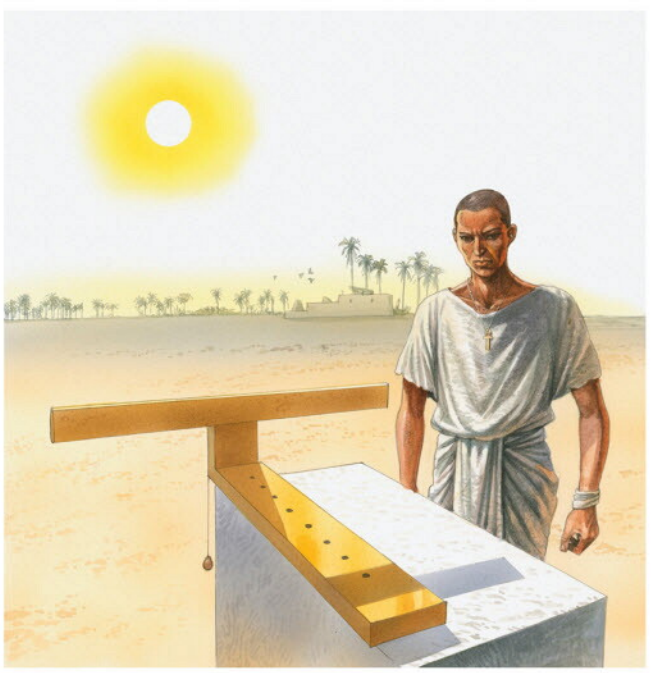
1. look at the title;
2. read the introduction;
3. look at the pictures;
4. read the words under the pictures;
5. guess what the article will be about.

Read

This information is from a science magazine. Use your dictionary to find the meaning of words you do not know.

What Time Is It?

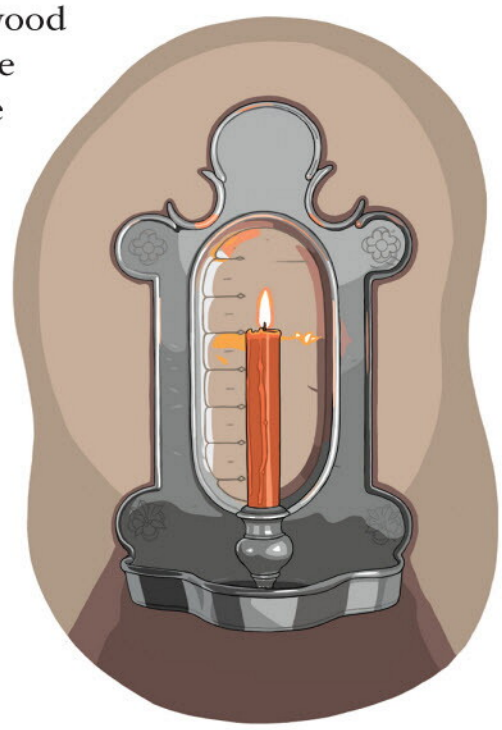
Early humans did not need clocks. They did not need to know the time of day. They woke up when the sun **appeared**. They hunted or fished or farmed while the sun was shining. They ate when they were hungry and went to bed when darkness came. Measuring time became important when people lived in towns and cities. People needed clocks so they could work together.



Early clocks used the sun's shadow to mark time.

THE EARLIEST CLOCKS

About 4,000 years ago, ancient Egyptians **developed** a 12-hour time **system**. They divided the day into 12 hours. The earliest clocks used sun shadows to show the hours of the day. A long piece of wood was marked into hours. A short piece of wood was put at one end of the long piece of wood. As the sun **shifted** across the sky, the short piece of wood created shadows on the long piece. These shadows showed the hours. This method of showing time was useful, but not very **accurate**. Later, round sundials were **developed**. They used sun shadows, too, but they were more **accurate** than the wood clocks. Sundials could measure time on sunny days. However, they did not work at night or when the sun was hidden by clouds. Also, people were **confused** to see the time on sundials **vary** with the seasons.



A candle divided by marks into hours functioned as a primitive clock.

Over many years, **different** kinds of clocks were created to measure time during the day and at night. Candle clocks were used in ancient China, Japan, and Iraq. A candle holder was divided by marks into hours. As the candle burned, the marks showed how many hours had passed. Greeks used water clocks made of two glass bowls. The bowls were connected by a small hole. The top bowl was filled with water. The water slowly ran into the bottom bowl through the hole. The bottom bowl was marked into hours that measured time. Hourglasses worked in a **similar** way. The **difference** was that sand **shifted** from the top bowl into the bottom bowl. Water clocks and hourglasses functioned very well to measure time.

THE DEVELOPMENT OF MODERN CLOCKS

Soon clocks **developed** into wonderful art objects. Clocks were put into beautiful wooden boxes. The boxes were painted with flowers and birds. About 1,000 years ago, an Arab engineer added mechanical **features** to water clocks. He used the falling water to turn gears that opened doors and rang bells. These mechanical **features** gave later engineers the idea to **develop** mechanical clocks.

An early mechanical clock.

Mechanical clocks first **appeared** in China about 800 years ago. The idea spread to other places. A mechanical clock had to be wound with a tool every day. It had a complex system of springs and gears inside. The gears turned a dial on the front of the clock. The earliest mechanical clocks had one dial that showed only the hour. Later another dial was added to show minutes.

Most modern clocks are powered by batteries or electricity. They show hours, minutes, and seconds. Knowing the exact time is important in our complex world. ■

Reading Comprehension

Mark each statement as *T* (True) or *F* (False) according to Reading 1.

___ 1. Early humans needed to know the exact time that the sun appeared.
___ 2. Egyptians developed a 12-hour time system about 4,000 years ago.
___ 3. People were confused when the time on sundials varied with the seasons.
___ 4. A sundial was more accurate in the winter than in the summer.
___ 5. Falling water was an important feature of mechanical clocks.
___ 6. Hourglasses were similar to water clocks.
___ 7. The sand in an hourglass shifted from a top bowl to a bottom bowl.
___ 8. There were many differences between water clocks and hourglasses.

READING SKILL Pronoun References

LEARN

Pronouns are words that can substitute for nouns. These words are pronouns:

Subjects:	I	you	he	she	it	we	they
Objects:	me	you	him	her	it	us	them
Possessive:	my	your	his	hers	its	our	their
	mine	yours	his	hers	its	ours	theirs

Imagine if you saw this confusing sentence in a book about a family in London:

> *Josef and Josef's brother asked Josef's and Josef's brother's mother if Josef and Josef's brother could borrow Josef's and Josef's brother's mother's car.*

The sentence is much easier to understand if we substitute pronouns for some of the nouns:

> *Josef and his brother asked their mother if they could borrow her car.*

Notice that each pronoun refers to a noun (or more than one noun) that came earlier in the sentence.

Sometimes the pronoun *it* is used without an earlier noun reference.

> *It was impossible to see through the thick fog.*
>
> *It is six o'clock.*
>
> *It makes no difference if we go today or tomorrow.*

APPLY

The following sentences are related to Reading 1. Underline each pronoun and write the noun it refers to on the line.

1. Early humans did not need clocks. They did not need to know the time of day.

   early humans

2. Sundials worked on sunny days. They did not work at night.

   _____

3. An Arab engineer added mechanical features. He used gears to open doors.

   _____

4. A mechanical clock had to be wound with a tool. It had springs and gears.

   _____

5. Modern clocks are powered by batteries or electricity. They show hours, minutes, and seconds.

   _____

6. People needed clocks so they could work together.

   _____

Vocabulary Activities STEP I: Word Level

Similar describes something that is almost the same as something else. The adverb form is *similarly*.

*A sand clock is **similar to** a water clock.*

*The two girls were **similarly** dressed.*

(See Oxford American Dictionary for learners of English, p. 669)

CORPUS

A. **Work with a partner. Match an item on the left to a *similar* item on the right. Take turns making sentences with the information.**

1. a zebra — *1* a. a horse

   *A zebra is **similar** to a horse.*

2. a turkey — ___ b. a butterfly
3. a lion — ___ c. a rat
4. a whale — ___ d. a chicken
5. a moth — ___ e. a tiger
6. a mouse — ___ f. a fish

If something is *accurate*, it is exact and without mistakes. The adverb form is *accurately*.

*Do you think that this newspaper story is **accurate**?*

*Be sure that you have spelled all of the words **accurately**.*

(See Oxford American Dictionary for learners of English, p. 6)

CORPUS

B. **Work with a partner. Read the sentences for a science magazine article. Imagine that you are the editors of the magazine. Write NA in front of the sentences that are not *accurate*. Then list what is not accurate in each NA sentence, using the words spelling, date, or country.**

NA 1. About 400 years ago, ancient Egyptians developed a 12-hour time system.

*The date is not **accurate**.*

___ 2. Sundyals were useful, but they did not work at night.

___ 3. Candle clocks were used in ancient Greece.

___ 4. Soon clocks developed into wonderful art objects.

___ 5. Mechanical clocks first appeared in China about 8,000 years ago.

___ 6. The blows were connected by a small hole.

A *system* is a group of things or parts that work together.

*Our city school **system** won an award for excellence.*

A *system* is also a plan for organizing things.

*Libraries use a **system** to help readers locate books.*

System also refers to the body of a human or animal.

*The infection had spread throughout her **system**.*

(See Oxford American Dictionary for learners of English, p. 742)

CORPUS

C. **Work with a partner. Use the words below to name each of the *systems* described. Take turns reading your sentences out loud.**

solar	metric	weather	transportation	computer

1. The sun and eight planets make up the *solar* **system**.
2. A monitor, a keyboard, a console, a printer, and a mouse are parts of a _____.
3. Streetcars, buses, and subways are parts of a city's _____.
4. Measurements such as meters, liters, and grams are based on the _____.
5. Rain, wind, clouds, and low temperatures are parts of a _____.

Vocabulary Activities STEP II: Sentence Level

The verb *to appear* means "to come into view." The noun form is *appearance*. *Disappear* and *disappearance* have opposite meanings.

*A bright meteor suddenly **appeared** in the sky.*

*We were excited by its sudden **appearance**.*

*Then it **disappeared** from view.*

To appear can also mean "to exist for the first time."

*Computers **appeared** around 50 years ago.*

*The **appearance** of computers changed our world.*

To appear can also mean "to look" or "to seem" a certain way.

*She **appeared** tired after the long airplane ride.*

*This book **appears** to be very old.*

Appearance can refer to a person's outside features, especially the face.

*His **appearance** changed when he wore a wig.*

(See Oxford American Dictionary for learners of English, p. 32)

CORPUS

D. **The sentences below are about a solar eclipse. A solar eclipse happens when the moon passes between the sun and the earth. The moon *appears* to cover the sun. Rewrite each of these sentences in your notebook to include a form of *appear*.**

1. The moon seems to be hiding the sun.

   *The moon **appears** to be hiding the sun.*

2. Children wonder if the sun will come out again.
3. It is so dark without the sun that it seems to be nighttime.
4. A few stars come into view in the dark sky.
5. A few minutes pass and the sun starts to come into view.
6. The sun seems brighter than ever.

A solar eclipse

The verb *to develop* means "to change or grow over time."

*A need for clocks **developed** as people began living in cities.*

To develop something means "to create something over time."

*The Egyptians **developed** a 12-hour time system.*

To develop into means "to change from one form to another."

*Simple water clocks **developed into** complex art objects.*

The noun form is *development*.

*The **development** of modern clocks took many centuries.*

(See Oxford American Dictionary for Learners of English, p. 199)

CORPUS

E. **Rewrite these sentences in your notebook with the given form of *develop*. Then, in a small group, take turns reading your sentences to each other.**

1. Scientists have created a system to learn how trees grow. (developed)

   *Scientists have **developed** a system to learn how trees grow.*

2. They analyze tree rings to learn about the history of a tree. (development)
3. As a tree grows, it adds a layer of wood on the tree trunk every year. (develops)
4. Each layer is called a ring. The rings are linked to a tree's growth. (development)
5. Wide rings form when a tree has lots of water during the year. (develop)
6. Thin rings are formed when a tree does not have much water. (developed)
7. Scientists learn about the growth of a tree by analyzing its rings. (development)

The noun *difference* tells how two people or things are not alike.

*The time **difference** between Tokyo and Bangkok is two hours.*

*Which of these bowls is bigger? I can't tell the **difference** (between the two).*

The adjective *different* means "not the same as." (When two things are compared, use *different from*.) It can also mean "not of the same kind." The adverb form is *differently*.

*Chinese is very **different from** English.*

*The languages are very **different**.*

*Each one was prepared **differently**.*

To make a difference means "to have an effect" or "to influence" something. *To not make a difference* means "to not have an effect or influence."

*If you don't study, it could **make a difference** in your grade.*

*It won't **make a difference**. I'm already failing the class.*

To *have differences* means "to disagree about some things."

*My brother and I are best friends, but we **have** our **differences**.*

(See Oxford American Dictionary for learners of English, pp. 201–202)

CORPUS

F. **Complete this story with forms of the word *difference*. Then, with a partner, take turns reading the story out loud.**

Time passes for all humans in the same way. Yet there are many (1) _____ ways to express time in numbers. For example, many countries use a 24-hour time system. In these countries, the day begins at midnight, which is 00:00. The day ends at 23:59. These times are written (2) _____ in a country with a 12-hour time system. Midnight is 12:00 A.M. The day ends at 11:59 P.M. Countries also write dates (3) _____ In some countries a date is written as June 2, 2014. In other countries, it is written as 2 June 2014. The (4) _____ could be confusing if the date is written in just numbers. For example, a visitor might confuse 6/2/2014 and 2/6/2014.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Have you ever visited a country that was in a different time zone?
2. What time does the sun rise where you live? What time does it set?
3. Why does the time vary in different places on earth?

REVIEW A SKILL **Previewing** (See p. 2)

Before you begin the reading, preview it. Remember to

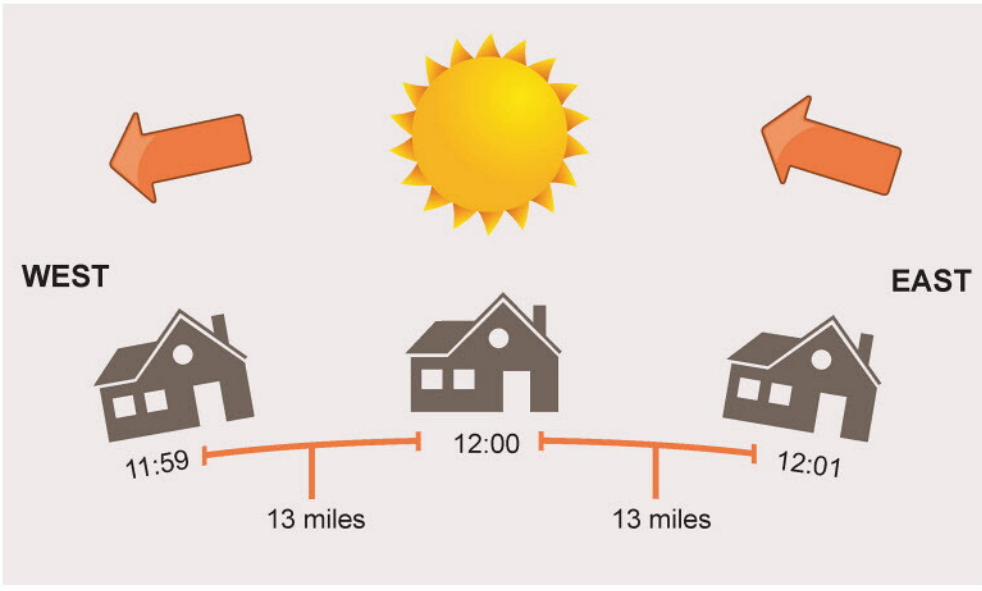
1. look at the title;
2. read the introduction;
3. look at the pictures;
4. read the words under the pictures;
5. guess what the article will be about.

Read

This article is from a geography text book. Use your dictionary to find the meaning of words you do not know.

Time Zones

Many years ago, people used the sun to set their clocks. When people saw the sun exactly above them, they knew it was noon. Everyone living nearby had the same sun time. But the sun was not exactly above in other locations to the east or west. As a result, people in **different** locations had **different** local times.

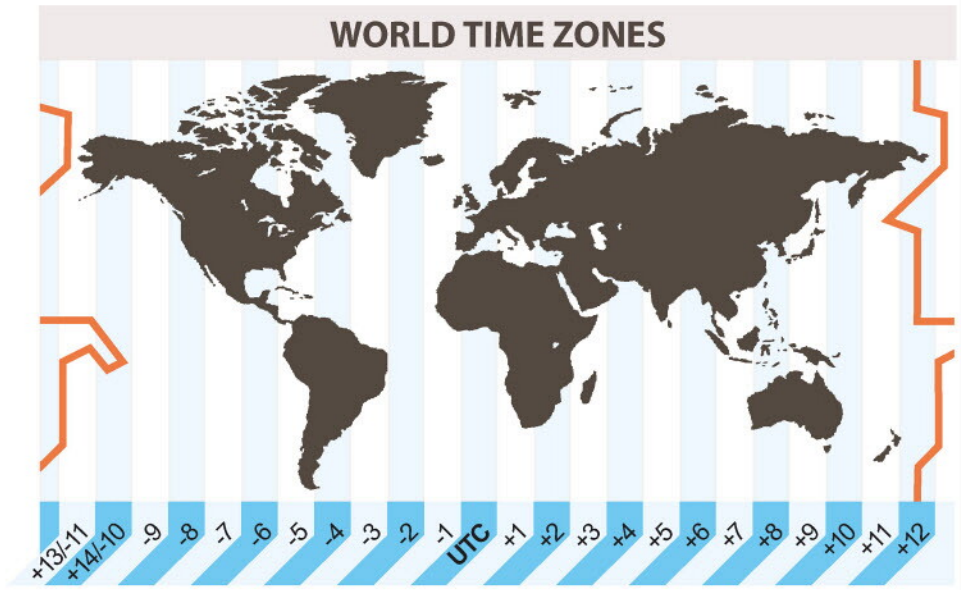


Sun time differs by about one minute every 13 miles (about 21 km) of distance on the earth.

DIFFERENT PLACES, DIFFERENT TIMES

As the earth turns each day, the sun **appears** to move across the sky. It appears to **shift** from east to west. As it moves, time **varies**. Sun time **differs** by about one minute every 13 miles (about 21 km) of distance on the earth. Imagine that the sun time is exactly 12:00 noon in one town. The sun time is a minute earlier 13 miles to the west. This is because the sun is not yet exactly above. The sun time is a minute later 13 miles to the east. This is because the sun has already been exactly above. Towns 130 miles apart **differ** about 10 minutes in sun times. Towns 1,300 miles apart **differ** about 100 minutes in sun times.

For most of human history, **differences** in local sun times were not important. However, in the 19th century, railroads began to carry people over long distances. Travelers and railroad workers were **confused** by the many local sun times. They set their watches to their own local time at the start of a trip. Later the train stopped at a distant town. Then the watches were not **accurate**. They did not match the local time. Railroads needed to create an official time system to link the rail system together.



A map of world time zones

THE TIME ZONE SYSTEM

In 1884, a world committee met. They **developed** a world **system** that **featured** time zones. The committee divided the earth into 24 time zones. Each time zone was equal to one hour of time in a 24-hour day. Clock time was the same for everyone living in one time zone. When people traveled into a new time zone, they had to change their watches. People traveling east had to add one hour. **Similarly**, people traveling west had to **shift** the time back one hour.

The center of the first zone was in Greenwich, England. Exactly half way around the earth an International Date Line was created. Here the time was exactly 12 hours **different** from Greenwich Time. Here the calendar date **shifted**. When it was Tuesday to the west of the line, it was Wednesday to the east of the line.

Today the time zone **system** is used by most countries of the world. It has helped world transportation and communication to **develop**. ■

Clocks showing different times in different cities.

Reading Comprehension

Mark each sentence as *T* (True) or *F* (False) according to Reading 2.

___ 1. There is a difference of one hour when you travel from one time zone to the next time zone.

___ 2. The sun appears to shift across the sky from west to east.

___ 3. Sun time varies for people who live in the same location.

___ 4. Sun time in one town is similar to the sun time in a distant town.

___ 5. Travelers were confused by the many local sun times.

___ 6. An international committee developed a system of 12 time zones.

___ 7. Railroads needed an accurate time system.

___ 8. The International Date Line is a feature of the world system of time zones.

READING SKILL Pronoun References

APPLY

Below are some sentences about Reading 2. Replace the underlined words with a pronoun. Write the pronoun(s) after the sentence.

1. When people saw the sun exactly overhead, people knew that the time was noon. *they*
2. When the sun was overhead in one location, the sun was not overhead in a different location. _____
3. Railroad workers were confused by the many local times. Railroad workers did not know the accurate time. _____
4. Whenever people traveled east into a new time zone, people had to change the people's watches. _____
5. The International Date Line was in the middle of the ocean. The International Date Line did not divide any large nations. _____
6. When the day was Tuesday to the west of the line, the day was Wednesday to the east. _____

Vocabulary Activities STEP I: Word Level

The verb *to vary* means "to be different from something else," or "to change."

*The two airlines **vary** in the services they offer.*

*The number of cars on the highway **varies** with the time of day.*

To vary something means "to make changes in it."

*I **vary** the route I walk each day.*

The adjective *varied* means "to have different qualities."

*The children were of **varied** ages.*

(See Oxford American Dictionary for learners of English, p. 807)

CORPUS

A. **Work with a partner. Imagine that two friends have just returned from a vacation in Hawaii. You are asking them questions about their vacation. Match each question with a good answer. When you are finished, take turns asking and answering the questions.**

1. How was the weather? ___
2. What kind of food did you have? ___
3. Did you go swimming every day? ___
4. How was the surfing? ___
5. Was the food expensive? ___

Answers

a. We tried to vary our schedule each day.
b. The temperature varied between 80°F and 84°F (27°C and 29°C) every day.
c. It varied from one beach to another.
d. The prices varied from expensive to cheap.
e. We ate a varied diet of Chinese food, Hawaiian food, and fast food.

A *feature* is an important part of something.

*Lots of good food is a **feature** of most celebrations.*

*Automobile traffic is one **feature** of big cities that I don't like.*

To feature something means "to include it as an important part."

*This museum **features** several paintings by Rembrandt.*

*My favorite restaurant **features** fresh fish every Saturday.*

(See Oxford American Dictionary for learners of English, p. 266)

CORPUS

B. **Work with a partner. Imagine that you have been given the job of writing an advertisement for a new alarm clock that your company makes. Choose three of the *features* below to mention in your advertisement. Then write the advertisement by completing the paragraph below.**

___ a loud alarm
___ numbers that shine in the dark
___ a beautiful green color
___ a long electric cord
___ a back-up battery
___ a strong plastic case
___ parts that were made locally
___ a low price tag

You will like our new EZ Sleep alarm clock.
It has many great features.
The most important feature is _____.
Another great feature is _____.
It also features _____.
Buy one today!

Vocabulary Activities STEP II: Sentence Level

The verb *to confuse* means "to cause a person to be unable to understand something."

*The information in travel guides sometimes **confuses** me.*

The noun form is *confusion*.

*I missed my airplane flight because of some **confusion** about the time.*

The adjective *confusing* describes the thing that causes confusion. The adjective *confused* describes the way a person feels because of it.

*The information was **confusing**.*

*I was **confused**.*

These words also mean "not being able to recognize the difference between two people or things."

*My sons Kyle and Jason are twins. Their friends **confuse** the two of them.*
*The boys laugh at their friends' **confusion**.*

The noun *confusion* is sometimes used to describe a situation that lacks organization.

*In the **confusion** after an earthquake, many people are separated from their families.*

(See Oxford American Dictionary for learners of English, p. 152)

CORPUS

C. **Complete this paragraph with forms of the word *confuse*. When you have finished, take turns reading the paragraph out loud with a partner.**

On Sunday, November 18, 1883, the United States was divided into four time zones. A weekend date was chosen because fewer people would be going to work. A weekend day would (1) _____ fewer people. At exactly noon on that Sunday, all of the railroad clocks were changed to the new times. Homes and businesses shifted their clocks, too. It was a day of much (2) _____. The change was (3) _____ for some people because they lost many minutes of time when they set their clocks ahead. Other people were (4) _____ because they had two noons in one day when they set their clocks back. The (5) _____ lasted several days because some people changed their clocks but others did not. "I'm (6) _____," many people said. "This time shift is really (7) _____."

To shift means "to be moved or to move something to another place or another direction." It also means "to change a position of the body" or "to change an action."

*I **shifted** my books from the desk onto the floor.*

*The tennis player **shifted** to the right.*

*The hostess tried to **shift** the conversation to a different topic.*

The noun form is also *shift*.

*The **shift** from one time zone to another time zone confuses travelers.*

(See Oxford American Dictionary for learners of English, p. 658)

CORPUS

D. **Rewrite each of these sentences in your notebook to include a form of *shift*.**

Many parts of the United States change their official time during the spring and summer to enjoy an extra hour of sunlight in the evening. This allows people to walk, play tennis, or do other outdoor activities into the evening hours.

1. The change is called Daylight Savings Time.
2. Newspapers and TV stations remind people to move their clocks forward one hour.
3. The change in time usually takes place in March.
4. When the time is moved forward, children must walk to school in the dark.
5. But the time change allows them to play outdoors during the bright evening hours.
6. In November, Daylight Savings Time ends and clocks are moved back one hour.

E. **Work with a partner. Complete this story by putting one of these target words in each space. Use the words in parentheses as clues.**

accurate	confused	difference	shift	system
appears	develop	feature	similarly	vary

Whenever people fly a long distance on an airplane, they are likely to (1) _____ (*begin to have*) jet lag. Jet lag is a common (2) _____ (*part*) of long distance travel. It results from the (3) _____ (*something that is not the same*) between the body time of a traveler and the clock time of the place he is visiting. For example, Yoshi gets on an airplane in Tokyo at 9 A.M. During the 12-hour flight to London, he reads and watches movies. As the plane flies west, the sun is (4) _____ (*also*) moving west. It (5) _____ (*seems*) to be following the plane. When the plane lands in London, Yoshi's wrist watch reads 9 P.M. But inside the airport terminal, the clocks read 12 noon. Yoshi wonders if the clocks are (6) _____ (*correct*). Outside, the sun is shining. Yoshi feels sleepy and (7) _____ (*unable to understand*). He goes to his hotel, eats lunch and falls asleep in his room. He wakes up after eight hours. His body thinks it is morning, but the clock reads 10 P.M. He has jet lag. For a few days, Yoshi's body time will (8) _____ (*be different from*) from clock time. He will be sleepy during the day and awake at night. Then his (9) _____ (*internal body of a person*) will (10) _____ (*change*) to the new time.

Writing and Discussion Topics

Discuss the following topics in small groups.

1. Take turns naming activities during an average day when it is important for you to know the exact time. Name at least ten activities.
2. Take turns describing the kinds of clocks or other devices that measure time that you and your family own or use. Name at least ten different kinds.

Choose one of the following topics. Write four sentences about the topic. Include some of the new vocabulary words from this unit.

1. Describe how time is important in our modern transportation system.
2. Describe a job in which a worker must check the time often.
3. This unit is about systems for measuring hours. However, days, weeks, months, and years are also important to people. Describe how these other ways to count time are important in your culture.

UNIT 3

BIOLOGY

Living with Bacteria

In this unit, you will

- read about harmful and helpful bacteria.
- review pronoun references.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Definitions

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
cause						
effect						
AWL environment						
exist						
harm						
infect						
prevent						
AWL proceed						
react						
transfer						

AWL Academic Word List
Oxford 3000™ keywords

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Why should people wash their hands before eating?
2. Have you ever eaten food that later made your stomach sick?
3. Have you ever looked through a microscope? What did you see?

Read

Information in this article is from a science textbook.

Harmful and Helpful Bacteria[1]

One day in 1676, a Dutch scientist named Antony van Leeuwenhoek looked through a microscope. He **reacted** with surprise. Something appeared that no one had ever seen before. He saw bacteria. As he **proceeded** to watch, the things moved. They were so tiny that he could see them only through a microscope. He did not know what they were. He did not know where they came from. Today, over 350 years later, scientists know that the world is filled with bacteria. Scientists know that bacteria can **harm** and can help humans.

Bacteria—tiny living things—**exist** everywhere in the **environment**. They **exist** deep under the ground. They **exist** in oceans and lakes. They **exist** inside of plants and animals. They **exist** on people's hands and in their noses. People cannot see them. Yet bacteria have many **effects** on humans.

Antony van Leeuwenhoek and an example of bacteria viewed through a microscope.

[1] Note: The word *bacteria* is a plural word. The singular form is *bacterium*.

There are many kinds of bacteria. Some are **harmful** and others are **harmless**. Many bacteria actually help us.

PROBLEMS WITH BACTERIA

Sometimes the word *germs* is used to describe harmful bacteria. Germs can **cause** terrible diseases such as cholera and tuberculosis. Cholera bacteria live in dirty water. If a person drinks the dirty water, the bacteria will **infect** his digestive system. He will suffer terrible stomach pains. Some diseases easily **transfer** from one person to another. For example, someone who has tuberculosis bacteria in her lungs can **transfer** the disease if she coughs or sneezes. The bacteria come out of her mouth or nose and **proceed** into the surrounding air. People who breathe the air will breathe in the **harmful** bacteria.

Often foods have germs growing on them or inside of them. Eating the food could make people sick. However, there are ways to **prevent** getting sick. For instance, washing fruits before eating them will wash away many **harmful** germs. Heat is another way to destroy **harmful** bacteria. Cooking meat for a long time will make it safe to eat.

BENEFITS OF BACTERIA

Not all bacteria are **harmful**. Some bacteria help humans in many ways. For example, millions of good bacteria **exist** in the body's digestive system. They help change the food we eat, so our bodies can use the vitamins in the food. Also, good bacteria are needed to make certain foods, such as cheeses and yogurts.

Many bacteria also help the **environment**. For example, bacteria help break down dead plant material, such as fallen leaves, so it can mix with the soil. Bacteria that **exist** in the oceans help in several ways. For example, they become food that is eaten by tiny fish. Then the tiny fish become food for big fish. When you catch a big fish, it becomes food for your dinner. Another way that bacteria help is by cleaning up oil spills from ships. Also, they help clean up human waste that rain carries into the oceans.

Our world is filled with bacteria, but not all are **harmful**. In fact, some help us. ■

Bacteria can help	Bacteria can harm
Digestion of foods	Cause infections
Making cheese & yogurt	Cause diseases
Decay dead plants	
Provide food for fish	
Clean ocean oil spills	
Clean ocean wastes	

Bacteria can both help and harm us.

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. Coughing can transfer tuberculosis germs to others and infect them.

___ 2. Helpful bacteria can cause diseases.

___ 3. Bacteria exist only in cold environments.

___ 4. Heating food to a high temperature can destroy harmful bacteria.

___ 5. People can prevent illness by not eating fruits.

___ 6. Bacteria have many effects on our lives and on our environment.

___ 7. People may react to cholera bacteria by getting sick.

___ 8. The bacteria Leeuwenhoek saw proceeded to grow as he watched.

READING SKILL Identifying Definitions

LEARN

Sometimes a text will include a word that readers may not know. The writer may help the reader by giving a definition of the word in the text. Below are some examples of how definitions can be included in the text.

The scientist saw bacteria through a microscope (an instrument that magnifies small objects).

The scientist saw bacteria through a microscope. This instrument magnifies small objects.

The scientist used a microscope—an instrument that magnifies small objects—to see the bacteria.

The scientist saw bacteria through a microscope, which is an instrument that magnifies small objects.

APPLY

Find the definitions of these words in Reading 1. Write the definitions.

1. bacteria _____
2. germs _____

REVIEW A SKILL **Pronoun References** (See p. 20)

In the sentences below, circle the pronouns and write the noun that each refers to. Check Reading 1 if necessary.

1. Paragraph 1

   They were so tiny that he could see them only through a microscope.

   _____ _____ _____

2. Paragraph 3
   He will suffer terrible stomach pains.
   _____

3. Paragraph 4
   Often foods have germs growing on them or inside of them.
   _____ _____

4. Paragraph 4
   Cooking meat a long time will make it safe to eat.
   _____

5. Paragraph 6
   Bacteria help change dead plant material so it can mix with the soil.
   _____

Vocabulary Activities STEP I: Word Level

To transfer something means "to move it from one place to another." The noun form is also *transfer*.

*Some diseases can be **transferred** from animals to humans.*

*This kind of **transfer** often occurs on farms.*

*My company **transferred** me to another office.*

*I asked for the **transfer**.*

(See Oxford American Dictionary for learners of English, pp. 774–775)

CORPUS

A. Work with a partner. Match the item on the left to where it will be transferred. Then take turns making sentences with the information.

1. the ice cream — 1 a. to the freezer.

   *I will **transfer** the ice cream to the freezer.*

2. the leftover food — ___ b. to another bank.
3. my daughter — ___ c. to another building.
4. my furniture — ___ d. to your computer.
5. my account — ___ e. to a small bowl.
6. my office — ___ f. to a new school.
7. the email message — ___ g. to my new apartment.

To prevent something means "to stop something from happening." *To prevent a person from doing something* means "to stop a person from doing something."

*Brushing your teeth can **prevent** tooth decay.*

*My brother tried **to prevent** me from buying my own car.*

Certain words are often used with *prevent*, such as prevent diseases, prevent accidents, prevent damage, prevent crime, and prevent fires.

(See Oxford American Dictionary for learners of English, p. 552)

CORPUS

B. **Work with a partner. The phrases on the left tell how to prevent something. Match each one with the thing it will prevent. Take turns making sentences with the information.**

1. Brush your teeth — 1 — a. to prevent tooth decay.

   *Brush your teeth to **prevent** tooth decay.*

2. Drive carefully — ___ — b. to prevent spreading germs.
3. Wash all fruits and vegetables — ___ — c. to prevent a fire.
4. Cover your mouth when you cough — ___ — d. to prevent accidents.
5. Do not hang towels by a hot stove — ___ — e. to prevent a sick stomach.

Which of these might be signs on the wall of a restaurant kitchen?

The *environment* refers to the natural world in which we live. It includes the land, oceans, rivers, and lakes, and all of the plants and animals.

*Bacteria exist everywhere in our **environment**.*

The adjective form is *environmental*.

*Climate change could cause **environmental** problems.*

Environment can also refer to the conditions in a particular place, such as at work, at home, or at school.

*My work **environment** is very unfriendly.*

(See Oxford American Dictionary for learners of English, pp. 242–243)

CORPUS

C. **Below are some imaginary newspaper headlines. Work with a partner. Write an E in front of the headlines that are about an *environmental* problem.**

- E — Fires Destroy Forests in Asia
- ___ African City Chosen for Olympics
- ___ Water Shortage Exists in Brazil
- ___ Disease Infects Desert Animals
- ___ Beaches Sunny for Holiday
- ___ Rain Causes Floods in Canada
- ___ Harmful Bacteria Spreads to Whales
- ___ Earthquake Damages River System
- ___ Truck Causes Highway Accident
- ___ Bird Museum Opens Today

Vocabulary Activities STEP II: Sentence Level

To harm something means "to hurt or damage it." The noun form is *harm*.

*Smoking can **harm** your lungs. The **harm** might be permanent.*

*Poor grades could **harm** your chances of graduating.*

There are two adjective forms: *harmful* and *harmless*. They are opposite in meaning. *Harmful* describes something that can damage or hurt someone or something. Something *harmless* cannot hurt or damage someone or something.

*Snakes often frighten people, but most of them are **harmless**.*

*"Why are you angry? I made a **harmless** comment about your work."*

*Is watching television **harmful** for babies?*

(See Oxford American Dictionary for learners of English, p. 332)

CORPUS

D. **Imagine you are teaching your friends about the forest. Rewrite each of these sentences in your notebook with the given form of *harm*.**

1. That snake can't hurt you. (harmless)

   *That snake is **harmless**.*

2. We have to be careful not to damage the environment. (harm)
3. That insect is very pretty, but its sting is bad. (harmful)
4. No, snow doesn't hurt the animals. (harm)
5. That's not a lion. It's just a nice rabbit. (harmless)
6. Don't eat that berry. It could make you sick. (harm)

To proceed means "to continue on to the next action or the next place."

*The forest fire started here and **proceeded** to destroy over 500 trees.*

*The guide asked us to **proceed** to the next room.*

The noun *procedure* refers to the actions that are necessary to do something correctly.

*Nurses are trained in life-saving **procedures**.*

(See Oxford American Dictionary for learners of English, p. 556)

CORPUS

E. **Complete each sentence with a form of *proceed*. Take turns reading your sentences with a partner.**

1. Firefighters are trained in the correct _____procedures_____ for rescuing people.
2. They are trained to _____ carefully in a burning building.
3. One _____ they learn is how to carry a person down a ladder.
4. By following the _____ exactly, they can save a life.
5. They might tell someone in a burning building, "Please _____ to a window."
6. Then they will _____ to set up ladders to help the person down.
7. Firefighters may receive an award for how they _____ in an emergency.

F. **Use the following words to complete this paragraph.**

cause	environment	harmful	prevent	reaction
effects	existed	infected	proceeded	transferred

The *E. coli* bacteria can (1) _____ great harm to people. In 2011, many people were (2) _____ by *E. coli* bacteria. They developed food poisoning. This is a serious disease with many bad (3) _____. One (4) _____ is terrible stomach pain. The infection started in Germany. Soon it (5) _____ to infect people in other countries. Health authorities believed that vegetables were the source of the infection. They searched the (6) _____ where the vegetables came from. They thought the (7) _____ bacteria (8) _____ in the soil. Water (9) _____ the bacteria from the soil to the vegetables. People who ate the vegetables got sick. Many tons of vegetables were destroyed to (10) _____ other people from getting sick.

Before You Read

In small groups or with the whole class, discuss these questions.

1. When you are sick, what kinds of medicines help you?
2. Does your family have special cures to help sick people get well?
3. What are some things that you do to prevent getting sick?

Read

The information in this article is from an online medical guide.

FIGHTING BACTERIA

Long ago, people did not understand **infection**. They did not understand illness. They did not know that illnesses could be **transferred** from one person to another. They believed that bad air **caused infections** and illnesses. People tried using plants and animals from their **environment** to cure **infections** and illnesses. Usually they did not help. People did not know that bacteria **caused infections** and diseases. They did not know that bacteria **existed**.

THE DISCOVERY OF BACTERIA

Antony van Leeuwenhoek first observed bacteria in 1676. Nearly 200 years later, scientists learned that bacteria were linked to many of the terrible diseases that humans suffered from. However, they did not know how to cure these diseases. Instead, scientists tried to develop ways to **prevent** many of these diseases.

PASTEURIZATION

In 1859, Louis Pasteur developed a **procedure** to make milk from farm animals safe to drink. He found that bacteria in the milk could be destroyed whenever the milk was heated to a high temperature. This heating process was called *pasteurization*. Pasteur had ideas for destroying bacteria in other situations. For instance, he found that one **reaction** of carbolic acid (a strong chemical) was to destroy bacteria on laboratory equipment.

Pasteurization makes milk safe to drink.

CARBOLIC ACID

Joseph Lister was a surgeon. He lived around the same time as Pasteur. He knew that surgery was dangerous. Patients often developed **infections** where their skin was cut. Many patients died from these **infections**. Lister analyzed Pasteur's ideas. He wondered if chemicals could **prevent infections** in surgery patients. He tried the carbolic acid. Before each surgery, he sprayed a weak mix of the acid on the surgery tools. He sprayed it on a patient's skin. And he sprayed it on the bandages that the patient would wear after the surgery. He saw that the acid spray was very **effective** in **preventing infections**. The acid spray made surgery safer for patients. His patients **reacted** very well to the treatment.

PENICILLIN

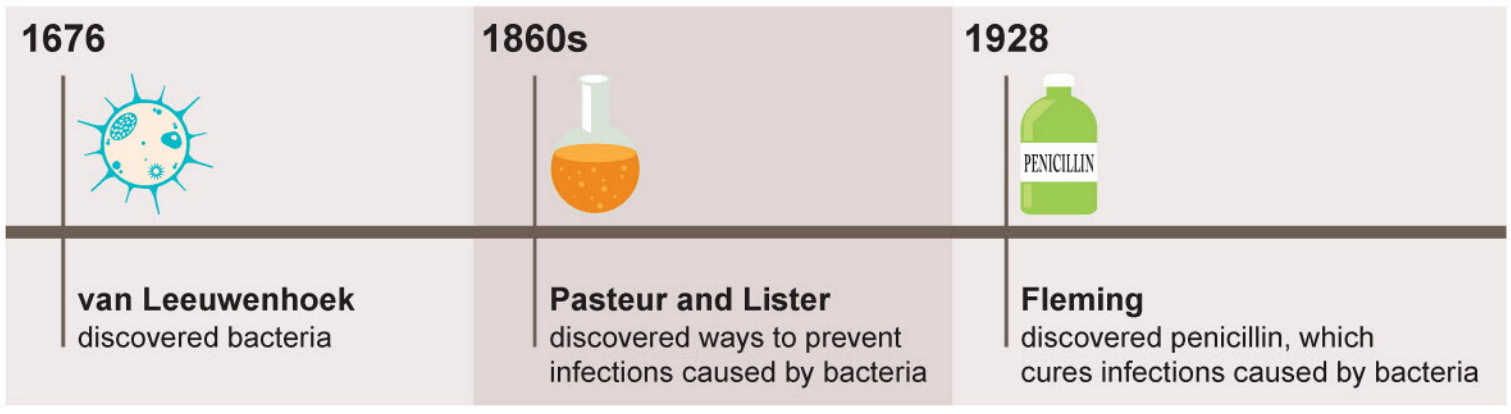
Scientists had developed several **effective** ways to **prevent** bacteria from causing **harmful** diseases. But they had not yet found ways to cure people who were already ill from a disease. They knew that high heat and chemicals would destroy bacteria. But they knew doctors could not heat a patient's body to a high temperature. Doctors could not spray a person's lungs with acid. These acts might kill the bacteria, but they would also kill the patient.

In 1928, scientist Alexander Fleming noticed a **reaction** when bacteria touched a certain fungus (a plant-like growth). The bacteria were destroyed. Just as important, the fungus was **harmless** to humans. This fungus was penicillin. Soon penicillin was put into medicines for patients to swallow.

Penicillin could cure many diseases. The penicillin helped the patient's body destroy **harmful** bacteria. This kind of medicine was called an *antibiotic*. In the following years, many other antibiotics were created.

First, scientists discovered bacteria. Then they developed ways to **prevent** bacteria from causing harm. Finally they found cures for many of the illnesses and **infections caused** by bacteria. ■

Penicillin helps fight harmful bacteria.



Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. Long ago, people did not understand that bacteria caused diseases.

___ 2. Long ago, people did not know that bacteria existed in the environment.

___ 3. Two hundred years after van Leeuwenhoek first saw bacteria, scientists learned how to transfer diseases.

___ 4. Pasteur created a procedure to develop harmful bacteria in the milk of farm animals.

___ 5. Lister wanted to prevent infections in patients who needed surgery.

___ 6. The acid that Lister sprayed was effective, and his patients reacted well.

READING SKILL Identifying Definitions

APPLY

Find the meaning of each of these words from Reading 2. Write the definition in blank space.

1. fungus _____
2. antibiotic _____
3. pasteurization _____
4. carbolic acid _____
5. penicillin _____

REVIEW A SKILL **Pronoun References** (See p. 20)

The sentences below are from Reading 2. A pronoun in each sentence is underlined. Circle the noun that the pronoun refers back to.

1. People used plants and animals in the environment to cure infections. Usually they did not help.

   a. infections b. people c. plants and animals

2. Scientists learned that bacteria were linked to many terrible diseases. However, they did not know how to cure them.

   a. bacteria b. scientists c. diseases

3. Patients often developed infections where their skin was cut.

   a. skin b. infections c. patients

4. Scientists found ways to prevent bacteria from causing harm. Then they found ways to cure illnesses caused by bacteria.

   a. bacteria b. illnesses c. scientists

Vocabulary Activities STEP I: Word Level

To react means "to have or show a feeling about something a person has seen, heard, touched, etc." It also means "to respond to a situation." The noun form is *reaction*.

*What was Ylia's **reaction** when she opened your gift?*

*She **reacted** with a big smile.*

*People **reacted** quickly when they saw the accident.*

A *reaction* also refers to the body's response to something.

*Yuko had a bad **reaction** to the medicine.*

A *reaction* can also refer to an opinion about something.

*What was your **reaction** to the president's speech?*

*People **reacted** favorably to questions about the new airport.*

(See Oxford American Dictionary for learners of English, p. 581)

CORPUS

A. **Work with a partner. Match the situation on the left with how someone might *react*. Then take turns making sentences with the information.**

1. The artist saw her ruined painting 1 a. with tears.
   *The artist saw her ruined painting and **reacted** with tears.*
2. The firefighters saw the danger and ___ b. with screams of fear.
3. I waved hello and my neighbor ___ c. angrily.
4. All the lights went out and people ___ d. with applause.
5. When I asked her for money, she ___ e. quickly.
6. When the film ended, the audience ___ f. with a smile.

To exist means "to be" or "to occur for a long time."

*Traffic laws **exist** so people will be safe.*

*Hunger **exists** in many parts of the world.*

For living beings, *to exist* also means the same as "to live."

*Humans cannot **exist** without oxygen.*

*Dinosaurs **existed** millions of years ago.*

(Note: The verb isn't normally used in the continuous *–ing* form.)

The noun form is *existence*.

*Antibiotics came into **existence** during the last century.*

*This microscope from 1635 is the oldest one in **existence**.*

(See Oxford American Dictionary for learners of English, p. 253)

CORPUS

B. **Work with a partner. Circle the item in parentheses that matches the function on the right. Then take turns making sentences with the information, using the word *exist*.**

1. (Microscopes / Computers): to help scientists see small things.

   *Microscopes **exist** to help scientists see small things.*

2. (Traffic laws / Service laws): to keep drivers safe.
3. (Restaurants / Hospitals): to care for sick people.
4. (Schools / Shopping centers): to educate children.
5. (Clocks / Thermometers): to measure time.

C. **Work with a partner. Match the scientists on the left to what they studied. Then take turns making sentences with *the existence of*. (Check your dictionary for new words.)**

1. Astronomers wondered about _1_ a. distant solar systems.

   *Astronomers wondered about the **existence** of distant solar systems.*

2. Anthropologists studied ___ b. odd underwater creatures.
3. Geologists searched for ___ c. a new type of lion in Kenya.
4. Marine biologists described ___ d. oil under the North Pole.
5. Zoologists discovered ___ e. an ancient society in Brazil.

To cause something means "to make something happen."

*High winds **caused** the fire to spread.*

*Bad air does not **cause** illness.*

The noun form is also *cause*. It is a person or thing that makes something happen.

*Falling asleep while driving is the **cause** of many accidents.*

(See Oxford American Dictionary for Learners of English, p. 111)

CORPUS

D. **Work with a partner. In each pair of sentences, one sentence describes the *cause* of something happening. The other sentence describes what happened. Write C in front of each *cause*. Write R in front of the result.**

1. _C_ A man at work had a cold. _R_ He was coughing and sneezing.
2. ___ He was coughing and sneezing. ___ He was spreading germs in the office.
3. ___ I caught his cold. ___ I was breathing in the germs.
4. ___ I visited my doctor. ___ I had a sore throat and a fever.
5. ___ I feel better today. ___ The doctor gave me medicine.
6. ___ I am still sneezing a lot. ___ I'm going to stay home from work.

Vocabulary Activities STEP II: Sentence Level

The noun *effect* has the same meaning as *result*. It refers to a change or action that is caused by something.

*Being thirsty is one **effect** of eating too much salt.*

*The thunder had a strange **effect** on the animals.*

The adjective *effective* means that the change or action that happens is the result that was hoped for. The adverb form is *effectively*.

*The poison was **effective** in getting rid of the rats.*

*The poison **effectively** got rid of the rats.*

(See Oxford American Dictionary for learners of English, p. 232)

CORPUS

E. **Rewrite each sentence to include the given form of *effect*. The first sentence is done for you.**

1. Scientists have found a good way to prevent infections from germs. (effective)
   *Scientists have found an **effective** way to prevent infections from germs.*
2. They have developed a hand cleaner that can destroy germs on people's hands very well. (effectively)
3. Rubbing the hand cleaner on your hands helps in destroying germs. (effective)
4. The result of using a hand cleaner before eating is germ-free hands. (effect)
5. Hand cleaners have been useful in reducing the spread of germs. (effective)

Hand cleaners can prevent infections.

An *infection* is a disease or illness that is caused by bacteria or other very small living things.

*She cut her arm last week. An **infection** developed in the cut.*

The verb *to infect* is to cause an illness or infection.

*The tuberculosis bacteria **infected** his lungs.*

There are two adjective forms. *Infected* describes a body part or a person that is ill from an infection.

*Her lungs became badly **infected**.*

The adjective *infectious* describes a disease or illness that can easily spread from one person to another.

*The flu is an **infectious** disease.*

*The ordinary cold is an **infectious** illness that I get almost every year.*

(See Oxford American Dictionary for learners of English, p. 373)

CORPUS

F. **Complete the sentences by using a form of *infect* in each blank.**

1. The Black Death was an _____ disease that spread through Europe in the 14th century.
2. The _____ was caused by bacteria that rats transferred to humans.
3. The Black Death _____ many people in Europe.
4. About 25% to 50% of the _____ people died from the disease.

G. Use the words in the box to complete the paragraph.

effective	environment	exist	harmful	prevent	reacts

The human body has some (1) _____ ways to fight bacteria. First, the body reacts to (2) _____ bacteria by creating extra white blood cells to destroy the bacteria. Also, the body (3) _____ to diseases by creating a fever. Bacteria cannot (4) _____ in an (5) _____ of high temperatures. The high body temperature destroys the bacteria. The body also has a way to (6) _____ some diseases. It is called immunity. While a person's body is fighting off certain bacteria, the body is creating a substance that will remain in the cells. The substance will protect the person from having the same disease again.

Writing and Discussion Topics

Discuss the following topic in small groups.

Imagine that you work for an advertising office. A chemical company has just developed a new hand cleaner. It is called Germ Away. It is packaged in small plastic bottles that will fit in a pocket. If you put a few drops of the cleaner on your hands, it will kill germs.

The company wants you to create a TV advertisement to help sell the new product. Create some simple sentences that could be used in the TV advertisement. Use one or more of the ten unit target words in each sentence.

Choose one of the topics below. Write at least four sentences about that topic. Include some of the new vocabulary words from this unit.

1. Imagine that you are a teacher. Children in your classroom often come to school with colds. What might you tell the children about staying healthy?
2. Today we have many effective ways to prevent illnesses. Yet in our modern world, illnesses can spread worldwide in a short time. Why do illnesses spread so easily in our modern world?
3. Describe a time when you were ill. How did you feel? What did you do to feel better?

UNIT

4

SOCIOLOGY

A Changing World

In this unit, you will

- read how the young people of today will shape the future world.
- read about how changing family structures and the job market affect young people.
- review identifying definitions.
- increase your understanding of target academic words for this unit.

READING SKILL Identifying Cause and Result

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
assist						
AWL assume						
community						
AWL consequence						
AWL define						
AWL factor						
physical						
seek						
sufficient						
tradition						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about today's job market? Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. How are you and your friends different from your parents?
2. What will your life probably be like ten years from now?
3. What are some factors that may determine what your future will be?

Read

Information in this reading is from an online sociology journal.

Changing a Traditional Way of Life

Until recently, most people in China were farmers. Farming was the **traditional** way of life for Chinese people. Life was hard. Farmers did hard **physical** work. Each boy **assumed** he would be a farmer when he grew up. And each girl **assumed** she would become the wife of a farmer in the **community**. When the boys and girls grew up and got married, their lives were clearly **defined**. The man took care of the farm, and the wife took care of the home. Their aging parents lived with them because that was the **tradition**.

In the last 50 years, several **factors** have caused young adults to leave the farms. They are **seeking** jobs in a city. As a **consequence,** the **traditional** way of life in China is changing.

A traditional farming lifestyle

WHY YOUNG ADULTS MOVED TO CITIES

Television was one **factor** that drew young adults to the cities. Television showed young Chinese men and women how other people lived. They saw many ways to earn money in a city. City jobs seemed **physically** easier than farming.

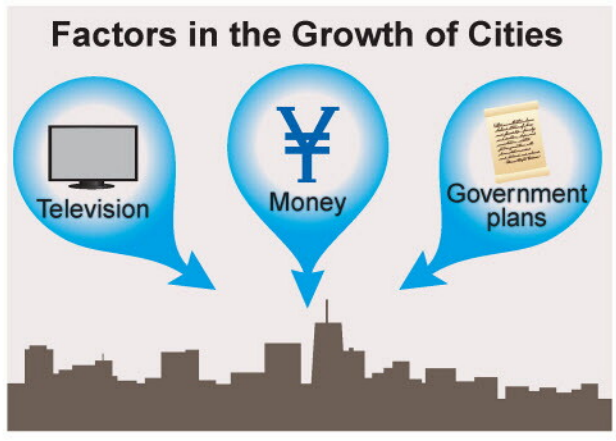
Money was another **factor** that drew young adults to the cities. Farming provided **sufficient** food to eat. Farming did not provide **sufficient** money to buy computers or cell phones. The young adults wanted money to buy modern things. Money from a city job helped them buy these things. They were also able to send money home. The money **assisted** their aging parents.

The economic goals of the Chinese government were another **factor**. Government leaders believed that China could not **define** itself as a modern nation if many people were poor and lived on farms. As a result, the government created a plan. The government would **assist** 300 to 500 million people to move from farms to cities by 2020. Many young adults were happy to leave the farm and move to a city.

A CHANGING WAY OF LIFE

Soon the Chinese economy was growing. Factories in the cities offered low-paying jobs to the new workers. But the factory workers still earned more money than farmers earned. The products made in the factories were shipped to other countries. This brought money into the Chinese economy. As more people moved to cities, new jobs were created. More housing was needed. Workers were hired to build new apartments. Stores **sought** workers to **assist** with their growing businesses. Workers were also hired to build bridges and railroads for the growing cities.

Factory workers earned more money than farmers.



China expects that by 2020, nearly 60% of its people will be living in cities. Some of these will be new cities. They will be built near the farming areas. Land near the farming areas is cheaper to buy than land in a city. **Consequently**, factories will cost less to build there. Many workers will move to the new cities. However, some workers will be able to live in their old farm **communities**. They will ride a bus each day to their city jobs.

China is an example of a changing nation. It is changing from a **traditional** way of life to a modern industrial way of life. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. In the past, children assumed they would follow the traditional way of life.

___ 2. Young adults did not like physical labor. Consequently, they did not want to farm.

___ 3. Farming did not provide sufficient money for young adults to marry.

___ 4. Television was one factor that led young adults to seek jobs in a city.

___ 5. The government wanted China to be defined as a modern nation.

___ 6. New cities are being developed close to old farm communities.

___ 7. It is traditional for young adults to assist their aging parents.

READING SKILL Identifying Cause and Result

LEARN

Many sentences describe something that happened and explain why it happened.

These are sentences that describe the cause and the result of an event.

Kim bought a new cell phone because his old one didn't work.
Kim's old cell phone didn't work, so he bought a new one.

The cause: Kim's old cell phone didn't work.
The result: Kim bought a new cell phone.

Words that signal a cause include *because* and *since*.

Kim bought a new cell phone since his old one didn't work.

Words and phrases that signal a result include *so*, *therefore*, *as a result*, *as a consequence*, and *consequently*.

Kim's old cell phone didn't work. As a result, he bought a new one.

APPLY

The sentences below are taken from Reading 1. Work with a partner. Circle the signal word or phrase in each sentence. Then underline the cause.

1. Stores and restaurants sought additional workers because their businesses were growing.
2. Land there is cheaper than city land. Consequently, factories cost less money to build.
3. More houses were needed, so workers were hired to build them.
4. Government leaders believed that China could not define itself as a modern nation if most of the people were poor and lived on farms. As a result, the government created a plan to assist people to move from farms to cities.

With your partner, take turns reading these sentences out loud, but change the signal word to another one with the same meaning.

REVIEW A SKILL **Identifying Definitions** (See p. 36)

Find the words *industrial* and *products* in your dictionary. Describe how they are related to the topic of changing the traditional way of life in China.

Vocabulary Activities STEP I: Word Level

A *community* is a place where people live, such as a small town or a section of a larger city.

*Several **communities** were without electricity during the storm.*

*We plants flowers along the sidewalks in our **community** every spring.*

A *community* can also be a group of people who live in a certain area.

*Our **community** welcomed the new family with gifts of food and flowers.*

A *community* can also be a group of people who have something in common, such as culture, interests, religion, type of work, etc.

*The Asian **community** in New York had a parade to celebrate the Lunar New Year.*

(See Oxford American Dictionary for learners of English, p. 142)

CORPUS

A. **Work with a partner. Match the people on the left with the *community* they are part of. Take turns making sentences with the information.**

1. students, professors, teaching assistants — 1 a. university community

*Students, professors, and teaching assistants are part of the university **community**.*

2. people who live near an ocean — ___ b. business community
3. soccer players, basketball players, team owners — ___ c. health-care community
4. people from other countries — ___ d. science community
5. bankers, store owners, managers — ___ e. sports community
6. chemists, geologists, astronomers — ___ f. immigrant community
7. doctors, nurses, hospital aides — ___ g. beach community

A *factor* is something that influences a decision or a situation.

*The broken traffic signal was a major **factor** in the accident.*

*One **factor** I didn't consider was the high cost of renting an apartment.*

(See Oxford American Dictionary for learners of English, p. 260)

CORPUS

B. **Work with a partner. Write an F before the *factors* that a company might consider when hiring a new computer programmer. Then take turns making sentences with the information.**

*One **factor** to consider is her programming experience.*

1. F her programming experience
2. ___ her education
3. ___ how many sisters she has
4. ___ the size of her shoes
5. ___ letters from her former company
6. ___ where she lives
7. ___ her knowledge of programs
8. ___ her ability to work long hours

To define a word means "to state the meaning of the word." The noun form is *definition.*

*What is the **definition** of a SIM card?*

*My dictionary **defines** it as a plastic card inside a cell phone.*

To define something can also mean "to explain the characteristics of something."

*Modern art is **defined** by its effective use of color and shapes.*

(See Oxford American Dictionary for learners of English, p. 191)

CORPUS

C. **Work with a partner. Match the word on the left with its *definition*. Check new words in your dictionary. Then take turns making sentences with the information.**

1. a prune — 1 a. a dried plum

*The **definition** of a prune is a dried plum.*

2. an oyster — ___ b. a boy or a man
3. a latte — ___ c. a type of shellfish
4. a jersey — ___ d. a drink made of coffee and hot milk
5. a dude — ___ e. the shirt part of a football uniform

Take turns with your partner to restate the sentences using *is defined as*.

*A prune is **defined** as a dried plum.*

Vocabulary Activities STEP II: Sentence Level

A *consequence* is a result or effect of some action.

*The delay at the airport was a **consequence** of yesterday's storm.*

The adjective form is *consequent*.

*The heavy rain and **consequent** flooding caused a huge traffic jam.*

The phrase *as a consequence of* can be used within a sentence to show a result.

*Many of my classmates are without job offers **as a consequence of** the bad economy.*

The adverb form is *consequently*.

*Yuri missed the bus and **consequently** was late for work.*

(See Oxford American Dictionary for learners of English, pp. 153–154)

CORPUS

D. **Complete the sentences with one of these words or phrases.**

consequent	as a consequence of
one consequence of	consequently

1. The rapid growth of many cities and the _____ shortage of housing often requires two families to share an apartment.
2. Many young adults who move to cities are lonely _____ being away from their family and friends.
3. _____ a growing economy is the large number of job openings.
4. _____ increased automation, many factory workers are losing their jobs.
5. A person with a good education will _____ be qualified for many well-paying jobs.
6. The high cost of food is _____ living in a city.

Increased automation has caused many factory workers to lose their jobs.

To seek something means "to look for something." The past tense of seek is *sought*.

*The rescuers spent hours **seeking** the boy who was lost in the mountains.*

*The police **sought** the driver who caused the accident.*

To seek something also means "to ask a person for something."

*I'm **seeking** donations to help the flood victims.*

*You should **seek** advice from a doctor.*

To seek can also mean "to try to achieve something."

*Farah will **seek** a degree in engineering at the university.*

*The governor **sought** a second term in office, but he lost the election.*

(See Oxford American Dictionary for learners of English, p. 644)

CORPUS

E. **Rewrite each of the numbered sentences to include a form of *seek*.**

1. Many young adults do not look for a job until they are over 18.
   *Many young adults do not **seek** a job until they are over eighteen.*
2. When I turned 18, I thought it was time to look for a job.
3. I decided to ask my father for some advice.
4. He described the first time he looked for a job.
5. He made the mistake of looking for a job that paid well.
6. He told me to look for a job that would teach me a skill.

F. **Use the following words to complete the paragraph.**

assist	community	physically	sufficient
assumes	consequently	factors	tradition

Mr. Cho works for an electronics store in a (1) _____ near the university. He hires clerks to (2) _____ the manager of the store. The store has a (3) _____ of selling the newest, most advanced electronic devices. Mr. Cho knows these devices are important to young adults. In fact, most of the store's customers are young. (4) _____, he wants to hire young adults. He (5) _____ that young customers will be more comfortable with young sales clerks. However, he does not want to hire anyone without (6) _____ knowledge of electronic devices. He also wants to be sure that anyone he hires is (7) _____ able to lift the heavy pieces of equipment. These (8) _____ guide Mr. Cho in hiring suitable workers.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. How important is it to have a good job before you marry?
2. What is a good age for marriage?
3. How would you define a traditional family in your culture?

Read

This article is from a popular news magazine.

Changing the Future

Young people in many Western cultures want to become independent. They want to live away from their parents. They want to have a job. They want to earn their own money. They want to get married. They want to have children. They want to have a home in a nice **community**. However, it is hard for young adults in many parts of the world to become independent. One **factor** is that they cannot find jobs.

WHY JOBS ARE HARD TO FIND

Automation is one reason why jobs are hard to find. Automation means that businesses use machines instead of people to do work. A shoe factory, for example, once needed many workers to cut leather and sew the pieces together. This was hard **physical** work. Now a machine can do this work. One machine can often do a job that once needed 20 workers to do. As a **consequence**, businesses have fewer jobs to offer.

Another **factor** is that many jobs need workers with special training. For some jobs workers must have a university degree. Companies will not hire someone with **insufficient** training or without a degree. Training may take months. Earning a degree may take several years.

Workers did many jobs by hand that are now done by automation.

Consequently, many young men and women cannot get a good job. They must first finish their training or education.

Finally, the world economy has had serious problems in recent years. Businesses in many countries are not hiring new workers. There are too few jobs and too many people **seeking** work. As a **consequence,** a large number of young adults cannot find jobs. They cannot earn **sufficient** money to support themselves or a family.

For some jobs, workers need a university degree.

CHANGES IN FAMILIES

The changing job market is changing the **traditional** Western family. Once, a **traditional** Western family was **defined** as a mother and father living together with their young children. This **definition** has changed. Now many adult children live with their parents until they are 30 or 40 years old. They cannot find a well-paying job. They need **assistance** from their parents.

Most young adults **assume** they will get married some day. However, they are waiting much longer than before. As a result, the percentage of single (unmarried) people is growing. In 1970, just 16% of people in the United States between the ages of 25 to 29 were single. This percentage grew to 55% in 2011. In Japan today, 61% of the men are single. The average age at marriage is rising in many countries, too. In both Libya and Greece, it is 32 for men and 29 for women. In China, it is 34 for men and 29 for women. In Sweden, it is 35 for men and 33 for women. Waiting to marry also means waiting to have children. Fewer babies are being born. This has caused a low birth rate in some countries. Lack of jobs and new marriage patterns are causing changes in many countries. ■


Now many adult children live with their parents.

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. In the past, young adults did not want to assume adult responsibilities until they were 35–40 years old.

___ 2. A traditional Western family was once defined as a mother, a father, and their grown children.

___ 3. Many young people are delaying marriage. As a consequence, the average age for getting married is rising.

___ 4. Young adults who cannot earn sufficient money to be independent may need assistance from their parents.

___ 5. Young adults are seeking jobs that require hard, physical work.

___ 6. Delaying marriage is one factor that is causing a low birth rate in some countries.

___ 7. Marriage patterns and job patterns are changing in some communities.

READING SKILL Identifying Cause and Result

APPLY

Each sentence below states the result of something. For each, find the sentence or words in Reading 2 that states the cause of these results. Write the cause on the line.

1. Cause: _____

   As a result, businesses have fewer jobs to offer.

2. Cause: _____

   As a consequence, a large number of young adults cannot find jobs.

3. Cause: _____ has caused a decrease in the population in some countries.

REVIEW A SKILL **Identifying Definitions** (See p. 36)

Find the definitions of these words in Reading 2. Write the definitions on the line.

1. traditional Western family

   _____

   _____

2. single

   _____

Vocabulary Activities STEP I: Word Level

Something *physical* is related to the body. (This is in contrast with something mental.) The adverb form is *physically*.

*Try to get some **physical** exercise every day.*

*Sufficient sleep is important for your **physical** health.*

*A **physically** disabled person may be unable to work.*

(See Oxford American Dictionary for learners of English, p. 524)

CORPUS

A. **Work with a partner. Mark each *physical* activity with a P. Mark each mental activity with an M. Then take turns making sentences with the items marked P.**

*Running a race is a **physical** activity.*

P running a race	___ playing tennis	___ walking up stairs
___ memorizing a poem	___ adding numbers	___ spelling words
___ washing a car	___ planting a garden	___ swimming
___ reading a newspaper	___ painting a fence	___ cleaning windows

A *tradition* is a custom or belief of a culture, a family, or a group. Often a tradition started long ago and is repeated over and over. The adjective form is *traditional*. The adverb is *traditionally*.

*One of our family **traditions** is playing chess every Sunday evening.*

*It is **traditional** for a Western bride to wear a white wedding dress.*

*The bride **traditionally** carries a bouquet of flowers.*

Traditional can also mean doing things in an old way rather than in a modern way.

*My mother was a **traditional** housewife who never held a job.*

(See Oxford Dictionary for learners of English, p. 773)

CORPUS

B. **Work with a partner. Complete this paragraph by putting a form of *tradition* in each space. Take turns reading the completed paragraph.**

Birthday (1) _____ are very important to in my family. We always celebrate someone's birthday with a special cake. After we finish eating dinner, Mother brings out the (2) _____ birthday cake. (3) _____ the cake is chocolate with chocolate frosting. Another (4) _____ is to put an extra birthday candle on the cake. Yesterday, for my nineteenth birthday, I had twenty candles on my cake. (5) _____, the oldest person at the table lights the candles on the cake. That was my grandmother. Everyone sang a (6) _____ birthday song to me. Next, I had to blow out all twenty candles. Then Mother cut the cake. And I got the first piece, because it is our (7) _____ to give the first piece to the birthday person.

The adjective *sufficient* means "enough" or "as much as is needed for a certain purpose." The adverb form is *sufficiently*.

*Do you have **sufficient** sugar to make two cakes?*

*Is this box **sufficiently** strong to carry all your books?*

(See Oxford Dictionary for learners of English, p. 730)

CORPUS

C. **A young woman is talking to her mother. Work with a partner to complete their conversation. Write *sufficient* or *sufficiently* in each space. With your partner, read the completed conversation.**

Katrina: It's time for me to be independent. This afternoon I found a good apartment to rent.

Mother: Is it (1) _____ close to your job?

Katrina: Yes, and there is (2) _____ parking for my car.

Mother: That's good, but is it safe? Is the outside (3) _____ lighted at night?

Katrina: Yes, Mother. And the kitchen is (4) _____ for the cooking I do.

Mother: Is the closet space (5) _____ large to hold all of your clothes?

Katrina: I hope so. And there is (6) _____ room for my big desk.

Mother: Do you have (7) _____ money to pay the rent?

Katrina: Yes. Do you have (8) _____ time tomorrow to go see it with me?

Vocabulary Activities STEP II: Sentence Level

The verb *to assume* has two different meanings. One meaning is "to believe that something is true even if you have no proof." It is almost always followed by a clause that begins with *that*. Sometimes *that* is omitted.

*I **assume** that the meeting will start at noon, as it always does.*

*Everyone **assumed** I wasn't home because I didn't answer the phone.*

A second meaning is "to begin to use power or to take over a position."

*The vice president **assumed** control of the company when the president retired.*

*I **assumed** the role of leader during the emergency.*

(See Oxford American Dictionary for learners of English, p. 41)

CORPUS

D. Rewrite the sentences in your notebook to include a form of *assume*. The first one has been done for you. Then with a partner, take turns reading the new sentences.

Lin is a young adult who worked in a city after graduating from a university. Now he has moved back to his parents' home. Here is a conversation Lin had with his father.

1. Father: I think that you tried to find a job.
   *I **assume** that you tried to find a job.*
2. Lin: I thought you knew that I had a job interview yesterday.
3. Father: I guess you didn't get the job.
4. Lin: No. The interviewer thought that I had a degree in chemistry.
5 Father: I suppose you told him your degree is in music.
6. Lin: Yes. I wasn't qualified to take on the position of Research Director.
7. Father: Lin, you have to take control of your life. Keep looking, and good luck.

To assist someone or *to assist* with something means "to help."

*The teacher **assisted** the child by drawing a picture.*

*Each year I **assist** with a food program for homeless people.*

Assistance is the noun form.

*The teacher's **assistance** helped the child understand.*

A person who provides help to someone is an ***assistant***. Usually this is an official or paid position. When ***assistant*** is used before a position title, it suggests a higher professional status.

*The mayor's **assistant** distributed copies of the report.*

*The **assistant** manager described the goals for the coming year.*

(See Oxford American Dictionary for learners of English, p. 40)

CORPUS

E. Complete the following paragraph with forms of *assist*.

Thanks to my parents, I now have a university degree and a good job. My parents (1) _____ me in several ways. First, they provided financial (2) _____ by paying for my university tuition. Then they (3) _____ me by helping me find a part-time job. Without their (4) _____, I never would have earned my degree in business. After graduating, I found a good job as the (5) _____ manager of a large store. My job is to (6) _____ the manager by supervising new workers and creating advertisements. Thanks for your (7) _____, Mom and Dad.

F. Use the following words to complete the paragraphs.

assist	community	define	physical	sufficient
assumed	consequently	factors	seek	tradition

University classes will begin tomorrow. Today there is a meeting for new students. The leader of the meeting asks the students to introduce themselves. He asks them to describe the (1) _____ that brought them to this university. He asks them to (2) _____ their goals.

Raul's father and grandfather graduated from this university. Raul is continuing a family (3) _____ by enrolling there. Raya says that all her life she (4) _____ that she would study medicine and become a doctor. She imagines herself in a white uniform saving sick children. Daniel's family is poor. They did not have (5) _____ money to (6) _____ Daniel by paying for the university. (7) _____, he had to borrow money from a relative. Daniel plans to work to repay the money. He hopes that he has the (8) _____ strength to work and study many hours each day. He hopes that after graduating he will have a well-paying job. Su Ling did not want to (9) _____ a university degree. She wanted to travel far away from the small (10) _____ where she grew up. However, her high school math teacher told Su Ling that she had a brilliant mind and must not waste it. She hopes to travel after she completes her university degree.

Writing and Discussion Topics

Discuss the following topics in a small group.

1. What are some of the good things about being a young adult today?
2. How do electronic communication methods and devices (such as emails, cell phones, and Facebook) assist young adults?

Choose one of the following topics. Write five or more sentences about the topic. Include some of this unit's target vocabulary words.

1. Describe a wedding or holiday tradition in your culture.
2. What factors are important to you when you consider taking a job?
3. What factors are important to a company when they consider hiring a person?

UNIT 5

Cities Are Growing Up

In this unit, you will

- read about skyscrapers and what makes them possible.
- read about growing populations in cities.
- review cause and result.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Examples

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL area						
construct						
design						
height						
AWL major						
previous						
restrict						
AWL structure						
support						
vertical						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about urban planning? Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What is the tallest building you have visited? Where was it?
2. Would you like to work in a very tall building? Why or why not?
3. What kinds of buildings are often very tall?

Read

Information in this article is from a popular online technology magazine.

SKYSCRAPERS

About 2,800 years ago, the tallest **structure** in the world was the Great Pyramid of Giza in ancient Egypt. It was 146 meters (479 feet) tall. Today, the Burj Khalifa building in Dubai is nearly six times that **height**. It is 828 meters (2,717 feet) tall and has 163 stories.

The Burj Khalifa is one of many skyscrapers **constructed** in different **areas** of the world recently. Even though the Great Pyramid was very tall, it was not a skyscraper because people did not live or work inside. There is no exact definition of a skyscraper. It is simply a very tall building. Today, millions of people live and work in skyscrapers.

EARLY BUILDINGS

Until the end of the 19th century, few buildings were taller than ten stories. One reason was because people could not easily climb any higher on stairs. Also, the entire **structure** of an old building was **supported** by its four outside walls. These walls were made of **vertical** piles of bricks or stones. The piles had to be very thick or they would fall over. This **restricted** the **height** of the walls.

STEEL BEAMS

Two **major** inventions in the 19th century made the **construction** of taller buildings possible. One was a new process for making steel. This process was used to create strong beams (long, thin pieces) of steel. Tall **structures** could be built with these beams. These **structures** used a new **construction design**. The walls were not made of stone or brick. Instead, thin steel beams were used to build a strong **vertical** framework for the walls. Later, the **vertical**

The Burj Khalifa

beams were covered with concrete to create attractive walls. The thin walls gave much more **area** inside a building.

SAFETY ELEVATORS

The safety elevator was the other **major** invention that made possible the **construction** of taller buildings. **Previously,** elevators had been used for lifting things on ships or in factories. But they were too dangerous to use to lift people. The ropes often broke and the lifts fell to the ground. The invention of an elevator safety brake prevented elevators from falling. This meant that people could safely ride up to high apartments and offices. And they could safely ride down.

Steel beams make taller structures possible.

However, elevators created certain building **design** problems. First, the **vertical structures** for elevators used valuable space inside a building. The engine room that provided power to the elevators also used valuable space. The **area** that could be used for offices or apartments was **restricted** by these necessary **structures**.

Skyscrapers have other **design** problems. For example, they need machinery to pump water up to high stories. They also need pipes to carry clean water up and waste water down. Tall buildings also have complex systems for bringing electricity, heating, and air conditioning to the whole building. Finally, the top part of a very tall building must be **designed** to be safe when strong winds blow high above the ground.

Is there a limit to the **height** of skyscrapers? We will probably learn the answer soon. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. Millions of skyscrapers have been constructed in the area near Dubai in recent years.

___ 2. Two major inventions in a previous century made the construction of tall buildings possible.

___ 3. The tallest structures in the world are restricted to 146 meters in height.

___ 4. Today, strong steel beams form the vertical support of skyscrapers.

___ 5. The design of a skyscraper must include plans for a system to pump water to high stories.

___ 6. The vertical space where elevators travel increases the valuable space inside a building.

READING SKILL Identifying Examples

LEARN

Writers often include examples in their articles. Examples help readers understand the writer's ideas. Several signals help readers identify examples. These include

for example or *for instance*

… is an example of …

Like… or *such as…*

There are many… One is… Another is… …also….

APPLY

Work with a partner. Find these sentences in Reading 1. Follow the instructions given after each sentence.

1. Two major inventions in the 19th century made the construction of taller buildings possible.

   What signals are used to identify the first and the second examples?

   _____

   _____

2. Skyscrapers have other design problems.

   How many examples are in the paragraph that begins with the above sentence?

   Write the signals that are used to identify each one.

   _____ _____

   _____ _____

REVIEW A SKILL **Identifying Cause and Result** (See p. 52)

The sentences below are from Reading 1. Circle the sentence or sentences that state a cause. Underline the sentence or sentences that state a result.

Until the end of the 19th century, few buildings were taller than ten stories. One reason was because people could not easily climb higher on stairs. Also, the entire structure of an old building was supported by its four outside walls.

Vocabulary Activities STEP I: Word Level

A *structure* is something complex that is built of many parts, such as a dam, a building, or a bridge.

The Great Pyramid is a tall ***structure****.*

The *structure* of something is concerned with the arrangement of its parts.

Our class studied the ***structure*** *of the Greek government.*

(See Oxford American Dictionary for learners of English, p. 724)

CORPUS

A. **Work with a partner. Match the specialist on the left with the kind of *structure* he or she might study. Look in a dictionary to find the meaning of words you do not know. The first one has been done for you. Take turns making sentences with the information.**

1. a conductor — 1 — a. a symphony

A conductor might study the ***structure*** *of a symphony .*

2. botanist — ___ b. the solar system
3. geologist — ___ c. a thunderstorm
4. linguist — ___ d. a horse's heart
5. meteorologist — ___ e. a volcano
6. astronomer — ___ f. Korean
7. veterinarian — ___ g. a leaf

Something is *vertical* if its longest dimension is straight up and down. Something is *vertical* if it stands at an angle of 90° to the ground. (An object that is parallel to the ground is described as *horizontal*.) On a piece of paper, a *vertical* line goes from the bottom to the top (or top to bottom) on the page.

Be sure that you make your fence posts ***vertical****.*

Draw a ***vertical*** *line on the paper.*

(See Oxford American Dictionary for learners of English, p. 810)

CORPUS

B. **Work with partner. Circle the things below that are usually *vertical*. Then take turns making sentences with the circled words.**

Fence posts are ***vertical****.*

fence posts	chimneys	floors	walls
flagpoles	shelves	milk cartons	lampposts
tree trunks	railroad tracks	candles	airplane wings

Question: What time is it on a clock when both hands are vertical?

Something *major* is something that is very large, very important, or very serious.

*There was a **major** earthquake in the mountains yesterday.*

*New Year's Day is a **major** holiday in many cultures.*

*We have a **major** problem.*

Major has a different meaning related to university study. A person's *major* is his field of study. It also identifies a person who is studying in that field.

*She is a business **major**. My **major** is chemistry.*

(See Oxford American Dictionary for learners of English, p. 432)

CORPUS

C. **Work with a partner. Imagine that you are planning a 13-hour airplane trip across the ocean to another country. Write M before the events that would be *major* problems. Take turns making sentences with the information.**

*Losing my luggage would be a **major** problem.*

M Losing my luggage
___ Sitting next to a window
___ Having a cup of coffee
___ Not being able to sleep
___ Watching a movie
___ Reading a magazine
___ Missing the airplane
___ Spilling a cup of coffee on my lap
___ Forgetting to pack a book to read
___ Sitting next to a crying baby

Vocabulary Activities STEP II: Sentence Level

To construct something means "to build something." The passive form of the verb is often used.

*Workers will **construct** a hotel near the river.*

*A hotel will be **constructed** near the river.*

The noun form is *construction*.

*The **construction** of the hotel will take seven months.*

(See Oxford American Dictionary for learners of English, p. 155)

CORPUS

D. **Use *construct*, *was constructed*, or *construction* to complete the sentences below.**

1. The Panama Canal _____ to form a sea passage between the Atlantic Ocean and the Pacific Ocean. Many workers died of yellow fever during the _____ of the canal.
2. The emperor Shah Jahan wanted to _____ the Taj Mahal in Agra, India, to honor his wife. The building _____ of white marble.
3. _____ of the Tower of Pisa in Italy began in 1173. One side of the tower began to sink into soft mud after the first floor _____. To this day, the tower is not vertical. It is popularly known as the Leaning Tower of Pisa.

To design something means "to make a drawing or a plan of how something will look or how something will work." The noun form is also *design*.

*The architect wanted **to design** the hotel so each room had a view of the city.*

*Her **design** was highly praised.*

To design something also means "to invent or plan something for a particular purpose." The noun form is also *design*.

*This stadium was **designed** for football games.*

*The stadium **design** provides seating for 58,000 people.*

A *design* can also be a pattern of lines, shapes, and colors that decorate something.

*Tiles of blue and green formed a beautiful **design** on the wall.*

(See Oxford American Dictionary for Learners of English, p. 197)

CORPUS

E. **Imagine that you are the architect of a new hotel. You are writing a letter to the builder. Rewrite each sentence in your notebook to include a form of *design*.**

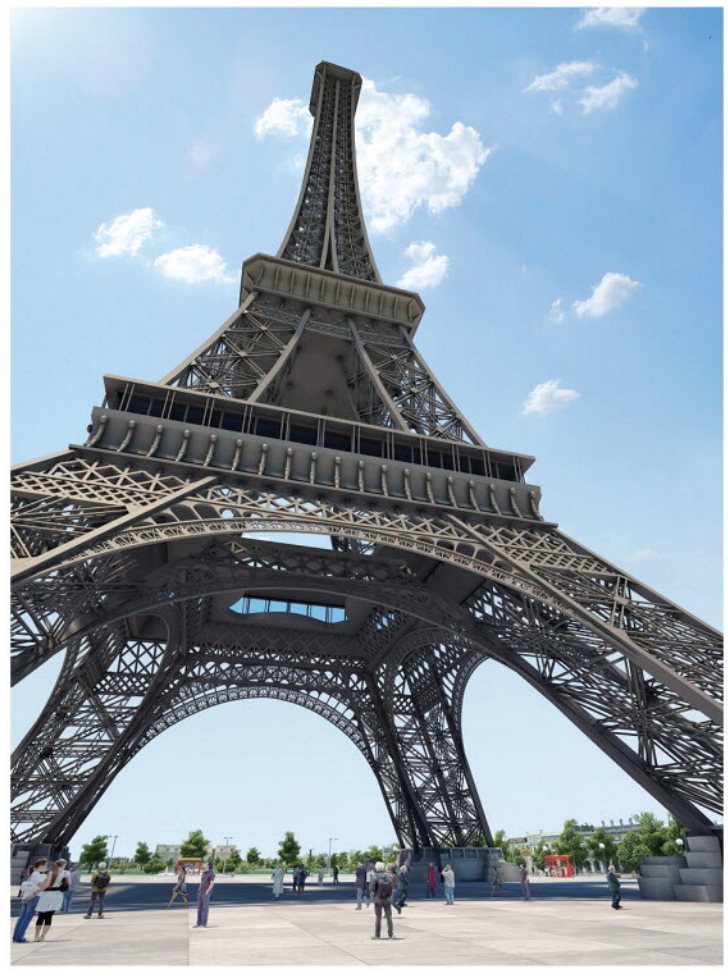
1. I am sending you my drawings for the Skyscraper Hotel in your city.

   *I am sending you my **designs** for the Skyscraper Hotel in your city.*
2. The hotel is planned for 1,000 rooms.
3. The plan for each floor is the same.
4. Each floor is planned to have ten rooms around a central hallway.
5. However, each floor will have a different pattern painted on the hallway walls.

F. Complete the paragraph below by putting these words into the blank spaces.

area	designed	major	restricted	structures
construction	height	previous	support	vertical

The Eiffel Tower in Paris, France, is one of the most famous (1) _____ in the world. (2) _____ of the tower was completed in 1889 for the World's Fair. The (3) _____ year, the World's Fair had been held in Barcelona, Spain. The Eiffel Tower was named for the engineer who (4) _____ it, Gustave Eiffel. Eiffel did not trust the recent invention of steel beams. Instead he chose to construct the tower framework of pure iron. He believed that an iron framework could better (5) _____ the tall, (6) _____ tower he planned. The framework was made in a criss-cross design to increase the strength of the iron. At the time, the city (7) _____ buildings to seven stories. At 324 meters (1,063 feet) in (8) _____, the Eiffel Tower was far taller than seven stories. In fact, it was the tallest structure in the world until 1930. The tower also occupied a large (9) _____. The base of the tower measured about 100 meters by 100 meters. Elevators carried visitors up high to enjoy the view of the city. The tower was supposed to remain for just 20 years and then be torn down. But the tower became a (10) _____ attraction in Paris, so it still stands today.



The Eiffel Tower

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What is the biggest city near your home? Do you ever visit this city?
2. What are some of the good things about visiting a big city?
3. What are some problems that people sometimes have if they live in a big city?

Read

Information in this article is from a city planning journal.

The Growth of Cities

The population of the world recently reached 7 billion. Over half of these 7 billion people live in cities. **Previously**, most people lived on farms or in small towns. But now cities are growing larger as people leave farms and towns. Today, nearly 30 cities in the world have populations of over 10 million people. Tokyo, the world's largest city, has a population of about 37 million people.

There are several reasons why cities are growing. One reason is that big cities are **major** business centers. Many factories, offices, and stores are located in big cities. These businesses need workers. People are moving to cities so they can find good jobs. They want jobs that pay enough money to **support** themselves and their families. Many big cities are also **major** ocean ports. Port cities have grown because international trade has been increasing. Ships bring materials into the city. Workers are needed to unload the materials and deliver them to factories and stores. Big cities are also **major** transportation centers. They have airports, train stations, and bus terminals. Convenient transportation enables visitors to come to the cities to live or for shopping, business, or vacations. Finally, big cities are likely to have large universities and technical schools that attract students to study there.

As cities grow, they face several problems when large numbers of people live in a limited **area**. For example, new buildings must be **constructed** for families to live in. Growing businesses need new buildings, too. However, there is usually very little empty space within the **area** of a large city.

A busy train station in London, U.K.

As a result, even a small plot of land is expensive. For this reason, builders are removing small, one-story buildings that were **constructed** in **previous** times. They are replacing them with tall, **vertical** buildings. As an example, a one-story apartment building might provide living space for 25 people. A ten-story building occupying the same land **area** could provide living space for 250 people. Many big cities have made efficient use of their land by going **vertical**. Hong Kong, for example, has nearly 8,000 **structures** that are 12 or more stories in **height**. New York City and São Paulo have nearly 6,000. Singapore and Moscow each have about 4,000.

Heights of some famous skyscrapers

Another problem cities face is **designing** and installing complex systems to provide services such as water and electricity to new homes and businesses. An efficient system must also be **designed** for collecting tons of trash and disposing of it in a safe way.

Finally, a growing population means more cars, trucks, and buses in the streets. Narrow streets in old cities are often unable to handle today's increased traffic. In addition, smoke from vehicles causes serious air pollution in some cities. To reduce traffic and pollution, some cities have passed laws that **restrict** the use of automobiles in certain **areas**.

As our world population continues to grow, cities will be growing, too. A growing city will have to solve many **major** problems. These problems result when millions of people live and work in a crowded city. ■


Traffic can cause air pollution called smog.

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. Many people who previously lived in cities are moving to farms and in small towns.

___ 2. A city offers many jobs that can help people support themselves and their families.

___ 3. Construction of tall, vertical buildings is a major problem in cities.

___ 4. Problems result when large numbers of people live in a limited area.

___ 5. Narrow streets in old cities were not designed for today's increasing traffic.

___ 6. Singapore has twelve structures that are nearly a thousand feet in height.

___ 7. Some cities have restricted the use of water and electricity to businesses.

READING SKILL Identifying Examples

APPLY

Paragraph 2 begins "There are several reasons why cities are growing." Write the signal words that identify each example.

1. _____ 2. _____

3. _____ 4. _____

Paragraph 3 includes an example that compares a one-story building with a ten-story building. Which of these ideas does this example support?

a. A small plot of land is expensive.

b. Tall buildings use land efficiently.

c. Many people live in apartments.

REVIEW A SKILL **Identifying Cause and Result** (See p. 52)

These sentences are related to Reading 2. Circle the word or words that state a cause. Underline the word or words that show a result.

1. Cities face several problems when large numbers of people live in an area.

2. There is usually very little empty space within a large city. As a result, even a small plot of land is expensive. For this reason, builders are removing small, one-story buildings that were constructed in previous times. They are replacing them with tall buildings.

Vocabulary Activities STEP I: Word Level

To support something means "to carry the weight of something." *Support* is both the verb form and the noun form of this word.

*This post **supports** the weight of the roof.*

*This post is the main **support** for the roof.*

To support a person or a belief means "to agree with the ideas of the person or belief."

*I **support** lower taxes for working people.*

*The president needs the **support** of voters to change the law.*

To support someone means "to provide money to pay for food, housing, etc."

*It is hard for a man **to support** his family if he does not have a job.*

*The family would starve without my **support**.*

(See Oxford American Dictionary for learners of English, p. 734)

CORPUS

A. **Work with a partner. Match the person or thing on the left with what the person or thing *supports*. Take turns making sentences with the information.**

1. voters park. — 1 — a. the mayor's plan to build a new

*Voters **support** the mayor's plan to build a new park.*

2. vertical beams — ___ b. the weight of an elevator.
3. banks — ___ c. the construction of a new airport.
4. strong cables — ___ d. their children until they are grown.
5. apartment owners — ___ e. the roof of the structure.
6. travelers — ___ f. the design of a new $1 coin.
7. parents — ___ g. a restriction on how many people can live in one room.

An *area* is a particular part of a place, a building, a city, a country or the world.

*Visitors are not allowed in the storage **area** of the museum.*

*An earthquake was felt throughout the desert **area**.*

An *area* can refer to a particular part of a subject or an activity.

*He's an expert in the **area** of ancient Egypt.*

Area is also a mathematical description of the size of a space. It is calculated by multiplying the length of a space by its width.

*The room was small. It was just 100 square feet in **area**.*

(See Oxford American Dictionary for learners of English, p. 36)

CORPUS

B. **Work with a partner. Take turns asking and answering questions about the map. Check a dictionary for new words.**

1. Where are banks and loan companies located?

   *In the financial **area**.*

2. Where do ships unload materials from other countries?
3. Where are factories located?
4. Where do most people live?
5. Where are department stores and other stores located?
6. Where are the airport and the train station located?
7. Where are the city hall and the city court house located?
8. Where are the oldest buildings located?

Vocabulary Activities STEP II: Sentence Level

The adjective *previous* describes something that happened earlier or before. The adverb form is *previously*.

*My **previous** apartment was on Orange Street.*

*I **previously** lived in a small town near the mountains.*

(See Oxford American Dictionary for learners of English, p. 552)

CORPUS

C. **Work with a partner. Imagine you are looking for a job in a big city. The manager of a large office is asking you questions. Answer using *previous* or *previously*. Take turns asking and answering the questions.**

1. Where did you live before moving to this city? (previously)

   *I **previously** lived in a small town near the mountains.*

2. Have you made an earlier visit to this city? (previous)
3. Do you know anyone who used to work for this company? (previously)
4. Where did you work before you moved here? (previously)
5. Have you had any earlier experience with computers? (previous)

To restrict something or someone means "to put a limit on what someone can do."

*The city **restricts** the size of signs that stores can have.*

*I **restrict** my children to three hours of television a day.*

A *restriction* is a law or a rule that limits the actions of people.

*The college placed a **restriction** on the use of cell phones in classrooms.*

The adjective *restricted* describes something that is limited for a particular purpose or for a particular group.

*The patients were placed on a **restricted** diet.*

(See Oxford American Dictionary for learners of English, p. 605)

CORPUS

D. **A city has been growing in the last few years. The mayor and the city council members have been discussing the problems this has created. In your notebook, rewrite their ideas with a form of *restrict*.**

1. Our city has a law that limits the height of buildings to ten stories.

   *Our city has a law that **restricts** the height of buildings to ten stories.*

2. We should not limit the height of buildings.
3. That limit is one reason we have a housing shortage.
4. We need to add changes to that law.
5. If we build taller apartments, we will need to limit parking on the streets.
6. Right now, there are no limits on street parking.
7. Street parking should be limited to people who live nearby.
8. That limit would be impossible to enforce.

The *height* of a person is his or her measurement from the top of the head to the feet. Only the adjective *tall* can describe a person's height.

*My daughter's **height** is now 40 inches.*

*My daughter is now 40 inches **tall**.*

The *height* of an object is the measurement from top to bottom. The adjective form is *high*. The adjective *tall* can also describe objects.

*What is the **height** of that building?*

*How **high** is that building? How **tall** is that building?*

*The **height** of that building is 200 feet.*

*That building is 200 feet **high**. That building is 200 feet **tall**.*

Height also is a measurement of distance above the ground. *High* is the adjective form. (*Tall* is not used with this meaning.)

*A strong wind carried the kite to a **height** of 50 feet.*

*A strong wind carried the kite 50 feet **high**.*

Height also describes the most important or strongest part of something. (There is no adjective form for this meaning.)

*He was at the **height** of his career when he became ill.*

*A tree fell over at the **height** of the storm.*

(See Oxford American Dictionary for learners of English, p. 339)

CORPUS

E. The chart below gives you information about several tall structures. Write questions and answers in your notebook about each one. Use *height, high,* and *tall* in your questions and answers. You may use either feet or meters in your answers.

1. How tall is the Statue of Liberty?

   *The **height** of the Statue of Liberty is 151 feet.*

	STRUCTURE	Height in feet	Height in meters	Use in question	Use in answer
1	Statue of Liberty	151	46	tall	height
2	Great Pyramid at Giza	479	146	high	high
3	Eiffel Tower	1,063	324	tall	high
4	Mount Everest	29,035	8,948	height	tall
5	Burj Khalifa skyscraper	2,717	828	high	height
6	Tallest roller coaster	456	139	height	high

F. Use the following words to complete this paragraph.

areas	designed	height	restricted	support
constructed	major	previous	structures	vertical

When cell phones were new, each cell phone company (1) _____ a system of signal stations so a person could call a friend far away. The electronic message was transferred from one signal station to another until it finally reached the friend's phone. Cell phone companies (2) _____ many tall, (3) _____ towers that would (4) _____ a signal station on the top. In some areas, there were not enough signal stations, so the electronic message was weak. The friends couldn't hear each other. In some (5) _____, the message was weak because cities (6) _____ the (7) _____ of the towers. In (8) _____ years, not many people used cell phones. But today there are millions of cell phone users. Cell phone companies are designing new systems of signal stations that will result in (9) _____ improvements in service. But instead of constructing new towers, the companies will locate new signal stations in the top stories of schools, hotels, office buildings, and other tall (10) _____. The companies will pay rent to the owners of the buildings.

Writing and Discussion Topics

Discuss the following topic in small groups.

Fire is a big worry for people who live or work in a skyscraper. Imagine that a fire starts on the 50th floor of a skyscraper. What are some of the problems that the people who live or work in the building might have? What are some of the problems that firefighters might have? Is it possible to design a safe skyscraper?

Choose one of the following topics. Write at least five sentences about the topic. Use some of the unit's target vocabulary words.

1. Some large cities restrict the height of buildings to just five or six stories. Describe the good or the bad effects of such a restriction in a city that is growing in population.
2. In many parts of the world, people are leaving farms and small villages to live in large cities. Describe how living in a large city would be different for these people.
3. What are some of the advantages of living in a large city? What are some of the disadvantages?

UNIT 6

The History of Food

In this unit, you will

- read about the history of the foods we eat.
- read about techniques for preserving and storing food.
- review identifying examples.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Time Signals

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
AWL available						
culture						
diet						
discover						
ensure						
preserve						
rely						
AWL significant						
supply						
technique						

AWL Academic Word List
Oxford 3000™ keywords

Before You Read

In small groups or with the whole class, answer the following questions.

1. What foods are traditional in your culture?
2. Do you ever eat in restaurants that serve foods of other cultures?
3. What is your favorite food? Why?

Read

The information in this article is from an anthropology textbook.

Food Traditions

Every **culture** in the world has its own style of cooking and eating. Every **culture** has its own beliefs about what is good to eat and what is not. Many of these food customs started hundreds or even thousands of years ago. They developed in part because of where the people lived.

DIETS OF EARLY HUMANS

The **diet** of early humans depended on what foods were **available** to them. Different foods were **available** in different environments. For example, humans who lived near an ocean **relied** on the ocean to **supply** them with fish to eat. In contrast, humans who lived in forest areas ate the animals they hunted. Humans in the warm Indus Valley picked wild bananas to eat. Humans in northern Europe dug up wild onions. Flavorings, such as spices, also depended on what was **available** in the environment. Sometimes seeds or leaves were added to foods for flavor. Over time, these foods and flavors became traditional in a **culture**.

EARLY FARMING

About ten thousand years ago, humans learned to farm. These early farmers tamed wild cows, goats, and sheep. They planted wheat, barley, and other grains. Slowly, farming spread to other areas. The animals that farmers raised and the crops they planted depended on where they lived. Rice, for example, grew well in southern Asia, but not in dry desert lands.

Early humans who lived in the far north fished through holes cut in the ice.

The animals and crops **ensured** that the farmers would have a **supply** of food **available** to eat.

NEW FOODS

Over the years, people learned about new foods. They learned from their neighbors or from travelers. They also learned about new cooking **techniques**. Travelers who went to distant places **discovered** new foods. Marco Polo, for example, traveled to China and brought noodles back to Italy. Explorers who sailed to the Americas brought tomatoes and potatoes back to Europe. Many of the new foods later became part of the traditional **diet** of some **cultures**. Potatoes, for example, became a **significant** part of the Irish **diet**. Both pasta (noodles) and tomatoes became part of the Italian **diet**.

EATING TECHNIQUES

Cultures also developed their own **techniques** for eating. Thousands of years ago, people in China began using chopsticks. They have **preserved** this eating **technique** and still use chopsticks today. People in other Asian countries learned the **technique** from them. The first eating tool used in Europe was probably a seashell or curved piece of wood. Later sharp, pointed knives were used. Most Western countries now use metal forks, knives, and spoons to eat with. Some **cultures** do not use eating tools. Instead, people use their fingers to pick up bites of food. People in other **cultures** **rely** on pieces of flat bread to pick up food.

People are proud of their **cultures** and enjoy their traditional foods. They want to **ensure** that their food traditions are **preserved**. ■

People still use chopsticks today.

Reading Comprehension

Mark each statement as *T* (True) or *F* (False) according to Reading 1.

___ 1. The diet of early humans depended on what foods were available in their environment.

___ 2. People who lived near the ocean relied on the ocean to supply them with animals to eat.

___ 3. Marco Polo discovered potatoes in China and brought some back to Europe.

___ 4. Tomatoes became a significant part of the Irish diet.

___ 5. The people of China have preserved the technique of eating with chopsticks into modern times.

___ 6. People are proud of their cultures and want to ensure that their food traditions are preserved.

READING SKILL Identifying Time Signals

LEARN

Writers use many kinds of time words to describe when events happened.

Specific dates, days, or times:			
on January 3, 1786	in the 14th century	by 2050	at three o'clock
Times in relation to other events:			
every summer	last week	when she was a child	
50 years ago	before he died	each day after school	
The passing of time:			
days later	over time	years went by	
Words that suggest past, present, or future time:			
past	**present**	**future**	
early humans	modern society	coming weeks	
once	now	soon	
recently	today	next year	
at one time	presently	later	

APPLY

Work with a partner. Find these sentences in Reading 1. Answer the question after each sentence.

1. The diet of early humans depended on what foods were available to them.

   Which word tells you that the sentence is about the past? _____

2. Over time, these foods and flavors became traditional in a culture.

   Did this change happen quickly or slowly? _____

3. Thousands of years ago, people in China began using chopsticks. They have preserved this eating technique and still use chopsticks today.

   When did the Chinese people start using chopsticks? _____

   What does the word *today* tell you? _____

4. Most Western cultures now use metal forks, knives, and spoons to eat with.

   What word tells you that the sentence is about the present time?

   _____

REVIEW A SKILL **Identifying Examples** (See p. 68)

Reading 1 includes many examples to help readers understand the main ideas. Work with a partner to find the following examples.

1. Paragraph 2 begins, "The diet of early humans depended on the foods that were available in their environment." What are the three examples given?

   a. fish or _____ b. bananas _____

2. Paragraph 4 includes two sets of examples.
   "Travelers who went to distant places often discovered wonderful new foods."
   What travelers were mentioned? What foods did they bring back?

   a. _____ brought back _____.

   b. _____ brought back _____ and _____.

Vocabulary Activities STEP I: Word Level

To ensure means "to make certain that something will (or will not) happen."

*The team practiced hard **to ensure** its success in the big game.*

*We bought our tickets early **to ensure** that we would have good seats.*

(See Oxford American Dictionary for learners of English, p. 241)

CORPUS

A. **Work with a partner. Match the two parts of sentences to make rules for safely preparing chicken to eat. Take turns making sentences with the information using the word *ensure*.**

1. Keep raw chicken in the refrigerator — 1 — a. it stays cold.

   *Keep raw chicken in the refrigerator to **ensure** that it stays cold.*

2. Rinse the chicken in cold water — ___ b. bacteria will be destroyed by the heat.
3. Sprinkle salt on the chicken — ___ c. bacteria on the outside are washed away.
4. Put the chicken in a large pan — ___ d. you do not spread bacteria to other foods.
5. Put the pan in a hot oven — ___ e. the meat juices will not drip in the oven.
6. Wash your hands in hot, soapy water — ___ f. the meat inside is cooked before eating it.
7. Cut into a thick part of the chicken — ___ g. the meat will have a good flavor.

To rely on something means "to need something in order to do certain tasks."

To rely on a person has the same meaning.

*I **rely on** an alarm clock to wake me up in the morning.*

*She **relies on** an old car for transportation.*

*Li **relied on** his parents to support him through college.*

(See Oxford American Dictionary for learners of English, p. 595)

CORPUS

B. **Work with a partner. Match each kitchen item on the left with the task people *rely on* it to do. Take turns making sentences with the information.**

1. coffee makers — 1 — a. to make coffee.

   *People **rely on** coffee makers to make coffee.*

2. measuring cups — ___ — b. to eat with.
3. chopsticks — ___ — c. to count the minutes while food is cooking.
4. knives — ___ — d. to cut the top off of metal cans.
5. ovens — ___ — e. to keep their clothes clean when they cook.
6. minute timers — ___ — f. to know the exact amount of an ingredient.
7. can openers — ___ — g. to cut food into pieces.
8. aprons — ___ — h. to keep foods cold.
9. refrigerators — ___ — i. to roast meat or bake cookies.

A *diet* is the food that a person or a group of people usually eats.

*Her **diet** includes lots of fruits and vegetables.*

*The Mexican **diet** is based on grains such as corn and rice.*

Often a person eats a special diet, such as a low-salt diet, a vegetarian diet, a fat-free diet, etc.

*My doctor put me on a liquid **diet** after my surgery.*

To diet or *to go on a diet* means "to restrict the types of food or the amount of food a person eats for the purpose of losing weight." The adjective *diet* refers to food that has no sugar or fat, such as *diet* cola.

(See Oxford American Dictionary for learners of English, p. 201)

CORPUS

C. **Work with a partner. Complete the chart to show which foods might be included in each animal's diet. Take turns making sentences with the information.**

*A cow's **diet** includes grass.*

	Grass	Insects	Nuts	Apples	Raw meat	Fish
cow	✓					
bird						
whale						
lion						
zebra						
mouse						

Now change the word order in the sentences and take turns making new sentences.

*Grass is part of a cow's **diet**.*

Vocabulary Activities STEP II: Sentence Level

To supply something means "to give or provide something to a person or to a place."

*A local power company **supplies** our community with electricity.*

*A guitar player **supplied** entertainment for the party.*

The noun *supply* refers to a quantity of something that is available to use.

*The hotel provides each room with a large **supply** of towels.*

*I put a **supply** of tissues in my pocket in case I started sneezing again.*

The plural *supplies* refers to things that people need.

*The sailors filled their ship with **supplies** before leaving home.*

(See Oxford American Dictionary for learners of English, p. 734)

CORPUS

D. **Imagine you are an explorer from long ago. You are getting your ship ready for a long journey. You are meeting with the Queen. Answer her questions with full sentences, using the word in parentheses. Compare your sentences with a partner.**

1. Do you have enough food to last you for a month? (a supply)

   *Yes, we have a good **supply** of food.*

2. When you return, will you give me a report? (supply)
3. What will happen if a sailor gets sick? (medical supplies)
4. How are you going to wash clothes? (a supply)
5. Did my royal map maker give you any maps? (supplied)

To discover something means "to find something that no one had ever seen before." It also means "to learn information that no one knew before." The passive verb form *was discovered* is used when you don't know who made a discovery. The noun form is *discovery*.

*Scientists recently **discovered** that pigeons can count.*

*Gold **was discovered** in California in 1849.*

*The **discovery** of penicillin has saved many lives.*

To discover something can also refer to finding or learning something that you did not know about before.

*My friend and I **discovered** a great new restaurant downtown.*

*I **discovered** a mouse in my cupboard.*

(See Oxford American Dictionary for learners of English, p. 207)

CORPUS

E. **Use the information in the chart to answer questions about vitamins. Write your answers on complete sentences in your notebook. Use *discover* or *supply* in your sentences.**

Scientists	Year	Vitamin	Foods that supply the vitamin: Include these in your diet.
Charles Glen King Albert Szent-Györgyi	1932	C	oranges lemons
Elmer McCollum Lafayette Mendel Thomas Osborne	1917	A	yellow fruits and vegetables green leafy vegetables
Christiaan Eijkman Adolphe Vorderman	1897	B_1	eggs, rice, oats
Elmer McCollum	1921	D	fish, eggs

1. When was vitamin A discovered?
2. What foods supply vitamin C?
3. What vitamin did Eijkman and Vorderman discover?
4. What foods should you include in your diet to get a supply of vitamin D?
5. Which scientist discovered two vitamins?
6. Which two vitamins do eggs supply?
7. Why should you include yellow fruits and vegetables in your diet?
8. Which discovery took place in 1932?

F. Use the following words to complete this paragraph.

available	diet	ensure	rely on	supply
culture	discovered	preserving	significant	techniques

About ten thousand years ago, humans in several parts of the world made a (1) _____ change in the way they lived. They (2) _____ how to farm. Before that time, the (3) _____ of early humans depended on what was (4) _____ in their environment. They hunted for animals. They gathered wild fruits and vegetables. When humans became farmers, they no longer had to go looking for food. They could stay in one place. They could (5) _____ their animals and plants to (6) _____ them with food. Many people came to farm in areas where the land was good. As more people came, towns developed nearby. Farmers took their extra food into town to trade it for supplies that they needed. People shared (7) _____ for cooking and (8) _____ food with each other. They shared stories and beliefs. They created a (9) _____ . Over time, many towns grew into business centers. People developed writing and number systems to (10) _____ that they could keep good business records. This was the beginning of civilization.

Early humans learned to farm.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Have you ever forgotten to put milk in the refrigerator? What happened?
2. What are some different ways that grocery stores keep foods fresh?
3. Have you ever visited a farm? What was growing there?

Read

Information in this article is from a science website.

PRESERVING FOODS

The daily **diet** of early humans depended on what foods they could find. While women searched for **available** fruits or roots, men hunted for wild animals or caught fish. However, if the humans did not eat the food in a few days, it began to rot. Rotten food did not taste good. It often made the humans sick. Early humans did not know how to **preserve** food to keep it safe to eat later. Today we have many **techniques** to **preserve** food. Some are thousands of years old.

THE ROLE OF BACTERIA

Early hunters were the first to **discover** cooling as a way to **preserve** meat. After killing a large animal, they often dragged it to a nearby cave to hide it from hungry animals. Each day they would cut off pieces of raw meat to eat. It was cool inside the cave, so the animal meat did not rot quickly. It stayed good to eat for many days. In the winter, meat left inside the cave froze. It was still good to eat months later.

Early hunters did not know about bacteria. They did not know that bacteria cause meat and other foods to rot. They did not know that cooling slows the growth of bacteria and that freezing stops it. In warmer parts of the world, early humans **discovered** that dried foods lasted for a long time. They **discovered** that meats and fruits left to dry in the hot sun did not rot. The humans did not know that bacteria cannot grow without moisture (wetness).

An early hunter dragging an animal to a cave.

FARMING

When humans learned to farm, it **significantly** changed the way they lived. They no longer had to search for food. Instead, they **relied** on farm animals to **supply** them with meat and milk. They ate grains and vegetables that they planted. Farmers had plenty of fresh food **available** during the warm months. They ate much of it. But they also **preserved** some to create a **supply** of food to eat during the winter.

PRESERVING FOOD

Farmers **discovered** several new **techniques** for **preserving** food. For example, they **preserved** meat by packing it in salt or by hanging it over a smoking fire. They also **preserved** vegetables in olive oil, salt, or vinegar. People of different **cultures** used these **techniques**, and the results were often very different. For example, Koreans combined raw cabbage and salt and made *kimchi*. Germans combined raw cabbage and salt and made *sauerkraut*. During the winter months, farmers **relied** on **preserved** foods for their meals.

Modern preserved foods

For thousands of years, there were few **significant** changes in food **preservation**. Finally, in the 19th century, the **technique** of canning was developed. In home kitchens, foods were sealed inside glass jars. Then the jars were boiled to **ensure** that bacteria were destroyed. In commercial canning factories, cooked foods were sealed into metal cans. A **supply** of canned foods could be stored in a kitchen cupboard for a long time.[1] Early in the twentieth century, home refrigerators became **available**. The cool temperature inside kept foods fresh for many days.

A visit to a modern grocery store is a reminder of the many ways that humans have found to **preserve** foods. For instance, you will see foods that are frozen, refrigerated, canned, and dried. You will even see smoked and salted meats. ■

[1] The terms "canning" or "canned foods" refer to the preservation process rather than to the container. The terms apply to foods in both glass and metal containers.

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to the information in Reading 2.

___ 1. Early humans developed many techniques for preserving fish.

___ 2. The daily diet of early humans depended on what foods were available.

___ 3. Destroying bacteria is one way to ensure that foods are safe to eat.

___ 4. Early farmers relied on hunting for wild animals to supply them with meat and milk.

___ 5. *Kimchi* and *sauerkraut* are examples of how cultures can create significantly different foods even when they use the same techniques.

READING SKILL Identifying Time Signals

APPLY

Work with a partner to answer the questions below.

1. Use the time signals in Readings 1 and 2. About how long ago did early humans discover cooling as a way to preserve meat?
2. Use the time signals in Reading 2. Number these preservation techniques in the order in which they were discovered or invented.

___ canning ___ freezing ___ packing in salt ___ refrigerating

REVIEW A SKILL **Identifying Examples** (See p. 68)

1. Circle all the examples in paragraph 5 of new techniques for preserving food.
2. In the last paragraph, there are six examples of _____.

Vocabulary Activities STEP I: Word Level

A *technique* is a method or way of doing something.

*I tried your **technique** for cleaning window. It really works.*

*Watch the **techniques** the teacher uses to keep order in the classroom.*

(See Oxford American Dictionary for learners of English, p. 750)

CORPUS

A. Work with a partner. Mark each cooking technique with a C. Mark each preserving technique with a P. Mark each eating technique with an E.

___ frying ___ freezing ___ salting

___ using a fork ___ boiling ___ canning

___ refrigerating ___ baking ___ using chopsticks

The adjective *available* describes things that you can buy or find, or that are ready to use.

*The author's new book will be **available** in April.*

*There were no rooms **available** at the hotel.*

Available also describes people who have time to meet with you.

*The doctor will be **available** at two o'clock.*

(See Oxford American Dictionary for learners of English, p. 45)

CORPUS

B. **Work with a partner. Imagine you are in a grocery store. You hear many announcements as you shop. Match the two parts of each announcement. Make sentences. Use *is* or *are* depending on the subject.**

1. Canned beans — 1 — a. on aisle seven.

   *Canned beans are **available** on aisle seven.*

2. Job applications — ___ — b. for 85¢ a pound, today only.
3. Oranges — ___ — c. in the bakery section.
4. Immediate check-out service — ___ — d. in the manager's office.
5. Ice cream — ___ — e. at cash register Number 6.
6. Fresh bread — ___ — f. in eight delicious flavors.

To preserve something means "to keep something safe or in good condition." *To preserve* a food means "to keep a food safe to eat by stopping or slowing the growth of bacteria."

*A thin layer of oil helped **preserve** the wood on my front door.*

*Canning and drying are two ways to **preserve** fruit.*

(See Oxford American Dictionary for learners of English, p. 550)

CORPUS

C. **Work with a partner. Match the countries to the famous places they want to *preserve*. Then take turns making sentences with the information.**

1. Australia — 1 — a. the Great Barrier Reef

   *Australia wants to **preserve** the Great Barrier Reef.*

2. The United States — ___ — b. the pyramids
3. India — ___ — c. the Grand Canyon
4. England — ___ — d. the Great Wall
5. China — ___ — e. the Taj Mahal
6. Egypt — ___ — f. Stonehenge

Vocabulary Activities STEP II: Sentence Level

The adjective *significant* has the same meaning as "big" or "great," but it is more formal. It is not used to describe the size of objects.

*There is a **significant** difference between Spanish and Japanese.*

*We spent a **significant** amount of money on travel last year.*

Informally, people say:

There is a big difference between Spanish and Japanese.

We spent a lot of money on travel last year.

Significant also means "important."

*The discovery of fire was the most **significant** event in human history.*

The adverb form is *significantly*. It is often used to compare two things, or to show the importance of an action or state.

*Raul is **significantly** older than his brother.*

*Automobiles **significantly** changed how people traveled.*

(See Oxford American Dictionary for learners of English, p. 668)

CORPUS

D. **Read the paragraph below. In your notebook, rewrite each of the seven underlined sentences. Include *significant* or *significantly* in each sentence. Take turns reading all the sentences with a partner. The first one has been done for you.**

(1) The discovery of fire was the most important event in human history. When humans were able to make fire, they were able to cook foods. (2) Cooking foods made a big improvement in the diet of humans. (3) For example, cooking destroyed a large number of the bacteria found in raw food. Cooking also released vitamins in foods. (4) This made the foods much more nutritious. (5) Cooking also released a large amount of the poisons that occurred in some foods. This meant that humans could add some new foods to their diet if they cooked these foods well. (6) Cooking greatly improved the flavor of food. Cooking also broke down the fibers in foods. (7) This made the foods much easier to digest.

Cooking destroys bacteria in raw food.

*1. The discovery of fire was the most **significant** event in human history.*

Culture includes the customs, language, beliefs, religion, arts, and family patterns of a group of people. The adjective form is *cultural*.

*The way people greet each other depends on which **culture** they belong to.*

*The **cultures** of South American countries are similar in many ways.*

*There are many **cultural** differences between Italy and Spain.*

Culture can also refer to the art, music, and literature of a society.

*Paris is one of the **cultural** centers of Europe.*

(See Oxford American Dictionary for learners of English, p. 179)

CORPUS

E. **Below is a letter written by someone who just visited New York. Complete the letter by writing *culture* or *cultural* in the blank spaces. Take turns reading the letter with a partner.**

Dear Grandmother,

It's good to be back. I was traveling on business to New York. At first I was confused by the (1) _____ differences that I saw. On my first night Tom, who worked in the New York office, took me to a restaurant for dinner. I was surprised by how late people in that (2) _____ eat dinner. Two of his friends joined us. In their (3) _____, men always greet each other by shaking hands. They wanted me to shake hands, too. And these strangers called me by my given name. Tom said he would order dinner for me. I was surprised when I got a plate with food already on it. In this (4) _____, they don't have large serving dishes of food that people share. Then I noticed an odd (5) _____ practice. When we were finished, Tom paid the waiter with a credit card. As we were leaving, each man put some money on the table. "Don't forget your money!" I called. Tom laughed and said that in his (6) _____ people always leave extra money for the waiter. It's called a "tip." Things got better as I got used to these strange (7) _____ practices. In fact, I had a wonderful visit in New York.

F. Use the following words to complete this paragraph.

available	diet	ensure	relies on	supply
cultures	discovered	preserve	significantly	techniques

The Mediterranean diet is not a plan to lose weight. Instead it is a plan to (1) _____ good health. Doctors recently (2) _____ that following this (3) _____ plan can (4) _____ reduce heart disease and other serious illnesses. The diet plan is based on eating practices in the Mediterranean area. However, the foods in the diet plan are (5) _____ almost everywhere in the world. The diet plan is also based on the cooking (6) _____ common in the (7) _____ of that area. The diet plan (8) _____ fruits, vegetables, whole grains, beans, and nuts to (9) _____ most of the food that a person eats. Instead of butter, people use olive oil or vegetable oil to cook with. And instead of salt, people rely on spices for flavor. The Mediterranean diet plan does not (10) _____ that you will live to be 100 years old, but doctors say that it can help prevent illness.

Writing and Discussion Topics

Discuss the following topic in small groups.

In order to get food, early humans hunted animals and gathered wild plants. Early humans did not cook foods until they discovered fire. How is this way of living different from the way you and your family get and prepare food? What inventions have made possible your modern way of getting and preparing food?

Choose one of the following topics. Write six to eight sentences about the topic. Use some of the target vocabulary words.

1. If you have visited another country, describe the food traditions that you saw there.
2. How has modern transportation (airplanes, railroads, automobiles, trucks) affected the kinds of foods that people eat?
3. Today, many foods (for example, breads, cereals, cooked meat) are preserved with chemicals. How does the use of chemicals in food help people eat a good diet?

UNIT 7

Patterns of Technology

In this unit, you will

- read about bar codes and how they are used.
- learn about how bar codes could be used in the future.
- review time signals.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Steps in a Sequence

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
automatic						
AWL consist						
AWL identify						
invent						
item						
pattern						
produce						
purchase						
technology						
unique						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about bar codes? Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. When you go to a market or other kind of store, how does the clerk know how much to charge you for your purchase?
2. Have you ever noticed bar codes on items that you buy? What is their purpose?
3. Imagine you wanted to make a list of all of the food items in your kitchen. Why would this be hard?

Read

Information in this article is from a popular book on inventions.

Bar Codes

Look at the **items** you have **purchased** recently. Do any of them have a bar code on the package? A bar code is a printed **pattern** of black and white lines. The **pattern** contains important information. Bar codes are becoming common all over the world. The **technology** is especially useful in supermarkets.

NEED FOR BAR CODES

Before bar codes were **invented**, supermarket customers waited in long lines. They waited for a clerk to add up the cost of their **purchases**. First the clerk picked up an **item**. Then she searched for a price sticker and read the amount. Finally, she entered the price on a cash register. Sometimes the clerk did not read the price accurately. The checkout process was slow. Bar codes were **invented** to help grocery stores speed up the checkout process. Now a clerk picks up an **item** and passes it over a scanner. The scanner reads the bar code. The store computer searches its memory. It finds the matching

Bar codes on food product packages.

bar code. Then it **automatically** enters the correct price into the cash register.

HOW BAR CODES WORK

A supermarket computer system has in its memory the bar code for each **item** in the store. The computer also has in its memory the price of each **item**. If a store has a sale on canned fruit, for instance, the store manager does not have to change the prices on the cans. Instead, he changes the price in the computer memory. When a sale **item** is scanned, the computer reads the bar code. It enters the new price into the cash register. Bar codes also help stores count what they have sold. As **items** are scanned, the computer **automatically** counts them. At the end of each day, the store manager knows what the store has sold. For example, he knows that he still has enough canned fruit, but that he must order more coffee.

HOW BAR CODES DEVELOPED

Bar code **technology** became available in 1974. Since then, several bar code systems have been designed. Each system is based on creating a **unique identification** number for every manufacturer. One system uses 12-digit **identification** numbers. Each printed bar code **consists** of a **unique pattern** of black and white lines that represent numbers from 0 to 9. The first six digits **identify** the manufacturer. The next five digits **identify** a certain **product**. The last digit is called a *check digit*. It tells if the number scanned correctly. For example, the Campbell Soup Company **produces** canned foods. The first six digits of all Campbell **products** are the same. The next five digits are different for each Campbell **product**, such as chicken soup, tomato soup, and so on. As a result, the bar code for each **product** in a store is **unique**.

Each bar code consists of a unique pattern.

HOW BAR CODES HELP

Many kinds of businesses use bar codes. However, a bar code system is especially useful in supermarkets. One reason is that most customers **purchase** a large number of **items**. Bar codes make the checkout process fast and easy. Also, supermarkets sell a wide variety of **items**. Most of these **items** sell quickly. Using bar codes allows stores to easily track what has sold and what needs to be ordered. Using the **technology** of bar codes makes supermarkets more efficient. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. A bar code is a pattern of black and white lines.
___ 2. A bar code might be printed on an item that you bought recently.
___ 3. Bar code technology is not used in supermarkets.
___ 4. Supermarket clerks count the number of purchases that a customer makes.
___ 5. Bar codes were invented to help customers save money.
___ 6. Computers automatically tell a customer the price of an item.
___ 7. The bar code for each product is unique.
___ 8. Bar code readers can identify customers by what they purchase.
___ 9. A bar code number consists of 12 digits.

READING SKILL Identifying Steps in a Sequence

LEARN

Articles often describe the steps necessary to complete an action. Sometimes these steps describe how a famous person was able to do something special. Sometimes these steps tell you how to build something. Sometimes these steps relate the progress of a historical event.

Often the order of the steps begins with words like *first, the first thing,* or *to begin with*. Sometimes the next steps are identified with words like *second, next, then,* or *after that*. The last step often begins with words like *finally* or *at last*. Sometimes the separate steps are not labeled.

APPLY

Work with a partner. Answer the questions below. Then follow the directions given.

1. In Paragraph 2 there is a description of the steps that checkout clerks had to take before bar codes were used. How many steps were there? ___

2. Paragraph 2 also describes the steps to check out customers after bar codes were used. How many steps are there? ___ How many of these steps are done by the checkout clerk? ___

3. Follow the directions to create a sample bar code digit.

   First, draw a square on a piece of paper. Make the square about one inch wide and one inch high. Next, draw six vertical lines inside the square. The lines should divide the square into seven equal spaces. Now you are ready to create a digital 9. After that, use a pencil to blacken in the first three spaces on the left. Then leave the fourth space white. Next, blacken in the fifth space. Finally, leave the last two spaces white. You have just created a digital 9.

   Number the six steps that are included in the directions.

REVIEW A SKILL **Identifying Time Signals** (See p. 84)

Work with a partner. Find the sentences below in Reading 1. Then answer the questions in your notebook.

1. *Look at the items you have purchased recently.*
   Which word tells you that the sentence is about the past?
2. *Before bar codes were invented, supermarket customers waited in long lines.*
   Which words tell you that the sentence is about the past?
3. *Now a clerk picks up an item and passes it over a scanner.*
   Which word tells you that the sentence is about present time?

Vocabulary Activities STEP I: Word Level

Technology refers to the equipment or scientific knowledge that is used in a particular industry.

Canning contributed to the growth of food ***technology****.*

Computer ***technology*** *has changed our lives.*

(See Oxford American Dictionary for learners of English, p. 750)

CORPUS

A. **Work with a partner. Write the name of each invention or event under the appropriate technology. Then take turns making sentences with the information.**

Space ***technology*** *made satellites orbiting Earth possible.*

brain surgery	laptop computers	~~satellites orbiting Earth~~
cell phones	moon landings	studies of the sun
heart transplants	preventing some diseases	the Internet

Space Technology	Medical Technology	Information Technology
satellites orbiting Earth		

Something is *unique* when it is the only one of its kind. A person is *unique* if he or she is not like anyone else. It can also mean "very unusual."

*Antarctica is **unique**. It is the only continent permanently covered with ice.*

*My family is **unique**. All five of my sisters are doctors.*

Unique can also mean that someone or something is connected with a single time or place.

*The kangaroo is **unique** to Australia.*

(See Oxford American Dictionary for learners of English, p. 795)

CORPUS

B. **Work with a partner. In each group below, decide which item is *unique*. Tell why it is unique. Take turns making sentences with the information.**

1. piano violin (radio) guitar trumpet drum

   *Why? Radio is **unique** because it is not a musical instrument.*

2. elephant zebra cow horse chicken sheep

   Why? _____

3. Brazil Italy Spain France Denmark Portugal

   Why? _____

4. Earth Jupiter Mars Sun Neptune Mercury

   Why? _____

5. beef bananas berries beans cheese bread

   Why? _____

To consist of something means "to be made up of two or more parts, substances, etc."

*The United States **consists of** 50 states.*

*Pasta **consists of** a mixture of flour and water.*

(See Oxford American Dictionary for learners of English, p. 154)

CORPUS

C. **Work with a partner. Match the item on the left with what it *consists of*. Then take turns making sentences with the information.**

1. a soccer team	___ a. shops, restaurants, and other businesses
2. water	___ b. a crust, tomato sauce, and cheese
3. South America	___ c. two hydrogen atoms and one oxygen atom
4. the English alphabet	___ d. 12 independent nations
5. a shopping mall	___ e. 11 players
6. pizza	___ f. 26 letters

Vocabulary Activities STEP II: Sentence Level

The adjective *automatic* refers to a machine that can operate without human help. The adverb form is *automatically*.

*I stopped by the **automatic** teller machine at the bank to get some money.*

*The machine **automatically** counts out the amount you request.*

Automatic also means "to do something without thinking about it."

*Whenever the phone rings, my **automatic** reaction is to answer it.*

*I **automatically** answer the phone whenever it rings.*

Automatic also refers to a certain outcome as a result of an action.

*There is an **automatic** penalty if you hit another player.*

*You are **automatically** penalized if you hit another player.*

(See Oxford American Dictionary for learners of English, p. 45)

CORPUS

D. **Read the paragraph below. Then rewrite each of the eight underlined sentences in your notebook with *automatic* or *automatically*. Take turns reading all the sentences with a partner. The first one has been done for you.**

I went to a modern supermarket to buy food for my family. (1) As I approached the door, it opened for me. A young woman inside the market gave me a leaflet. (2) It said, "You will get a 10% discount if you spend over $100." (3) I took a leaflet without thinking about it. Then the manager greeted me with, "How are you today?" (4) Without thinking, I answered, "Fine, thanks." As I finished my shopping, I passed by a new kind of frozen food cabinet. (5) A light inside turned on whenever someone passed by. I got to the checkout counter. (6) The clerk said, "Please put your items on the scanning disc. It will turn without help." (7) As the disc went around, a scanner read the prices. The clerk said, "Your total is $100.01." (8) I got a 10% discount.

*1. As I approached the door, it **automatically** opened for me.*

To invent something means "to think of an idea or to make something for the first time." The noun form is *invention*.

*Thomas Edison **invented** the first practical electric light bulb.*

*This **invention** made Edison rich.*

Often this verb is used in the passive, especially when the inventor is unknown.

*The zipper **was invented** in 1893.*

*Writing **was invented** thousands of years ago.*

(See Oxford American Dictionary for learners of English, p. 387)

CORPUS

E. **Use the information in the chart below to write a sentence about each invention.**

Inventor	Invention	Date of Invention
1. Alexander Bell	telephone	
2. Ransom Olds	gasoline-powered car	1896
3. The Chinese	magnetic compass	2,000 years ago
4.	nylon	1935
5.	the Internet	1969

1. *Alexander Bell **invented** the telephone.*
2. _____
3. _____
4. _____
5. _____

F. Use the following words to complete this paragraph.

automatically	identify	items	produces	technology
consists of	invented	pattern	purchase	unique

Bar codes help supermarkets count the (1) _____ that customers (2) _____. Now animal scientists are using bar code (3) _____ in a new way. They are using it to help (4) _____ and count the zebras that live in the grasslands of Africa. The scientists know that the hair of zebras grows in a (5) _____ that 6) _____ black and white stripes. They also know that each zebra has a (7) _____ pattern of stripes. Scientists saw that these stripes look like bar codes. They (8) _____ a program called Stripe Spotter to read the zebras' stripes. The program uses photos of zebras. It changes the stripes electronically and (9) _____ a bar code for each zebra. These bar codes are (10) _____ stored in a computer. Scientists can follow the movements of wild zebras by comparing their stripes to the bar codes stored in the computer. This helps them study how zebras live.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Bar codes are very useful for businesses such as supermarkets. Can you think of any ways that bar codes could help people in their personal lives?
2. Why are bar codes printed only in black and white? Why aren't bar codes printed in other colors?
3. Have you ever used a smartphone? What are some of the things a smartphone can do?

Read

The information in this article is from a technology website.

2-D BAR CODES

In 1974, the first bar code was scanned. It was printed on a pack of chewing gum. It was a significant event. Almost immediately, UPC bar codes began to appear on hundreds of other **products**. Supermarkets and other large stores quickly installed machines to scan these bar codes. These machines were called *scanners*. They were linked to store computer systems.

UPC and other bar code formats are one-dimensional. That is, the information coded in the black and white **pattern** of lines can be read in only one direction. There is a beginning to the **pattern** and an end to the **pattern**. The information in the **pattern identifies** only the **product** and its manufacturer. After a while, companies wanted to find a way to include more information in the bar code.

A NEW KIND OF BAR CODE

This led to the **invention** of 2-D, or two-dimensional, bar codes in Japan. They were first used in the 1990s to track the **production** of automobiles. A 2-D bar code **consists** of shapes in both a vertical and a horizontal **pattern**. Like 1-D bar codes, 2-D bar codes are black and white. Each shape or combination of shapes provides information. This allows a 2-D bar code to hold over a hundred times more information than a 1-D bar code. Like 1-D bar codes, each 2-D bar code is **unique**. However, the complex **pattern** requires a powerful scanner to read and analyze the information. Modern smartphones and tablet computers can scan the bar codes and download the information.

A 2-D bar code

Companies have found this **technology** very useful for advertising and selling their products. For example, a sportswear company might place an advertisement in a popular magazine. The advertisement shows a picture of happy people skiing down a mountain. There is a 2-D bar code under the picture. A young man is looking through the magazine. First the picture catches his eye. Then he notices the 2-D bar code. He scans it with his smartphone. A short video **automatically** appears on the screen of the phone. The video shows people skiing. Then it shows many styles of ski clothes. He decides he needs a new ski jacket. He clicks a button on the phone and it links him to the company's website. Within minutes, he **purchases** a ski jacket online.

1-D bar codes	2-D barcodes
appeared in 1974	appeared in 1990
horizontal pattern	horizontal and vertical patterns
unique pattern	unique pattern
identifies a product	provides product information
printed on products	printed almost anywhere
read by scanning machines	read by smartphones/ computer tablets

USES FOR 2-D BAR CODES

Most 2-D bar codes appear in magazine or newspaper advertisements. When scanned, most provide information about **items** in the advertisement. However, 2-D bar codes can be put almost anywhere, and they can be used for more than advertising. Giant bar codes on highway billboards give directions to rest stops. Smaller ones on the backs of stadium seats can show a team's schedule of games. A hardware store might attach a 2-D bar code to the tools it sells. Customers who buy a tool can watch a video on their smartphone screens to learn how to use the tool. A 2-D bar code might appear on a FOR RENT sign placed in the window of an empty apartment. Scanning the bar code will give people information about the apartment, such as the monthly rental fee. Modern **technology** has provided us with an amazing tool. ■

Scanning a 2-D bar code with a cell phone

READING COMPREHENSION

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. A 2-D bar code consists of two digits.

___ 2. A 2-D bar code can provide information about a product you purchase.

___ 3. Each 2-D bar code consists of a unique pattern of black and white shapes.

___ 4. 2-D bar codes were invented in Japan to identify automobiles.

___ 5. Each item in a supermarket has a 2-D bar code printed on it.

___ 6. 2-D technology enables smartphone users to automatically access many kinds of information.

READING SKILL Identifying Steps in a Sequence

APPLY

1. Re-read paragraph 4. The paragraph describes how 2-D technology is useful in advertising and selling products. Number the steps that the young man takes to purchase a ski jacket in your notebook.
2. The last paragraph in Reading 2 tells that people advertise apartment rentals using 2-D bar codes. Imagine that a young man is looking for an apartment to rent. In your notebook, write the steps he might take to rent the apartment.

REVIEW A SKILL **Identifying Time Signals** (See p. 84)

The sentences below are taken from Reading 2. Answer the questions.

1. They were first used in the 1990s to track the production of automobiles.

   What part of the sentence tells you that this happened in the past?

   _____

2. Modern technology has provided us with an amazing tool.

   What word tells you that this is about the present time?

   _____

Vocabulary Activities STEP I: Word Level

To purchase something means "to buy something." It is a more formal word than *buy*.

*The company plans to **purchase** a new office building downtown.*

The noun form is also *purchase*. It can refer to the act of buying something. It can also refer to the item or items that you buy.

*The **purchase** of a new house takes time and money.*

*I put my **purchases** in my car and drove home from the market.*

(See Oxford American Dictionary for learners of English, p. 567)

CORPUS

A. **Work with a partner. You have just been shopping. Match each item with the store where you *purchased* it. Take turns making sentences with the information.**

1. a pair of slippers — 1 — a. a shoe store

   *I **purchased** a pair of slippers at a shoe store.*

2. a cake — ___ b. a pharmacy
3. a wrist watch — ___ c. a bakery
4. lunch — ___ d. a bookstore
5. some cough medicine — ___ e. a jewelry store
6. a dictionary — ___ f. a sidewalk café

With your partner, answer these questions about the purchases.

1. Which purchase was the most expensive?
2. Which purchase took the longest?
3. Which purchases were something to eat or drink?

An *item* is one thing in a group or list of things.

*The first **item** of business for this meeting is to welcome our new vice president.*

*I wrapped all of the breakable **items** in newspaper before packing them.*

An *item* also refers to a story in a newspaper.

*Did you read the **item** in today's paper about oil production?*

(See Oxford American Dictionary for learners of English, p. 390)

CORPUS

B. **Work with a partner. Take turns asking and answering questions about the *items* on the lists below. Follow the example.**

1. Shopping list	2. Hawaii vacation	3. Menu
5 pounds of beef	sun hat	glass of water
1 can of beans	airline ticket	fried chicken sandwich
1 apple	snow shoes	bread
4. Newspaper stories	**5. Homework**	**6. Jobs to do**
No Change in Weather	clean off desk	paint kitchen walls
Animals Found on Mars	choose topic for final report	sweep floor
No Soccer Games Today	study for tomorrow's test	wash dishes

1. Which item on the shopping list will be the most expensive?

   A: Five pounds of beef.

2. Which item on the vacation list should you leave at home?
3. Which item on the menu would you like to order for lunch?
4. Which item in the newspaper sounds the most interesting?
5. Which item on the homework list should you do first?
6. Which item on the jobs list will take the longest?

A *pattern* is a repeated arrangement of sounds, colors, or shapes.

*The walls were covered with a beautiful **pattern** of red, gray, and black bricks.*

A *pattern* can also refer to the regular customary way something is done.

*Each language has a specific set of sentence **patterns**.*

*By the age of 50, Jan had fallen into a **pattern** of bad habits.*

*The police noticed a **pattern** to the bank robberies.*

A *pattern* is also a shape or design for making something.

*Sheila followed a **pattern** to cut material for a blouse she was sewing.*

(See Oxford American Dictionary for learners of English, p. 512)

CORPUS

C. **Work with a partner. Take turns reading the four numbered patterns below. Put the number of the pattern by the best description below.**

1. left foot, right foot,
   left foot, right foot

2. green stripe, white stripe,
   green stripe, white stripe

3. Twinkle, twinkle little star,
   How I wonder what you are.
   Up above the world so high,
   Like a diamond in the sky.

4. get up, eat breakfast, brush teeth,
   take a shower, get dressed,
   drive to work, come home,
   eat dinner, watch TV, go to bed.

___ a street pattern

___ a daily pattern

___ a walking pattern

___ a color pattern

___ a musical pattern

___ a rhyming pattern

Vocabulary Activities STEP II: Sentence Level

To identify someone or something means "to be able to tell what or who something or someone is."

*My friend **identified** the insect in my kitchen. He said it was a cricket.*

*The police **identified** the robber from his fingerprints.*

The noun form is *identification*. It refers to the process of showing or seeing who someone is or what something is.

*All workers had to have an **identification** photo.*

*Each year our club helps with the **identification** of wild birds as they fly south.*

(See Oxford American Dictionary for learners of English, p. 359)

CORPUS

D. Complete the paragraph below with *identify* or *identification*.

When you travel by plane, be sure you can (1) _____ your suitcases. Before leaving home, attach an (2) _____ tag to each suitcase. It should show your name, address, and phone number. If a suitcase gets lost, the tag will (3) _____ you as the owner. The tag will also help you (4) _____ your luggage at your destination. Sometimes these tags fall off, so also put (5) _____ information *inside* each suitcase. Then the airline can contact you if a suitcase *and* its tag get lost. When you arrive at the check-in counter the agent will ask to see a photo (6) _____. A passport or driver's license can be used to (7) _____ yourself.

The verb *to produce* something means "to make something or grow something." The noun form is *production*.

*Brazil **produces** over one-third of the world's coffee.*

*Brazil is known for its **production** of coffee.*

To produce something also means "to show something to another person, or to cause something to happen."

*I had **to produce** my passport to prove who I was.*

The noun *product* refers to something that is made or occurs in nature.

*The company's best-selling **product** is its chocolate candy.*

(See Oxford American Dictionary for learners of English, p. 557)

CORPUS

E. Complete this paragraph by using a form of *produce* in each blank space.

Coffee is the most popular drink in the world. About seven million metric tons of coffee is (1) _____ in the world each year. After petroleum, coffee is the most common (2) _____ in international trade. Brazil (3) _____ about one-third of the world's coffee. The (4) _____ of coffee begins with small bushes that (5) _____ coffee berries. Inside is a small coffee bean. The beans are roasted. They are sold to different coffee companies. Then these coffee (6) _____ are shipped to markets. Customers buy the coffee and make it at home. The finished coffee will (7) _____ a wonderful smell and a delicious drink.

F. Use the following words to complete this paragraph.

automatically	identify	item	produces	technology
consist of	invention	patterns	purchase	unique

Each (1) _____ that you (2) _____ in a supermarket can be identified by a unique bar code. Similarly, each person has a (3) _____ set of fingerprints that can (4) _____ him or her. Fingerprints are small (5) _____ on the tips of a person's fingers that (6) _____ tiny lines. When a person touches a hard surface, such as glass, he (7) _____ a copy of his fingerprints on the surface. Fingerprint identification is used in many ways. For instance, police departments use fingerprints to identify a person who might have committed a crime. Also, some companies use fingerprints to identify their workers. To enter a special area, a worker presses her thumb onto a scanner. The scanner reads her fingerprint into the company computer. If her fingerprint matches a print in the computer file, the door (8) _____ opens. The (9) _____ of fingerprinting has been in use for about a hundred years. However, the (10) _____ of computers has made comparing fingerprints fast and easy.

Writing and Discussion Topics

Discuss the following topic in small groups.

The last paragraph of Reading 2 describes several ways that 2-D bar codes can be used to provide information. What are some other places where these bar codes could be placed? What kind of information could they have in them?

Choose one of the following topics. Write six to eight sentences about the topic. Use some of the target vocabulary words from this unit.

1. Some supermarkets use a self-checkout system. There is no checkout clerk to scan the items. Instead, customers scan their own purchases and put them in bags. Then the customers pay by inserting a credit card into a machine. What are some of the good things about this system? What are some problems that could happen?
2. In the future, bar codes might be used in many new ways. Describe how bar codes could be used in hospitals or restaurants (or in another kind of business) in the future.

UNIT 8

Stealing from All of Us

In this unit, you will

- read about the theft of works of art from a museum.
- read about a famous art thief.
- review identifying steps in a sequence.
- increase your understanding of target vocabulary words.

READING SKILL Using a Dictionary

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
circumstance						
collection						
commit						
display						
AWL evidence						
initial						
AWL issue						
remove						
secure						
steal						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about art theft? Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Do you ever visit museums? What kinds of things do you like to look at?
2. If someone offered to sell you a famous painting for $100, would you buy it?
3. Why are some works of art worth millions of dollars?

Read

The information in this article is from a newspaper report on art theft.

Museum Theft

People enjoy visiting museums to see **displays** of wonderful paintings and sculptures. They also enjoy seeing ancient artifacts such as pottery and tools. These works of art are a rich source of information about past civilizations. They teach us about the culture that all humans share. In this way, the works of art belong to all of us. Museums help preserve human history by **collecting** works of art. Museums **display** these items so visitors can see them and learn from them. Sometimes valuable works of art or ancient artifacts are **stolen** from museum **collections**. This means the thief is **stealing** a piece of our history and culture. The thief is **stealing** from all of us.

THE VALUE OF MUSEUM ITEMS

Most items in a museum **collection** are valuable because they are unique. A small painting or ancient weapon can be worth millions of dollars. Therefore, museums try to prevent thefts. They use **security** guards and cameras to watch museum visitors. They **secure** paintings to the walls with strong wires that cannot be easily cut.

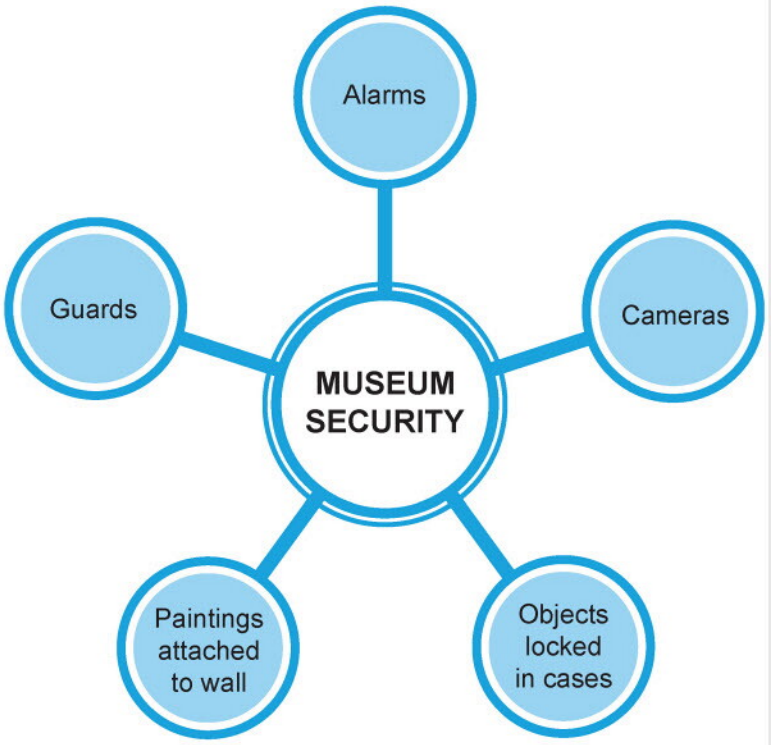
Museums display valuable artifacts.

They lock valuable objects in **display** cases. They use an alarm system that rings if someone **removes** a painting. If a visitor is caught **stealing**, police are called to arrest the thief.

STEALING ART

Art thieves know that paintings and ancient artifacts are worth millions of dollars. They see the museum as a source of valuable objects to **steal** and sell. Art thieves know that large museums have good **security** systems. Under those **circumstances**, they may not try to **steal** from large museums. They also know that small museums do not have many guards. They often do not have **security** cameras or alarms. Art thieves believe they can easily **steal** something from a small museum without being seen. They also know that a painting or small artifact is easy to hide. A painting can be **removed** from its frame and hidden under a coat. An ancient bowl can be lifted from a **display** and put into a pocket.

A museum security guard



Museums try to protect art in many ways.

SELLING STOLEN ART

Stealing a painting or small object may be easy **initially**. Selling it later is not easy. If a theft is **committed**, the museum **issues** a report to local police. The museum also **issues** a warning to nearby art dealers. It tells them to watch for the **stolen** object. However, thieves usually do not try to sell the **stolen** art right away. Depending on the **circumstances**, they might wait several years. They hope that art dealers will forget reports about the **stolen** art. However, if an art work is very famous, dealers will still recognize it. They will call the police. Often the thieves carry **stolen** art to another country. There they might pretend to be art dealers who buy and sell works of art. **Initially**, they might try to sell the **stolen** item to a small museum or to a person who **collects** art. They may finally have to sell an item worth millions for just a few hundred dollars.

LOOKING FOR THE ART

Meanwhile, the police try to identify the thieves. They check the museum for **evidence,** such as fingerprints or a camera photograph. Without **evidence,** the police do not know who **committed** the theft. To find the thieves, the police try to find the **stolen** art. However, most searches are not successful. Most **stolen** art works are never found. With each theft, we all lose a valuable piece of our history. Art theft is a crime that is **committed** against all of us. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. Museum displays include paintings and ancient artifacts.

___ 2. Most items in a museum collection are unique.

___ 3. Security guards steal works of art from museums.

___ 4. A thief could remove a painting from the wall and easily sell it.

___ 5. When a painting has been stolen, police look for evidence that will identify the thief.

___ 6. Museums issue a report to police when a theft is committed.

___ 7. In most circumstances of art theft, the police do not find the stolen art.

___ 8. Initially, stealing a work of art seems easy.

READING SKILL Using a Dictionary

LEARN

A dictionary can help you learn the meanings of unfamiliar words you read. Learning these new words can improve your understanding of what you read. It will also help increase your vocabulary.

After you find an unfamiliar word in a dictionary, decide which of its definitions fits the idea you were reading. For example, a word you may not know is *artifact*, which appears in the first paragraph of Reading 1.

> *They also enjoy seeing ancient* ***artifacts*** *such as pottery and tools.*

The writer includes two examples of this word (*pottery* and *tools*). The *Oxford American Dictionary for learners of English* gives this definition of *artifact* on page 38:

> *an object that is made by a person, especially something of historical or cultural interest*

Now you know that artifacts are objects that were made by people in the past. You know what *tools* are, but what is *pottery?* The *Oxford American Dictionary for learners of English* gives these definitions of *pottery* on page 544:

> *1. pots, dishes, etc. that are made from baked soft earth (clay)*
> *2. The activity or skill of making dishes, etc. from clay.*

Which meaning describes something in a museum? An activity or skill is not an object. Therefore, museum displays must include objects such as pots and dishes made of clay.

APPLY

Work with a partner. The following sentences are from Reading 1. Look up the bold word in a dictionary. Then follow the directions after each sentence.

1. A small painting or ancient **weapon** can be worth millions of dollars.

   Circle the ancient weapons that might be in a museum.

spear	horse	knife	sword
basket	hat	blanket	gun

2. The museum also tells nearby art **dealers** to watch for the missing painting or object.

   Circle the activities that dealers take part in.

buying	hiding	stealing	selling
advertising	creating	collecting	copying

3. People enjoy visiting museums to see displays of paintings and **sculptures**.

   Circle the materials that a museum sculpture could be made of.

clay	rain	cows	wood
steel	happiness	stone	clouds

Vocabulary Activities STEP I: Word Level

A *circumstance* refers to the fact and condition that is related to a certain situation. The plural form, *circumstances*, is commonly used.

*He could not explain the **circumstances** of his business partner's disappearance.*

*In such a **circumstance**, the police suspect a crime has occurred.*

Under the circumstances is a common expression. It means "considering certain facts before taking action or making a suggestion."

*You look ill. **Under the circumstances,** I think you should stay home.*

Under any/no circumstances is another common expression. It is a strong suggestion to take no action.

*Your car is making odd noises. You should not drive it **under any circumstances**.*

*Your car is making odd noises. **Under no circumstances** should you drive it.*

(See Oxford American Dictionary for learners of English, p. 125)

CORPUS

A. **Work with a partner. Match the person's comment on the left with the advice you might give. Take turns making sentences with the information.**

1. I feel sick. — 1 — a. you should stay home.

   Under the circumstances, *you should stay home.*

2. My term report is due next week. — ___ — b. you should not be buying concert tickets.
3. My shoes have holes in them. — ___ — c. you should buy some new ones.
4. My mother is coming tomorrow. — ___ — d. you should start working on it.
5. I have no money. — ___ — e. you should clean your apartment.

To collect things means "to gather things together for a particular purpose."

*I **collected** newspaper articles about the wedding and sent them to my sister.*

*Trucks **collect** our trash every Tuesday.*

When things *collect*, they come together in one place.

*Dust **collects** on my book shelves.*

*Neighborhood cats **collect** by my window and howl all night.*

To collect something means "to save items of the same type as a hobby." The noun form is *collection*.

*Anton **collects** foreign coins.*

*He has about 200 coins in his **collection**.*

A *collection* can also refer to a group of similar items that belong to an artist, a museum, an author, etc.

*The book includes a **collection** of poems by Walt Whitman.*

(See Oxford American Dictionary for learners of English, p. 136)

CORPUS

B. **Work with a partner. Match the people below with the item they purchased to add to their *collection*. Take turns making sentences with the information.**

*Katya bought an old dictionary to add to her **collection** of books.*

1. Lin bought a silk painting — ___ — a. pottery
2. Boris bought a U.S. silver dollar — ___ — b. weapons
3. Aisha bought an old violin — ___ — c. animal sculptures
4. Luis bought a stone elephant — ___ — d. Chinese art
5. Erin bought a Greek bowl — ___ — e. musical instruments
6. Yoko bought an ancient knife — ___ — f. coins

The verb *to issue* means "to give something to a person or to the public." It is generally used to describe the action of a person in authority.

*The policeman **issued** a ticket to a car that was parked illegally.*

*Our office manager **issued** a warning about a possible computer problem.*

The noun form is also *issue*. It refers to a problem or a topic of concern.

*Schools are concerned about the **issue** of cheating.*

The noun *issue* also means a single printing of an ongoing publication.

*Have you read today's **issue** of the* Times?

(See Oxford American Dictionary for learners of English, p. 389)

CORPUS

C. **Work with a partner. Imagine a valuable painting was stolen from a museum. The museum director has called a staff meeting. Write an I in front of the *issues* she will probably discuss. Take turns making sentences with the information.**

*One **issue** of concern is how the thief entered the museum.*

___ how the thief entered the museum
___ installing new theft alarms
___ when to give painting lessons
___ colors in the Matisse painting
___ how paintings are secured to walls
___ changes in the weather
___ hiring more guards
___ how to improve security
___ the beauty of ancient art
___ why security cameras were off

Vocabulary Activities STEP II: Sentence Level

The noun *theft* and the verb *steal* are related in meaning. *Theft* is the action of secretly taking something from another person or place without permission. The verb *to steal* something is to secretly take something from another person or place without permission. A person who steals something is a *thief*. The plural is *thieves*.

*Every year, there are many **thefts** from supermarkets.*

*Last year **thieves stole** over ten million items from supermarkets.*

*The **stolen** items are often small, like bottles of shampoo.*

(See Oxford American Dictionary for learners of English, p. 712 and p. 756)

CORPUS

D. Rewrite these sentences in your notebook with the given form of *steal*.

1. The theft of cars is a serious problem, especially in big cities. (stealing)
2. Car thieves look for unlocked cars to take. (steal)
3. It is easy to take an unlocked car. (steal)
4. Car thieves remove radios and other equipment from cars they have taken. (stolen)
5. They sell the taken equipment. (stolen)
6. One car thief took 40 cars before being caught by police. (stole)

The adjective *initial* refers to the beginning or first part of something. The adverb form is *initially*.

*My **initial** impression of the art display was disappointment.*

*I was **initially** disappointed in the art display.*

The noun *initial* or *initials* refers to the first letters of a person's full name or first letters of a name.

*The United States is commonly known by its **initials** U.S.*

*Artists often paint their **initials** in the corner of a picture.*

The noun *initiative* refers to the ability to recognize a need and to take action to fill the need. It is frequently used in the phrase *to take the initiative*.

*No one moved when the teacher fell. Then Eli **took the initiative** and helped her.*

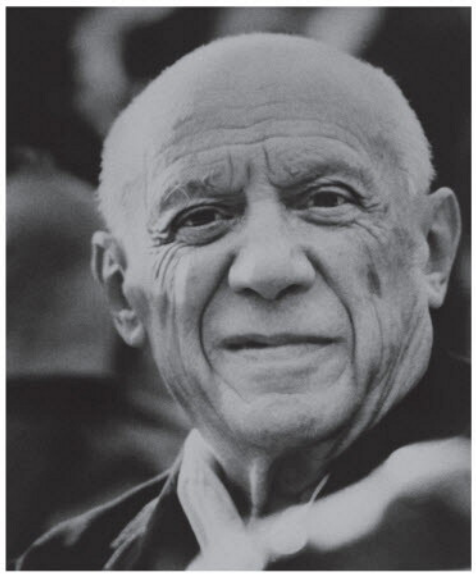
*Sher will never be a successful businessman. He has no **initiative**.*

(See Oxford American Dictionary for learners of English, pp. 375–376)

CORPUS

E. Complete this paragraph by using *initial, initially,* or *initiative* in each blank.

Pablo Picasso was a famous painter. He was born in 1881 in Spain. Even as a young child, he was a gifted artist. (1) _____ his art was realistic in style. In 1900 he made his (2) _____ visit to Paris, the center of art in Europe. By the (3) _____ years of the 20th century, his style had become more abstract. He was one of the (4) _____ artists to paint in the cubist style. Soon after arriving in Paris, he had the (5) _____ to begin an art magazine. The (6) _____ issue was printed in 1901. Picasso lived to be 92 years old. In his lifetime he produced many beautiful works of art.



Pablo Picasso

Evidence refers to signs, objects, or other items that prove a certain event took place. The word is often used in connection with crimes.

*The police looked for **evidence** that someone had entered the house.*

The adjective *evident* describes something that is clear or easily seen. It is often used in the phrase "It is evident that…" or "It was evident that…"

*It was **evident** that you didn't enjoy the concert. You kept yawning.*

*She was in **evident** pain after the surgery.*

(See Oxford American Dictionary for learners of English, p. 249)

CORPUS

F. **Rewrite the sentences to include *evidence* or *evident*.**

Mr. Ahmada had paid a lot of money for the paintings in his collection. Then he wanted to sell some of his Picassos. He called an art dealer to help him.

1. The art dealer looked for proof that the paintings were real Picassos.
2. It was clear to the dealer that the paintings were worthless.
3. There was no proof that the paintings were painted by Picasso.
4. It was easy to see that Mr. Ahmada had been tricked.
5. Mr. Ahmada's surprise was clear to see.
6. Finally the art dealer found proof that the paintings were fake. He found a price tag from a local store on the back of the paintings.

G. **Use the following words to complete this paragraph.**

circumstances	committed	evidence	issued	secure
collections	display	initially	removed	stolen

Humans have been creating art since ancient times. Some of these paintings, sculptures, and artifacts exist today in museum (1) _____. Museums are (2) _____ to protecting works of art for people to enjoy. However, over the centuries, many works of art have been lost. No one knows the exact (3) _____ in which some of them disappeared. Some of the lost artworks were probably (4) _____ by thieves. Some of them were probably lost in fires, floods, and earthquakes. Others were probably lost during wars when museums (5) _____ orders to hide valuable artworks. As a result, many artworks were (6) _____ from public (7) _____ and put in (8) _____ locations to protect them. But when the wars ended, there was no (9) _____ of some of the artworks. Museums (10) _____ believed these missing artworks were lost forever. But later, people found some of the missing art in old houses.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Do you collect anything as a hobby, such as stamps or coins?
2. Why do people enjoy having collections?
3. If a friend or a relative asked you to help commit a crime, would you help?

Read

The information in this online article is based on a true story.

A BOLD THIEF

Police can solve many crimes by using science. For instance, they might find **evidence** such as fingerprints where the crime happened. If the fingerprints match prints in a computer file, the police can identify the criminal. The police can also look at pictures made by **security** cameras. The pictures might show who **committed** the crime. But sometimes there is no **evidence** to help the police solve the crime. This happened in one of the biggest art crimes of all time.

Stéphane Breitwieser

Stéphane Breitwieser loved art. He loved art so much that he **stole** valuable pieces of art while he was traveling in Europe. However, Breitwieser did not want to sell the **stolen** art for money. He wanted to add the items to his **collection**.

HOW IT STARTED

His **initial** theft was in 1995. He was 24 years old. He and a friend were visiting an ancient castle in Germany when he saw a beautiful painting. He wanted it. While his friend watched for **security** guards, Breitwieser **removed** the painting from the frame. He hid the painting inside his jacket and left the castle. Four months later, he **stole** an ancient weapon from a small museum.

He decided to keep his **collection** of art at his mother's house in France. Over the next six years, Breitwieser **committed** his life to increasing his **collection**. But he did not **steal** from large museums. Most of them had complex **security** systems that were able to notice thefts. Instead, he went to small museums and **displays** that had few visitors. Such places were not likely to have cameras

taking pictures of visitors. They were not likely to have many **security** guards.

In 2001, he was seen **stealing** a 500-year-old musical instrument in Switzerland. A **security** guard saw Breitwieser run from the museum with it. Two days later Breitwieser returned to the same museum. The same guard saw Breitwieser. He called the police and Breitwieser was arrested.

Soon Breitwieser's mother heard of the arrest. Her **initial** reaction was to help her son. To help him, she destroyed many of the artworks in his **collection**. She cut up some paintings and put them into her kitchen garbage disposal. She chopped up other paintings and threw the pieces into a garbage can. A city garbage man emptied the garbage can the next day. She tossed objects such as weapons and sculptures into a nearby river. When the police came to search her house, they could not find any **evidence** of the missing art works.

A city garbage man emptied the garbage can the next day.

Police found some of the missing artwork in the river.

HOW IT ENDED

Breitwieser **stole** 239 art works from over 170 museums and **displays**. Together the artworks were worth about $1.4 billion. However, police had no **evidence** that he **stole** any of them. The **stolen** art was not at his house, and it was not at his mother's house. Under the **circumstances**, they could not arrest him. A few months later, some of the missing art objects were found near the river where Breitwieser's mother had tossed them. When the police searched the water, they found almost 100 more.

The police **issued** an order for Breitwieser's arrest. He confessed that he had **committed** the thefts. He faced trial in a court of law and was sent to prison for three years. His mother and his friend were also sent to prison. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. Breitwieser was 24 years old when he committed his initial theft.

___ 2. Breitwieser created his collection of valuable art by stealing from small museums and displays.

___ 3. A security guard issued an order for his arrest.

___ 4. Breitwieser's mother removed the stolen art from her house and hid it in a secure place.

___ 5. At first, the police had no evidence that Breitwieser stole the art. Under those circumstances, they could not arrest him.

___ 6. Over 100 stolen pieces of art were found in the river.

READING SKILL Using a Dictionary

APPLY

Using a dictionary to find a meaning sometimes requires some detective work. Here is an example of the kind of thinking you might have to do. An important part of the story in Reading 2 appears in the sentences below.

> *She cut up some paintings and put them into her kitchen garbage disposal. She chopped up other paintings and threw the pieces into a garbage can. A city garbage man emptied the garbage can the next day.*

Look up the underlined phrases. Which word below describes what each one is? Write the answers.

a tool	a machine	a worker	a building
a system	a container	a technique	

A garbage disposal is _____.

A garbage can is _____.

A garbage man is _____.

Now look up the word *garbage*. Underline the items that you would usually put in a garbage disposal. Circle the items that you would usually put in a garbage can.

rotten meat	a bent spoon	an old tomato	a cheese wrapper
apple skins	a broken egg	orange seeds	a used tissue
a broken dish	an empty milk carton		

REVIEW A SKILL **Identifying Steps in a Sequence** (See p. 100)

Number these sentences from 1–7 in the order the actions happened.

___ Breitwieser returned to the museum two days later.

___ The guard called the police.

___ Breitwieser stole a 500-year-old musical instrument.

___ Breitwieser was arrested.

___ The same guard saw Breitwieser.

___ A security guard saw Breitwieser run from the museum with it.

___ Breitwieser visited a museum in Switzerland.

Vocabulary Activities STEP I: Word Level

To display something means "to show something." It is often used when referring to museums and to art.

*The museum will be **displaying** a collection of ancient pottery next month.*

To display something can also be used to describe the feelings of a person.

*Benito **displayed** great surprise when he heard he had won the prize.*

A *display* is an arrangement of related items for the public to see. *On display* means that items are available for people to see.

*I went to the **display** of modern art. Many of Picasso's early works were **on display**.*

(See Oxford American Dictionary for learners of English, p. 210)

CORPUS

A. **Work with a partner. Use a form of *display* to complete these advertising posters.**

Ancient Pottery _____

Moscow Museum

_____ from June 10th through 20th

4th floor _____ room.

Giant _____ of Student Art!

The Art Club will be

_____ student work.

Campus Art Gallery

Tomorrow and Friday

All art _____ will be for sale.

To remove someone means "to take someone away." The noun form is *removal*.

*I'm going to **remove** my child from this math class. The work is too hard for her.*

*Her **removal** will make things easier for her and the teacher.*

To remove something means "to take something off (such as clothing)" or "to take something away."

*After you **remove** your coat, please hang it in the closet.*

*A doctor **removed** a fish bone that was stuck in my throat.*

(See Oxford American Dictionary for learners of English, p. 597)

CORPUS

B. **Work with a partner. Match the person or business on the left with what was *removed* and where it was *removed* from. Take turns making sentences with the information. Follow the example.**

*The customer **removed** some money from his pocket.*

1. A nurse	___ old magazines	___ from our table.
2. A waiter	___ dead leaves	___ from the shelf.
3. The laundry	___ a ring	___ from my arm.
4. The librarian	___ the bandages	___ from the display case.
5. My gardener	___ a coffee stain	___ from under the trees.
6. The jeweler	___ the dishes	___ from my sweater.

Vocabulary Activities STEP II: Sentence Level

The verb *commit* is most often used in connection with crime. In fact, *commit* is a common verb to talk about doing something illegal.

*You will be put in prison for life if you **commit** murder.*

*The court found him guilty of **committing** the bank robbery.*

If a man kills himself, he is said *to commit* suicide.

The verb *commit* can mean to send someone to prison or to a hospital.

*The thief was **committed** to prison for three years.*

Another meaning of the verb *commit* is to give money, time, or attention to something for a particular purpose. The noun form is *commitment*. It is used most often with *make/made*. *To* is used before the named action or item.

*I will **commit** the whole weekend **to** painting the kitchen.*

*I **made** a **commitment to** spend the whole weekend painting the kitchen.*

(See Oxford American Dictionary for learners of English, p. 141)

CORPUS

C. **Rewrite the numbered sentences in your notebook with a form of *commit*.**

Vincent van Gogh was a Dutch painter who lived from 1853 to 1890. He produced over 2,100 works of beautiful art in his lifetime.

1. As a child, Vincent spent many hours drawing and painting.
2. When he grew up, he made the decision to give his life to art.
   At first he was unable to earn much money. He suffered from terrible sadness.
3. His brother Theo gave both money and emotional support to help Vincent.
4. In 1889 he went to a hospital for help with his mental problems.
   He felt better for a while. Then, about a year later, Vincent was shot.
5. At the time, people believed that he killed himself.
   Recent evidence suggests that someone else probably shot him.
6. However, this person did not murder him.
   The shooting was accidental.

When something is *secure*, it is safe from being lost or being harmed. When a person feels *secure*, he or she feels safe from harm or danger.

*Your jewelry is **secure** now. I've locked it in a wall cabinet.*

*The thunder and lightning is awful. But I feel **secure** inside our house.*

To secure something means "to fasten something so it is not likely to move or fall."

*I'll use this rope **to secure** my boat to the tree.*

To secure something also means "to get something after much effort."

*I was able **to secure** two tickets to the championship game.*

The noun *security* refers to feeling safe from worry.

*Children like the **security** of having a daily routine.*

The noun *security* also refers to the steps that a family, a company, a country, etc. can take to prevent danger or to protect themselves if danger occurs.

***Security** guards at the bank watch for signs of a robbery.*

*Airport **security** has become very strict recently.*

(See Oxford American Dictionary for learners of English, p. 643)

CORPUS

D. **Complete this paragraph with *secure* or *security*.**

Credit card theft is a serious problem. The thief wants your credit card so he or she can spend your money. There are many ways a thief can (1) _____ your credit card or the card number. For example, the thief can look through your garbage cans for papers with your credit card number on them. Keep this information (2) _____ by shredding important papers before throwing them away. The thief can also steal your wallet and credit card from your pocket. You can (3) _____ your wallet inside your pocket by wrapping a rubber band around it. Then it will not easily slip out of your pocket. He can also steal a new credit card from your mailbox. You can put a (4) _____ lock on your mailbox to prevent this. To (5) _____ your house from thieves, install a (6) _____ alarm. You will feel (7) _____ when you are asleep or away from home.

E. Use the following words to complete this paragraph.

circumstances	commit	displays	secure	issue
collectors	evidence	remove	stolen	initial

Works of art by famous artists are valuable. Over time, some of these works disappear. Some were (1) _____ from (2) _____ by art thieves. Some were purchased by art (3) _____ who perhaps stored them in a (4) _____ spot but then suddenly died. Under the (5) _____, the art was never found. Occasionally we hear about a lost painting that has been found. This happened with a famous painting by Leonardo da Vinci. It was recently found hanging in a dark corner of a school in Ireland. The school thought it was a copy. Art experts were called to decide the (6) _____ of whether the painting was real. Art experts usually have to (7) _____ many hours to learn if a painting is real or a copy. They have to find evidence that will help them decide. Their (8) _____ step is to (9) _____ dirt from the painting. Then they look for evidence of the painting's age. They analyze the paint to see if it has modern chemicals that were not available 500 years ago. Sometimes the experts find (10) _____ that proves a painting is not a copy. This happened with the da Vinci painting. Experts found fingerprints in the paint. The fingerprints matched fingerprints found in other da Vinci paintings. Then they knew the painting was real.

Writing and Discussion Topics

Discuss the following topic in small groups.

What makes a painting valuable? Why are people willing to spend millions of dollars to buy a painting?

Choose one of the following topics. Write six to eight sentences about the topic. Use some of the target vocabulary words from this unit.

1. Why does the author of Reading 1 say that a thief who steals art is stealing from us all?
2. People think of a valuable painting as one that costs a lot of money. Is it possible for a painting to be valuable in other ways?
3. Have you ever visited an art exhibit? Describe the kinds of paintings that you liked. Describe the kinds of paintings that you did not like. Can you explain why you liked some and not others?

UNIT 9

Farms of Tomorrow

In this unit, you will

- read about new ways of growing plants.
- learn about how hydroponics could increase our food supply.
- review using a dictionary.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Contrast Signals

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
absorb						
achieve						
AWL benefit						
maintain						
AWL principle						
regulation						
AWL require						
strategy						
AWL theory						
transport						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about hydroponics? Watch the video on the student website to find out more.

Before You Read

In small groups or with your the class, discuss the following questions.

1. Have you ever visited a farm? What was growing? What kinds of equipment were used?
2. Have you ever tried to grow something at home? What did you grow? Were you successful?
3. What do plants need in order to grow?

Read

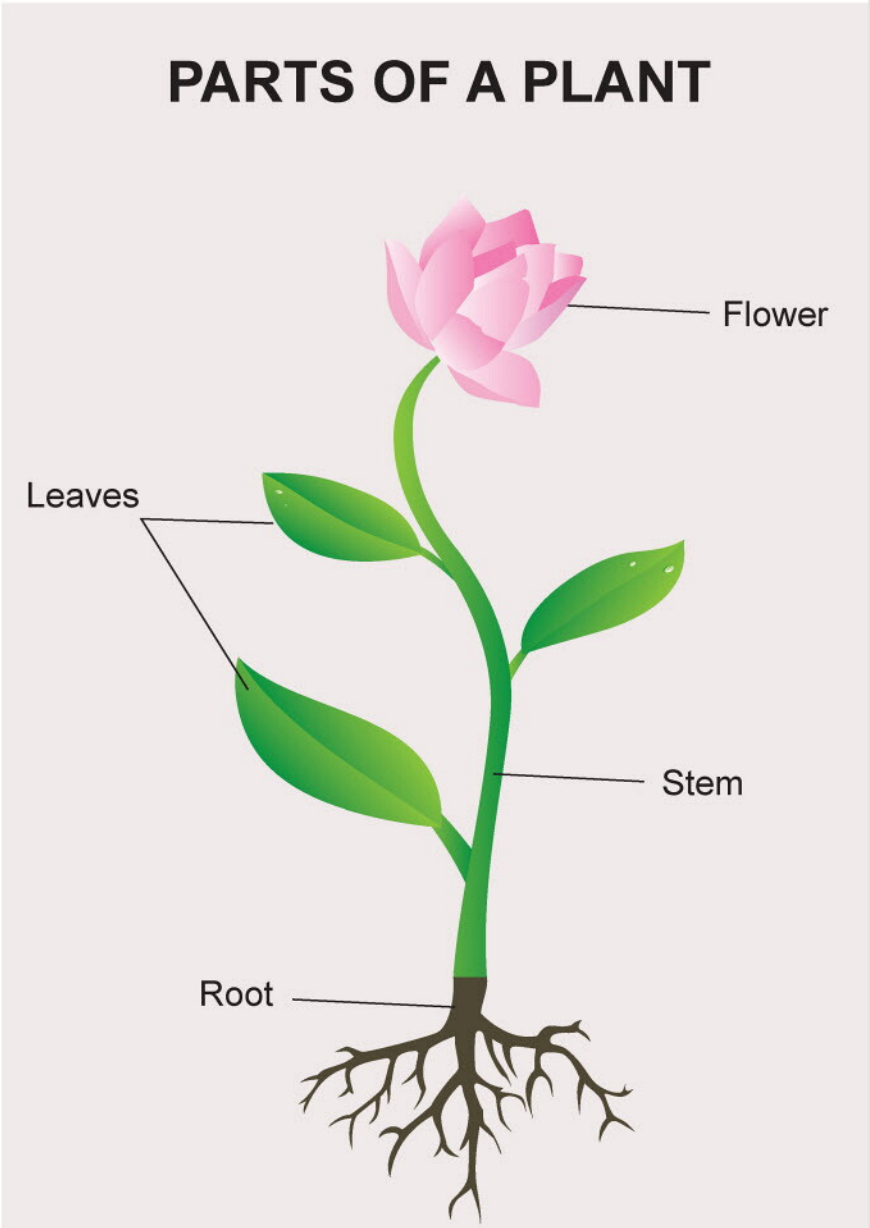
The information in this article is from a science book.

Hydroponics

Hydroponics is a way of growing plants without soil. Instead, the plants grow in water. The **principle** is simple. The water is mixed with nutrients—vitamins and minerals—that plants **require** in order to grow. The roots of the plants grow in the water mixture and **absorb** the nutrients. Hydroponics is one **strategy** to help provide food to the billions of people on our planet.

WHAT PLANTS NEED TO GROW:

Plants naturally grow in soil. The soil holds the water and the nutrients that plants need. The soil surrounding the plant roots helps the plants **maintain** a vertical growth pattern. Plants naturally grow upwards toward the sun. If plants cannot grow straight up, they receive less **benefit** from the sunlight. However, soil is not **required** for plants to grow. Soil is not **required** if the plants can get water and nutrients another way. Soil is not



needed if another method is used to **maintain** a plant's vertical growth pattern. A hydroponic system provides water and nutrients to plants. It provides a way for plants to grow straight up.

HYDROPONIC SYSTEMS:

There are many different kinds of hydroponic systems. The kind of system used depends on several factors. One factor is the kind of plant that will be grown. Nearly any plant can be grown in a hydroponic system, but the methods will vary according to the type of plant and its size. Another factor is how many plants will be grown. Some people use hydroponics to grow a few vegetables in their own garden. They want to grow just enough to supply their families with fresh tomatoes and carrots, for example. In contrast, a commercial farm might use a hydroponic system to grow thousands of tomatoes and carrots that will eventually be **transported** to nearby markets and sold.

A commercial hydroponic farm

Commercial farms usually set up a hydroponic system in a greenhouse—a building made of glass or heavy, clear plastic. The greenhouse will protect the plants from insects, rain, and too much heat from the sun. Long rows of tables fill the greenhouse. Each long table has a water pipe down its center that will deliver a nutrient mixture to the plants. Large plastic trays are lined up on the tables. Each tray has a cover that has rows of holes cut out. A tiny carrot plant grows from each hole. The hole helps keep the plant vertical. Each tray is connected to the water pipe and to a drain. An automatic timer **regulates** the watering schedule. Several times a day, the roots of the plants are sprayed with a nutrient mixture from the water pipe. The extra water drains out of the tray and back into the water pipe. The carrot plants have everything they need to grow: water, nutrients, and sunlight. When the carrots **achieve** the right size, they will be removed, packaged, **transported**, and sold.

Inside a greenhouse

The environment inside a greenhouse can be changed according to local conditions. For example, in areas that have few daylight hours or many cloudy days, farmers can add a lighting system to provide the light that plants need to grow.

The **theory** of hydroponics is not new. A book written in 1699 described experiments to grow plants without soil. In one description, the author **maintained** that plants grown in dirty water grew better than plants in pure water. Today we recognize that the "dirty water" probably contained nutrients that helped the plants grow. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 1.

___ 1. The principle of hydroponics is simple: plants absorb nutrients from a water mixture instead of from soil.

___ 2. Hydroponics may become a necessary strategy to help feed the billions of farmers in the world.

___ 3. Plants need to maintain a vertical growth pattern in order to benefit from sunlight.

___ 4. Early theories of hydroponics required that plants grow in dirty water.

___ 5. An automatic timer regulates the schedule when vegetables are transported to nearby markets.

___ 6. Commercial farmers can achieve success with hydroponics if they heat the nutrient mixture.

READING SKILL Identifying Contrast Signals

LEARN

Writers sometimes give information and then try to show a contrasting (opposite) aspect of that information.

The apples were red and juicy, but they were sour.

Tomatoes are easy to grow; however, they attract insects.

Strawberries are best in the spring. In contrast, blueberries are best in the fall.

Words and phrases that signal a contrast include *however, instead, but, although, in contrast,* and *on the other hand*.

APPLY

The following sentences are from Reading 1. Underline the contrast signal in each sentence. Then answer the question in a few words. Check Reading 1 again for answers.

1. Instead, the plants grow in water.

   What information is this being contrasted with? _____

2. However, soil is not required for plants to grow.

   What information is this being contrasted with? _____

3. What two contrast signals appear in Paragraph 3?

   _____ _____

REVIEW A SKILL **Using a Dictionary** (See p. 116)

1. Look up the adjective *commercial* in your dictionary. In your own words, describe what a *commercial* farm is.

_____

2. Look up the verb *spray* in your dictionary. Describe the nutrient mixture that is sprayed on the plant roots.

_____

Vocabulary Activities STEP I: Word Level

A *theory* is an idea that tries to explain something that has not yet been proven or that cannot be proven.

*My **theory** is that women have more interesting dreams than men.*

*Einstein developed a **theory** about energy.*

The expression *in theory* is used when a person is talking about an idea that may or may not be true.

***In theory**, Internet access could become available to the most isolated parts of the world.*

(See Oxford American Dictionary for learners of English, p. 756)

CORPUS

A. **Work with a partner. Match the scientist on the left with the theory he or she developed. Look in your dictionary for new words. Take turns making sentences with the information.**

*A nutritionist developed a **theory** about eating pizza for good health.*

1. An astronomer	___ a. the long life of elephants.
2. A botanist	___ b. the size of rain drops.
3. A geologist	___ c. plants being able to hear.
4. A meteorologist	___ d. the moon growing smaller.
5. A zoologist	___ e. the cause of earthquakes.
6. A chemist	___ f. creating safer fuels.

The verb *absorb* has several meanings. One meaning is "to take in something and hold it."

*The towel **absorbed** all of the water that I spilled.*

*The cup is too hot to hold. It's **absorbing** heat from the coffee inside.*

To absorb something also means "to take information into the mind."

*The professor talked so fast that I couldn't **absorb** all the information.*

*After studying all night, I finally **absorbed** the meaning of Einstein's theory.*

Another meaning of *absorb* is "to hold a person's attention."

*The book completely **absorbed** me.*

*I was so **absorbed** in my reading that I forgot to eat dinner.*

(See Oxford American Dictionary for learners of English, p. 3)

CORPUS

B. **Work with a partner. Check (✓) all of the things on the right that might be *absorbed* by the person or thing on the left. Take turns making sentences with the information.**

1. My T-shirt absorbed
   - ___ the smell of smoke from the fire.
   - ___ the information in the book.
   - ___ the sweat on my shoulders.
2. The book absorbed
   - ___ the coffee I spilled.
   - ___ my attention.
   - ___ the meaning of Einstein's theory.
3. I was absorbed
   - ___ by the professor's lecture.
   - ___ in the television program.
   - ___ by the towel.

Vocabulary Activities STEP II: Sentence Level

To maintain something means "to keep something the same."

*I've **maintained** the same weight all my adult life.*

*Diet and exercise have helped me **maintain** my good health.*

To maintain something also means "to keep something in good condition," especially an object or a place.

*We pay a custodian **to maintain** the office for us.*

*It's expensive **to maintain** the three cars in our family.*

To maintain an idea or belief means "to believe something to be true even if others disagree."

*I know you don't agree, but I **maintain** that wearing wet shoes causes head colds.*

*The man on trial **maintained** that he did not steal the painting.*

(See Oxford American Dictionary for learners of English, p. 432)

CORPUS

C. **Rewrite these sentences in your notebook with a form of *maintain*. Take turns reading your sentences with a partner.**

1. Plants need to stay in a vertical position to grow well.
2. The farmer said over and over that foods grown in soil taste better.
3. The farmer's son helped keep the greenhouse clean.
4. An automatic timer keeps the same spraying schedule every day.
5. I believe that hydroponics is a recent discovery.
6. The farmer keeps a record of his costs.

To achieve something means "to gain something through personal effort or skill." The noun form is *achievement*.

*He had a distinguished life and **achieved** much.*

*But his finest **achievement** was his involvement in our organization.*

To achieve something also means "to complete something."

*A horse doesn't **achieve** its full size until it is about two years old.*

*In spite of being sick, Ian managed **to achieve** a lot today.*

An *achievement* is the act of finishing something special.

*You read five books this week? What an **achievement**!*

*After taking her first steps, the baby smiled at her **achievement**.*

(See Oxford American Dictionary for learners of English, p. 6)

CORPUS

D. **Imagine that you have just created a new vegetable called a "squarrot"—a combination of a squash and a carrot. A newspaper reporter is asking you questions. Rewrite the answers in your notebook with the given form of *achieve*. Take turns reading your sentences with a partner.**

1. Are you proud of what you invented?
   Yes, I am very proud of what I invented. (achievement)
2. How long did it take you to get good results from your experiments?
   I got good results in about a year. (achieved)
3. What was the secret of your success?
   I was successful because I worked hard. (achieved)
4. I understand that you will be given an award.
   I will receive an award for scientific success. (achievement)
5. What are your plans for the future?
   I want to win a Nobel Prize. (achieve)

A *principle* is a basic rule about society or about a certain subject.

*I believe in the **principle** of being kind to others.*

*New drivers must learn the **principles** of safe driving.*

A *principle* is also a standard that a person believes in.

*Of course I wouldn't cheat on an exam. I have **principles**.*

*It's against my **principles** to tell lies.*

*On **principle**, he always wears a coat and tie to business meetings.*

A *principle* is a general law of science or another academic field.

*This chapter covers the **principle** of heat transfer.*

(See Oxford American Dictionary for learners of English, p. 554)

CORPUS

E. **Write three sentences in your notebook with *principle* or *principles*. Take turns reading your sentences with a partner.**

1. Write a sentence that describes a rule that your family believes in.
2. Write a sentence that describes something you will or will not do because of your personal beliefs.
3. Write a sentence about a rule of English grammar or punctuation.

F. Use the following words to complete the paragraph.

absorb	benefit	principle	require	in theory
achieve	maintain	regulated	strategy	transport

The Green Valley Farm supplies fresh vegetables to an expensive restaurant that is located about 75 miles away. Early each Friday morning, farm workers pick the vegetables and clean them. Then they load them onto a truck to (1) _____ them to the restaurant. The farm's (2) _____ is to get the vegetables to the restaurant as quickly as possible so they will still be fresh. (3) _____, a vegetable begins to spoil as soon as it is picked. For this reason, the farm follows the basic (4) _____ that a cool temperature helps preserve foods. The temperature inside of the truck is (5) _____ to (6) _____ a temperature of 55°F (about 13°C). The workers load the vegetables onto the truck carefully. Some vegetables (7) _____ special handling. Lettuce, for example, loses its crispness if it becomes warm, so they place it near the air blower. Other vegetables easily (8) _____ odors. They (9) _____ from being placed far from strong-smelling items such as garlic or onions. Careful handling of the vegetables helps the company (10) _____ its goal of delivering fresh vegetables to its customers.

Many farms supply fruits and vegetables to restaurants.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. Name some of the vegetables that your family eats. Where do you get them?
2. What are some areas in the world where farmers cannot to grow things?
3. What kinds of foods should humans eat to get the nutrients they need?

Read

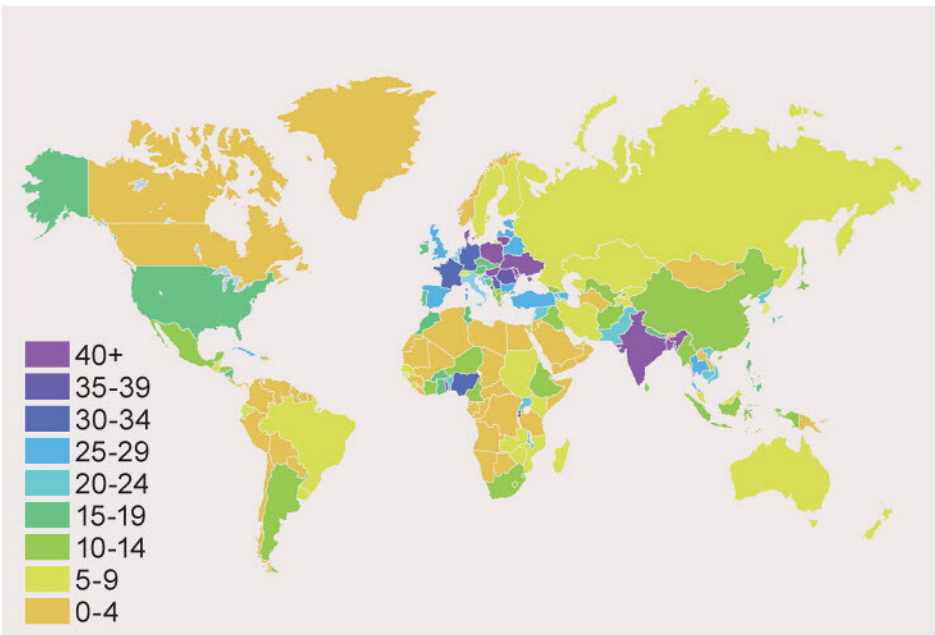
Information for this article is from an Internet website.

FARMING IN MANY PLACES

The population of the world has already reached 7 billion. Some experts estimate that by 2050, the world population will reach 9 billion. If this is true, we need a **strategy** for increasing the food supply to feed those 9 billion people. Some experts **maintain** that hydroponic farming could be an answer.

About 71% of the Earth's surface is covered with water, and about 29% of the surface is land. However, only about 10% of that land is suitable for farming. The rest of the Earth's land is in areas that are too hot or too cold for farming, or that have poor soil, not enough water, or not enough sun. Also, cities now occupy much of the land that was once farmland.

However, experts believe that hydroponic farming techniques would make it possible to grow food in all of these areas. Hydroponic farming has various **benefits**. First, of course, is that no soil is needed. Also, greenhouses would allow food plants to grow almost anywhere in the world. Artificial lighting and climate systems inside greenhouses would allow food plants to grow throughout the year. Another **benefit** is that hydroponic



Percent of land that is suitable for farming, by country.

farming uses very little water compared to traditional farming. Hydroponic systems **require** only about 5% of the water used in soil-based farming to produce the same amount of food. In part, this is because the water in a hydroponic system is recycled again and again. Finally, hydroponic farming could increase the nutritional value of food plants by adjusting the nutrients that the plants **absorb** as they are growing.

A hydroponic system would make it easy for families to grow their own vegetables in a small space. The **principles** of hydroponics are simple, and very little special knowledge or equipment is needed to **achieve** success.

Over half of the world's 7 billion people now live in cities. This number will grow as the world population increases. The people who live in large cities depend on food that is **transported** into the city from distant farms. This sometimes leads to problems. For example, often raw fruits and vegetables are not fresh after the long ride. They are expensive because the cost of **transporting** them is added to the price. Also, in winter there are fewer fresh fruits and vegetables in markets.

A hydroponic farm

Having farms in the city would solve these problems. Hydroponics might make it possible to farm inside of cities by using a system called *vertical farming*.

Vertical farming could be done inside city skyscrapers. Many farming experts believe that, **in theory**, vertical farming is possible. They suggest that old skyscrapers could become vertical farms. Each floor could be a greenhouse where vegetables and fruits could grow without soil in a hydroponic system. The light and heat on each floor could be **regulated** according to the time of year and the needs of certain plants. A crew of farming experts could **maintain** the plants. One tall skyscraper might provide as much growing space as a large farm. Vertically farmed foods would **benefit** people in the city by being fresh, cheap, and available all year.

Vertically farmed vegetables have many advantages.

Is relying on hydroponics a good **strategy** for feeding people in the future? If so, we should begin today to teach people the **principles** and **benefits** of hydroponics. ■

Reading Comprehension

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. Hydroponic farming requires less water than soil-based farming to produce the same amount of food.

___ 2. In theory, the principles of hydroponic farming are simple.

___ 3. One benefit of vertical farming is that fresh fruits and vegetables don't have to be transported long distances.

___ 4. Farm experts maintain that using hydroponic techniques is a good strategy for increasing the world's food supply.

___ 5. A hydroponic system can regulate the cost of transporting foods.

___ 6. Growing plants absorb nutrients from artificial lighting systems.

___ 7. A family using a hydroponic system to grow vegetables needs special knowledge to achieve success.

READING SKILL Identifying Contrast Signals

APPLY

1. These ideas are from sentences in Paragraph 2 in Reading 2.

   About 29% of the earth's surface is land. However, only about 10% of that land is suitable for farming.

   Circle the two contrasting ideas. What signal is used to connect the two contrasting ideas?

   _____

2. These sentences are from Paragraph 2 in Reading 2.

   The rest of the Earth's land is in areas that are too hot or too cold for farming, or that have poor soil, not enough water, or not enough sun. Also, cities now occupy much of the land that was once farmland.

   The sentences describe six kinds of land areas where farming is not possible. Circle the six kinds of land areas.

   Write the sentence from Reading 2 that has information that contrasts with the above information.

   _____

REVIEW A SKILL **Using a Dictionary** (See p. 116)

These words appear in Paragraph 3.

Artificial lighting inside of greenhouses would allow food plants to grow throughout the year.

Look up the word *artificial* in your dictionary. Which of these are examples of artificial lighting?

candlelight sunlight light bulb moonlight neon light

Vocabulary Activities STEP I: Word Level

A *strategy* is a plan that is made to achieve a particular goal.

*Little Carlito had a **strategy** for stealing a cookie from the table.*

*The company's **strategy** for increasing sales was to advertise more.*

(See Oxford American Dictionary for learners of English, p. 720)

CORPUS

A. **Work with a partner. Match a restaurant worker on the left with his or her goal and the *strategy* he or she would use to reach that goal. Take turns making sentences with the information.**

*My mother's **strategy** for getting us kids to eat vegetables is to put sugar on them.*

1. The chef's	___ increasing business	___ make soup.
2. The waitress's	___ getting a tip	___ soak them in hot water.
3. The dishwasher's	___ using leftover meat	___ always smile.
4. The owner's	___ cleaning greasy pans	___ offer free desserts.

A *regulation* is an official rule that controls how something is done. The verb form is *regulate*.

*Markets must follow government **regulations** in how they package meat.*

*The government **regulates** how markets package meat.*

Regulation refers to the control of something through rules or laws.

*The Health Department is responsible for the **regulation** of hospitals.*

To regulate something means "to control a machine or piece of equipment."

*You can **regulate** the temperature of your oven with this dial.*

(See Oxford American Dictionary for learners of English, p. 592)

CORPUS

B. **Work with a partner. Write an R in front of the items the driver of a car can *regulate*. Take turns making sentences with the information.**

*The driver can **regulate** the height of the driver's seat.*

___ the speed of the car	___ the size of the seats
___ the loudness of the radio	___ the windshield wipers
___ the air conditioner	___ the age of the car
___ the color of the car	___ the headlights
___ how much gasoline costs	

Vocabulary Activities STEP II: Sentence Level

To require something is to need something.

*New babies **require** 14 or more hours of sleep every day.*

*A bank **requires** your signature to open an account.*

The verb *require* is often used in the passive form, especially when a law or any authority makes it necessary for you to do something.

*A passport **is required** to enter a foreign country.*

A *requirement* is something that you must have in order to do something.

*One **requirement** for this job is being able to speak Arabic.*

(See Oxford American Dictionary for learners of English, p. 601)

CORPUS

C. **Use a form of *require* in each space to complete this letter. Share your letter with a partner.**

SKYSCRAPER FARMS

June 23, 2053

Dear Miss Song,

Thank you for your interest in a job at Skyscraper Farms. We are looking for smart, enthusiastic plant scientists to help us get started. A (1) _____ for employment is a degree in agriculture. We also (2) _____ experience in hydroponics. The Farming Commission (3) _____ everyone who works with food plants to be in good health. You will be (4) _____ to be examined by our company doctor to meet that (5) _____. Finally, all of our workers will be (6) _____ to work on a different schedule each week. Our growing plants (7) _____ care every day, so workers must be available seven days a week.

Sincerely,

Fred Greenleaf, President

Skyscraper Farms

To transport someone or something means "to move something or someone from one place to another in a vehicle." *Take* and *carry* are common synonyms.

*Taxis **transport** visitors from the airport to downtown hotels.*

*I hired a truck to **transport** my furniture to my new apartment.*

The noun *transportation* refers to the vehicles that transport people or things.

*Public **transportation** in my city includes buses, trams, and trains.*

*My car is the only **transportation** I use.*

Transport is sometimes used as a noun.

***Transport** by airplane is an expensive way to ship food products.*

(See Oxford American Dictionary for learners of English, p. 775)

CORPUS

D. **Rewrite each of these sentences in your notebook with *transport* or *transportation*. Share your answers with a partner.**

1. Modern ways of moving people will allow people to travel anywhere in the world. (transportation)
2. The fastest way to travel across the ocean is by airplane. (transportation)
3. The least expensive way to carry products across the ocean is by ship. (transport)
4. A modern airplane can carry hundreds of people at a time. (transport)
5. Most large cities have developed good systems to move people from place to place. (transportation)

The verb *benefit* means "to have a good effect."

*The new park will **benefit** everyone in the community.*

*Schools have **benefited** from the new law.*

The noun form is also *benefit*. It refers to the good effect or advantage of something.

*We are enjoying the **benefits** of having a new park.*

*One **benefit** of living in a warm climate is lower heating costs.*

(See Oxford American Dictionary for learners of English, p. 6)

CORPUS

E. **Look in Reading 2 to find answers to these questions. Answer in complete sentences and include a form of *benefit*. Share your answers with a partner.**

1. How would vertical farming benefit people who live in cities?
2. What is one benefit of hydroponic farming?

F. Use the following words to complete this paragraph.

absorb	benefit	principles	required	strategy
achievement	maintain	regulate	theory	transported

As our world becomes more crowded, perhaps humans will develop a (1) _____ to live on the moon. This would be a major scientific (2) _____ for humanity. Space ships have already (3) _____ humans to the moon for short visits. But would it be possible for a community of people to make it their home? Would it be possible to (4) _____ a community on the moon? What would be (5) _____ to make the moon a place where humans could live? A major problem would be supplying food to the residents. It would be too expensive for a space ship to transport food to the moon every week. But maybe people could grow food on the moon by using the (6) _____ of hydroponics. A space ship could bring building materials, seeds, water, and plant nutrients. People could set up a hydroponic farm. Residents would maintain the farm. The plants would (7) _____ light and heat from the sun to help them grow. The people would (8) _____ by having a dependable supply of fresh food. A moon commission could use international laws to (9) _____ the operation of the new community. Space scientists agree that, in (10) _____, people could live on the moon. Would you like to live there?

Writing and Discussion Topics

Discuss the following topic in small groups.

Some farming experts say that vertical farming in skyscrapers could supply fresh fruits and vegetables to people who live in big cities. Some also say that raising animals in skyscrapers could supply meat to people who live in big cities. Would it be a good idea to raise animals in skyscrapers?

Choose one of the following topics. Write six to eight sentences about the topic. Use some of the target vocabulary words from this unit.

1. What are some changes that might occur in international trade if humans grew most of their own food with hydroponic farming?
2. What are some ways that the work of traditional farmers is like the work of a hydroponic farmer? What are some ways their work is different?
3. What are some things that could go wrong in a hydroponic system that could hurt the growing plants?

UNIT 10

The Forces of Nature

In this unit, you will

- learn about alternative sources of energy.
- study renewable energy sources.
- review identifying signals of contrast.
- increase your understanding of target vocabulary words.

READING SKILL Identifying Signal Words for Comparisons

Self-Assessment

Think about how well you know each target word, and check (✓) the appropriate column. I have…

TARGET WORDS	never seen the word before	seen the word but am not sure what it means	seen the word and understand what it means	used the word, but am not sure if correctly	used the word confidently in *either* speaking *or* writing	used the word confidently in *both* speaking *and* writing
affect						
AWL approach						
AWL concept						
consume						
AWL data						
AWL derive						
AWL indicate						
obtain						
potential						
AWL source						

AWL Academic Word List
Oxford 3000™ keywords

Outside the Reading What do you know about alternative energy? Watch the video on the student website to find out more.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What tools or machines do you use every day that are powered by electricity?
2. How did people travel before machines were invented?
3. What are some ways that people can warm their houses during cold weather?

Read

The information in this article is from a technology magazine.

Sun, Wind, and Water

NATURE HELPS HUMANS

For all of human history, humans have depended on the powers of nature to help them survive. The sun warmed them and was a **source** of light. Rain filled lakes and rivers where they could **obtain** water to drink and catch fish to eat. Sun and rain combined to help plants grow. The plants became food for the humans to **consume**. The plants were also food for the animals that humans hunted. Wind blew the seeds of trees and grasses to new fields. Wind filled the sails of small boats, so humans could travel on rivers or across oceans.

NATURE BRINGS DIFFICULTIES

However, sometimes nature did not help humans. In some years, the rain did not come. The hot sun baked the earth. Plants dried up because they had no **source** of water. Hot winds blew the soil away, so future plants could not grow. This left humans without food to eat, and they starved. In some years, too much rain fell. Homes were washed away when gentle rivers grew into **potential** killers. Often people drowned. Farm animals drowned. Towns disappeared in the flood waters.

Similarly, the ocean was often a **source** of death. Without any **indication** of danger, a giant ocean wave might suddenly sink boats. Likewise, a wave might **approach** land, where it washed away houses and drowned people. Powerful cyclones and hurricanes

With the help of wind, humans were able to travel across oceans.

sometimes brought strong ocean winds over land. Sometimes they destroyed buildings, uprooted trees, and killed humans. The powers of nature have always **affected** human life.

HUMANS USE MACHINES

Then, about 200 years ago, humans learned how to create machines to help them do work. These machines needed fuel to work. Humans burned wood and coal to run the machines. They built steam engines to move ships and trains. They built automobiles and airplanes that were powered by gasoline engines. They learned how to produce electricity to light their homes. They built washing machines and telephones and refrigerators and computers. All of these machines **consumed** fuels **obtained** from the Earth.

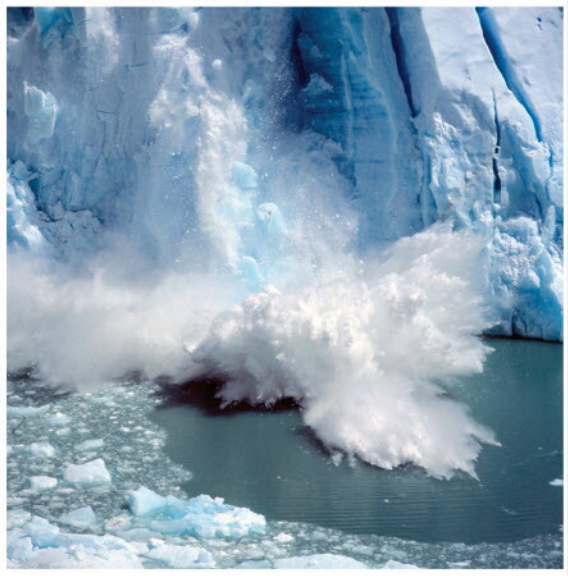
Even gentle waves can quickly become dangerous.

CHANGES IN CLIMATE

As the world population grew, so did the number of machines, and so did the use of fuels to power the machines. Recent scientific **data indicate** that the Earth is warming. The sun has melted ice near the North Pole and the South Pole. The level of the oceans is rising. Cyclones and floods are happening more often. The **concept** of climate change worries humans.

Many scientists blame humans for this change in the Earth's climate. They believe that humans have not used the fuels that we **derived** from nature in a good way. They believe we should instead use natural powers to produce energy. They suggest that using sun, wind, and water to produce energy will help preserve the Earth. The sun, wind, and water are considered *renewable* energy **sources** because they will always be there.

Ancient humans depended on the powers of nature to help them survive. Now modern humans want to use these powers to help them survive in today's machine-based world. ■



The sun has melted ice near the North Pole and the South Pole.

Reading Comprehension

Mark each sentence as *T* (True) or *F* (False) according to Reading 1.

___ 1. Recent scientific data indicate that the climate of the Earth is warming.

___ 2. The machines created by humans consume fuels obtained from rivers and lakes.

___ 3. Human lives are affected by the sun, wind, and water.

___ 4. Modern humans derive most of their fuels from renewable energy sources.

___ 5. An approaching hurricane or cyclone is a potential danger to humans.

___ 6. Humans invented the concept of climate change about 200 years ago.

READING SKILL Identifying Signal Words for Comparisons

LEARN

When writers compare two or more things, they show how the things are alike. Sometimes writers compare objects or people. Sometimes they compare places or events.

Brazil is in South America. ***So is*** *Argentina.*

Marco is ***as tall as*** *his father.*

Both *restaurants were crowded and noisy.*

Some common words and phrases that signal comparisons are listed below.

both	similarly	likewise	like..., so is...
all	too	the same as	like..., ...is too.
as... as	so is/so are	so does/did	also

APPLY

The sentences below are from Reading 1. Circle the comparison signals.

1. Similarly, the ocean was often a source of death. Without any indication of danger, a giant ocean wave might suddenly sink boats. Likewise, a wave might approach land, where it washed away houses and drowned people.
2. All of these machines consumed fuels obtained from the Earth.
3. As the world population grew, so did the number of machines, and so did the use of fuels to power the machines.

What three things grew?

_____ _____ _____

REVIEW A SKILL **Identifying Contrast Signals** (See p. 132)

There is one sentence in Paragraph 2 that shows contrast. Write the sentence below.

_____

_____

Vocabulary Activities STEP I: Word Level

To derive something means "to get something from a certain source." It is often used to describe feelings.

*Humans **derive** many materials from animals, such as wool and leather.*

*Ming **derived** great pleasure from her flower garden.*

To derive something also means "to be taken from a related source, such as a word or substance." The passive form, with *from*, is usually used with this meaning.

*Gasoline **is derived from** oil.*

*English words **are derived from** words in many other languages.*

(See Oxford American Dictionary for learners of English, p. 196)

CORPUS

A. **Work with a partner. Match the English word on the left with the foreign word it is *derived* from. Take turns making sentences with the information.**

The English word camera ***is derived from*** *the Greek word* kamara.

1. algebra	___ a. Latin	*petr* (rock) *oleum* (oil)
2. golf	___ b. French	*obtenir*
3. canyon	___ c. Arabic	*jabara*
4. petroleum	___ d. Greek	*enérgeia*
5. obtain	___ e. Spanish	*cañon*
6. energy	___ f. Dutch	*kolf*

Data is information or facts that have been collected for a particular purpose. It is a formal word, and it is not often used in conversation.

*Now that I have the **data** I need, I can begin writing my final report.*

*Computers help businesses analyze complex **data**.*

The word *data* is the plural form of datum. However, the word datum is rarely used. A verb that agrees with the plural form is usually used only in formal or scientific writing. In nonscientific use, especially when the meaning is information stored by a computer, a singular verb is used.

*Are the **data** complete? (plural usage)*

*Is the **data** complete? (singular usage)*

(See Oxford American Dictionary for learners of English, p. 184)

CORPUS

B. **Work with a partner. Match the type of *data* on the left with what that *data* might show. Take turns making sentences with the information.**

*Geological **data** show that South America and Africa were once connected.*

1. Population data	___ a. oranges are a good source of vitamin C.
2. Communication data	___ b. more people are traveling by airplane.
3. Historical data	___ c. our city received less rainfall this year than last.
4. Weather data	___ d. about 19% of the people in the world live in China.
5. Nutritional data	___ e. early humans used fire to cook foods.
6. Transportation data	___ f. nearly half of South Koreans under 40 have smart phones.

A *concept* is a basic understanding about a broad topic.

*The **concept** of climate change is explained in this textbook.*

*The manager explained her **concept** of how to make the office more efficient.*

No concept is often used to suggest that someone does not understand or know something.

*I have **no concept** of the enormous size of our solar system.*

*You have **no concept** of how hard I work.*

(See Oxford American Dictionary for learners of English, p. 148)

CORPUS

C. **Work with a partner. Match the type of people on the left with the *concept* they seem to lack. Take turns making sentences with the information.**

*People who are rich seem to have no **concept** of going to bed hungry.*

1. People who eat only fast food	___ a. time.
2. People who commit crimes	___ b. good nutrition.
3. People who are always late	___ c. danger.
4. People who drive too fast	___ d. right and wrong.

Vocabulary Activities STEP II: Sentence Level

The verb *approach* means "to come near something or someone."

*I can see the bus **approaching**.*

*The profits this year **approach** the company's profits from last year.*

The verb *approach* also means "to speak to someone, usually to ask for something."

*He didn't want **to approach** his friends for money.*

To approach something also means "to plan a way to solve a problem or to create a plan of action." The noun form is also *approach.*

*The students discussed several ways **to approach** the assignment.*

*Each student took a different **approach**.*

*One **approach** was to ask people their opinions and report the results.*

(See Oxford American Dictionary for learners of English, p. 34)

CORPUS

D. **Imagine a professor and her students are discussing climate change. Rewrite each question or answer on a separate sheet of paper with a form of *approach*. Share your questions and answers with a partner.**

1. What is the best way to solve the problem of energy shortages?
2. I'm glad that you came to me to ask for information.
3. In a few years the world population will be nearing 8 billion.
4. What plan do you recommend?
5. The best plan is developing more renewable energy sources.

To indicate something means "to show or point to something."

*A sign **indicates** where the restrooms are located.*

*A policeman **indicated** when the cars could move forward.*

To indicate something means "to give a sign that has meaning." The noun form is *indication*.

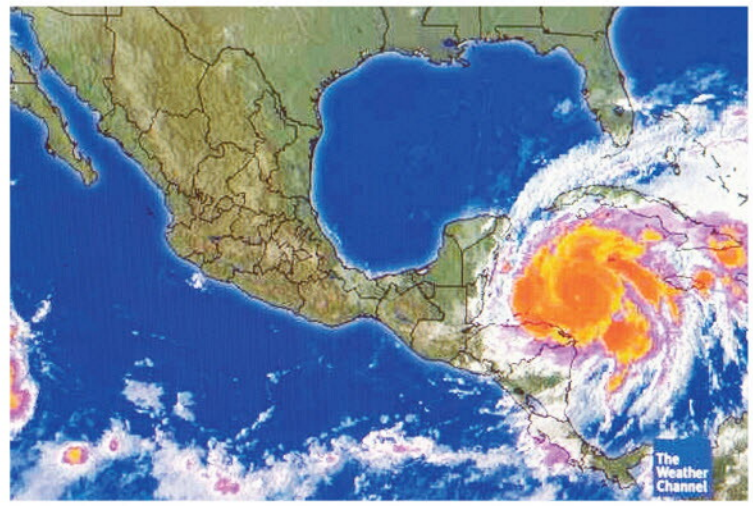
*Babies cry **to indicate** they are hungry.*

*Babies' cries are an **indication** that they are hungry.*

(See Oxford American Dictionary for learners of English, pp. 370–371)

CORPUS

E. Complete this paragraph by using a form of *indicate* in each blank space.



A TV weather map

A popular feature of television news programs is a report from a weather reporter. The weather reporter (1) _____ on a large map what the temperatures were that day in local cities. Falling temperatures often (2) _____ an approaching storm. If there is an (3) _____ of rain, such as falling temperatures, he or she will (4) _____ the direction of the storm on the map. He or she uses a large calendar to (5) _____ what kind of weather to expect for the next few days. There is a picture on each day of the week. A picture of a dripping cloud (6) _____ rain, and a picture of a smiling sun (7) _____ sunshine.

F. Use the following words to complete this paragraph.

affect	concept	data	indication	potential
approached	consumed	derive	obtained	source

Throughout history, sailors have reported seeing giant waves in the ocean. Giant waves were blamed for damage to many ships. Sometimes the giant waves even caused ships to sink. Sailors had no (1) _____ of why these giant waves occurred in mid-ocean. Recently, the study of giant waves has (2) _____ the time and attention of ocean scientists. They carefully analyzed the (3) _____ that they could (4) _____ from reports of giant waves. They concluded that earthquakes are not the (5) _____ of these waves. They learned that both the size of a giant wave and its shape (6) _____ its energy. The amount of energy in a wave is an (7) _____ of its (8) _____ danger. Reports that scientists (9) _____ from sailors indicated that the waves (10) _____ very quickly. There was no time to warn other ships of the approaching wave. Scientists hope to find some way to predict the approach of a giant wave and develop a warning system.

Before You Read

In small groups or with the whole class, discuss the following questions.

1. What are some machines or toys that depend on wind to make them work?
2. What are some ways that individuals use heat or light from the sun in their daily activities?
3. We often say that machines help us do work. What is *work*?

Read

The information in this article is from an online technology magazine.

USING RENEWABLE ENERGY SOURCES

Traditional Fuels	Renewable Energy Sources
gasoline	solar
wood	wind
natural gas	ocean waves
kerosene	nuclear
coal	organic materials

Over the last 200 years, humans created many machines to help them do work. Most machines were powered by burning fuels such as coal, gasoline, and natural gas. Other machines were powered by electricity. Now scientists are suggesting that we look for ways to use natural forces to help us do work. The scientists are suggesting that we use wind, water, and the sun as **sources** of power to create electricity. Sun, wind, and water are all renewable resources. They will always be available to our growing world population.

USING WAVE POWER

The power of ocean waves as they **approach** land is very strong. For this reason, engineers believe ocean waves have great **potential** as a force to create electricity. Engineers are developing technology to use that force. One plan for a wave farm includes putting several large fiberglass tanks in the ocean and securing them to the ocean floor. The tanks would be connected to each

other. They would float on top of the water. As powerful ocean waves **approached** land, the tanks would rise and fall with the water. The motion would spin turbines inside the tanks to generate electricity. The wave farm would be connected to shore. Engineers estimate that one tank would generate enough electricity to power one house. This **approach** would work in most areas that have a sea coast.

USING WIND POWER

A similar **concept** is now being used to create electricity using wind power. This **approach** works best in areas that have strong, steady winds. Engineers have created wind farms to collect the power of the strong winds. They put hundreds of wind machines in windy places. A wind machine is a very tall pole. At the top is a propeller with several long blades. When strong winds blow, the blades of the wind machines turn. The turning blades power machinery in nearby turbines to generate electricity. The electricity **derived** from a wind farm is then sent to nearby **consumers**.

A wind farm

USING SOLAR POWER

Another **concept** uses the sun to generate electricity. In areas that are sunny throughout the year, hundreds of collection devices are put into a large field. Each solar collection device consists of a pole with a large mirror on top. The mirrors reflect heat from the sun. The heat **obtained** from the mirrors is used to boil water. Steam from the boiling water turns machinery in a turbine to generate electricity for nearby **consumers**.

A field of solar panels

Scientific **data indicate** that generating electricity by using water, wind, and solar energy will benefit the world. However, at a local level, many people do not like these projects. They complain that wave farms destroy beautiful beaches. They also worry that a wave farm might **affect** whales and fish that swim in the water. Likewise, people complain that wind machine propellers are killing birds that fly too close to the blades. Others complain that rows of solar panels are ugly. They also say that the solar panels take up space that could be used for farming or recreation.

The choice is a difficult one. We need to consider both present and future needs when we decide how to **obtain** energy and how we **consume** it. ■

READING COMPREHENSION

Mark each statement *T* (True) or *F* (False) according to Reading 2.

___ 1. The concept of using wave power to create electricity is possible mainly on sea coasts.

___ 2. A wind farm could affect people as well as whales and fish.

___ 3. Consumers near wind farms could obtain electrical power generated by the wind.

___ 4. Data obtained by scientists indicate that using renewable sources of energy to generate electricity will benefit the world.

___ 5. Engineers will use the potential energy of ocean waves to bring water to nearby consumers.

___ 6. Building wind farms is one approach that will use natural forces to create electricity.

___ 7. Solar panels reflect heat that is derived from the sun.

READING SKILL Identifying Signals of Comparison

APPLY Identifying Signals of Comparison

Look back in Reading 2 to find signals of comparison. Write the ones you find in these paragraphs.

1. Paragraph 1 _____
2. Paragraph 4 _____
3. Paragraph 5 _____
4. Paragraph 6 _____

REVIEW A SKILL **Identifying Contrast Signals** (See p. 132)

1. Work with a partner. What two ideas are contrasted in Paragraph 1? Have one partner read the first idea and the second partner read the other idea. What words tell you that one idea is old and another one is new?
2. What two ideas are contrasted in Paragraph 5? Have one partner read the first idea and the second partner read the other idea. What word signals the contrast?

Vocabulary Activities STEP I: Word Level

To obtain something means "to get something." It is a formal word. People use *get* in conversations.

*You can **obtain** directions to the stores on their web sites.*

*The factory **obtained** machine parts from several sources.*

(See Oxford American Dictionary for learners of English, p. 484)

CORPUS

A. **Work with a partner. Imagine that one of you has just moved to a new city. Ask where to *obtain* things you need. Your partner will answer the questions.**

*Q: I lost the book I was reading. Where can I **obtain** a new copy?*
*A: You can **obtain** a new copy at the bookstore.*

1.	I will be traveling overseas soon.	a passport	at the embassy office.
2.	I don't know how to use my cell phone.	help	at the electronics store.
3.	I would like to work at your company.	a job application	at the employment office.
4.	I'll be buying a car next week.	a driver's license	at the Motor Vehicle office.
5.	I want to move in this building.	rental information	at the manager's office

The *source* of something is where it comes from.

*My car was making an odd noise, but I couldn't find the **source** of the noise.*

*The Internet is an important **source** of information.*

(See Oxford American Dictionary for learners of English, p. 693)

CORPUS

B. **Work with a partner. Write L by the items that are *sources* of light. Write S by the items that are *sources* of sound. Write H by the items that are *sources* of heat. Some items may be *sources* of more than one thing. Take turns making sentences with the information.**

*A drum is a **source** of sound.*

___ a ship's horn	___ a radio	___ an oven	___ a candle
___ piano	___ the sun	___ thunder	___ a bell
___ a lamp	___ a voice	___ a fire	___ a stove

Vocabulary Activities STEP II: Sentence Level

To affect someone or something means "to change or influence someone or something in some way."

*The climate in an area can **affect** what crops will grow.*

*Everyone in the school was **affected** by the new rules.*

The noun form of *affect* is *effect*.

*The new rules had an **effect** on everyone.*

(See Oxford American Dictionary for learners of English, pp. 12–13)

CORPUS

C. **Rewrite these sentences in your notebook with a form of *affect*. Share your sentences with a partner.**

1. Wave farms could harm the environment of whales and fish.
2. Using renewable energy sources will change the production of electricity.
3. A changing climate could influence the way humans live.
4. Our many machines have caused changes in how humans do work.
5. The growing world population has influenced our need for energy.

The adjective *potential* is used to describe something that is possible in the future. *Potential* can only be used in front of a noun. The adverb form is *potentially*.

*Wind farms are a **potential** danger to birds.*

*Wind farms are **potentially** dangerous to birds.*

*I've heard that our mayor is a **potential** candidate for president.*

*Our mayor is **potentially** a candidate for president.*

The noun *potential* refers to the abilities that a person or thing has, but that may not be fully developed. It is often used with the verb *have*.

*Wind farms have the **potential** to be dangerous to birds.*

*Our mayor has the **potential** to be a great president.*

(See Oxford American Dictionary for learners of English, pp. 543–544)

CORPUS

D. **Rewrite these sentences on a separate sheet of paper to include the given form of *potential*. Share your sentences with a partner.**

1. Wave farms could cause harm to whales. (potentially)
2. Wave farms are a possible source for generating electricity. (potential – adjective)
3. Renewable energy could increase our supply of electricity. (potential – noun)
4. Cloudy weather can reduce the amount of energy a solar panel absorbs. (potential – noun)
5. A growing population will cause a possible increase in energy needs. (potential – adjective)

To consume something means "to use something in such a way that there is less of it."

*My car **consumes** a lot of gasoline.*

*Homework **consumes** about four hours of my time each day.*

To consume something also means "to eat something."

*Many Americans **are consuming** more fruits and vegetables.*
*They **are consuming** less meat.*

A *consumer* is a person who buys products or pays for services.

***Consumers** expect good service when they shop.*

(See Oxford American Dictionary for learners of English, p. 156)

CORPUS

E. **Read the paragraph below. Then rewrite each of the six underlined sentences to include a form of *consume*. Take turns reading all the sentences with a partner. The first one has been done for you.**

(1) Automobiles use a lot of fuel. (2) People who purchase things are demanding cheaper fuel. (3) One approach is to make a fuel from plants that people eat, such as corn. (4) However, using corn to make fuel means less corn for people to eat. Another approach is to use paper, wood pieces, and even olive seeds to make fuel. This approach uses special bacteria. (5) The bacteria eat these materials, and their bodies release oil. (6) This process is one way to give customers a cheaper fuel.

*1. Automobiles **consume** a lot of fuel.*

F. Use the following words to complete this paragraph.

affect	concept	data	indication	potential
approach	consumers	derive	obtained	sources

Advertisements for automobiles used to stress how fast a car could go or how beautiful it was. (1) _____ buyers were expected to (2) _____ a feeling of need from the ads. Now advertisements for automobiles stress that their automobiles do not (3) _____ the environment in a bad way. Advertisements often include (4) _____ that was (5) _____ from scientific (6) _____ to show how "clean" a car is. The (7) _____ of a "clean car" is new. This new (8) _____ to selling automobiles is an (9) _____ of how (10) _____ today are concerned about the potential harm that automobiles and other machines could cause to the environment.

Writing and Discussion Topics

Discuss the following topic in small groups.

How would your life be affected if you and your family could not obtain the amount of electric power that you now use? What changes would you have to make in your daily lives? How would your city or community be different with less electricity?

Choose one of the following topics. Write six to eight sentences about the topic. Use some of the target vocabulary words.

1. Many people believe that the climate of the Earth is changing. What are some ways that life on Earth might change if the climate becomes warmer?
2. Vertical farming (Unit 9) is a way to grow food plants within a city environment. Would it be possible to have solar farms or wind farms in a big city? Why would this be a good approach to providing electricity? What are some potential problems?
3. Another way to deal with the energy shortage is to use less of it. Describe some steps that you have already taken to use less energy. What other steps could you take?

Inside Reading Intro Vocabulary List

The following Oxford 3000™ words are targeted in Intro.

Word	Location
analyze	U1
absorb	U9
accurate	U2
achieve	U9
affect	U10
appear	U2
approach	U10
area	U5
assist	U4
assume	U4
automatic	U7
available	U6
average	U1
behavior	U1
benefit	U9
cause	U3
circumstances	U8
collection	U8
commit	U8
community	U4
complex	U1
concept	U10
confuse	U2
consequence	U4
consist of	U7
construct	U5
consumer	U10
create	U1
culture	U6
data	U10
define	U4
derive	U10
design	U5
develop	U2
diet	U6
difference	U2
discover	U6
display	U8
effect	U3
ensure	U6
environment	U3
evidence	U8
exist	U3
factor	U4
feature	U2
function	U1
harm	U3
height	U5
identify	U7
indicate	U10
infect	U3
initial	U8
invent	U7
issue	U8
item	U7
link	U1
locate	U1
maintain	U9
major	U5
obtain	U10
pattern	U7
physical	U4
possible	U1
potential	U10
preserve	U6
prevent	U3
previous	U5
principle	U9
proceed	U3
produce	U7
purchase	U7
react	U3
regulation	U9
rely on	U6
remove	U8
require	U9
restrict	U5
secure	U8
seek	U4
shift	U2
significant	U6
similar	U2
source	U10
steal	U8
strategy	U9
structure	U5
sufficient	U4
supply	U6
support	U5
system	U2
technique	U6
technology	U7
theory	U9
tradition	U4
transfer	U3
transport	U9
unique	U7
vary	U2
vertical	U5
wonder	U1

The Academic Word List

AWL words targeted in Intro are bold

Word	Sublist	Location
abandon	8	L1, U7
abstract	6	L3, U5
academy	5	L3, U1
access	4	L1, U2
accommodate	9	L2, U7
accompany	8	L1, U2
accumulate	8	L2, U4
accurate	**6**	**L4, U6; L0, U2**
achieve	**2**	**L4, U1; L0, U9**
acknowledge	6	L1, U7
acquire	2	L1, U4
adapt	7	L4, U7
adequate	4	L2, U4
adjacent	10	L2, U3
adjust	5	L4, U3
administrate	2	L1, U3
adult	7	L3, U6
advocate	7	L1, U10
affect	**2**	**L2, U6; L0, U10**
aggregate	6	L1, U9
aid	7	L2, U7
albeit	10	L1, U7
allocate	6	L2, U6
alter	5	L1, U1
alternative	3	L1, U10
ambiguous	8	L1, U4
amend	5	L2, U9
analogy	9	L1, U4
analyze	**1**	**L2, U3; L0, U01**
annual	4	L1, U9
anticipate	9	L2, U3
apparent	4	L2, U9
append	8	L2, U10
appreciate	8	L3, U5
approach	**1**	**L3, U1; L0, U10**
appropriate	2	L1, U8
approximate	4	L3, U4
arbitrary	8	L2, U8
area	**1**	**L4, U1; L0, U5**
aspect	2	L3, U4
assemble	10	L3, U10
assess	1	L1, U8
assign	6	L2, U9
assist	**2**	**L2, U5; L0, U4**
assume	**1**	**L2, U1; L0, U4**
assure	9	L3, U4
attach	6	L3, U7
attain	9	L1, U5
attitude	4	L4, U6
attribute	4	L3, U10
author	6	L2, U4
authority	1	L1, U6
automate	**8**	**L3, U6; L0, U7**
available	**1**	**L3, U5; L0, U6**
aware	5	L1, U5
behalf	9	L3, U9
benefit	**1**	**L4, U2; L0, U9**
bias	8	L4, U8
bond	6	L4, U3
brief	6	L3, U6
bulk	9	L4, U9
capable	6	L1, U8
capacity	5	L4, U9
category	2	L4, U5
cease	9	L4, U10
challenge	5	L3, U8
channel	7	L1, U3
chapter	2	L3, U7
chart	8	L3, U10
chemical	7	L2, U10
circumstance	**3**	**L2, U10; L0, U8**
cite	6	L4, U10
civil	4	L1, U4
clarify	8	L4, U8
classic	7	L3, U9
clause	5	L2, U8
code	4	L4, U9
coherent	9	L2, U5
coincide	9	L1, U5
collapse	10	L4, U10
colleague	10	L1, U5
commence	9	L3, U9
comment	3	L3, U3
commission	2	L3, U9
commit	**4**	**L2, U6; L0, U8**
commodity	8	L4, U6
communicate	4	L3, U2
community	**2**	**L2, U7; L0, U4**
compatible	9	L1, U9
compensate	3	L3, U4
compile	10	L2, U6
complement	8	L1, U7
complex	**2**	**L4, U2; L0, U1**
component	3	L4, U3
compound	5	L4, U6
comprehensive	7	L2, U7
comprise	7	L4, U9
compute	2	L4, U8
conceive	10	L4, U10
concentrate	4	L3, U8
concept	**1**	**L3, U1; L0, U10**
conclude	2	L1, U6
concurrent	9	L4, U5
conduct	2	L1, U9
confer	4	L4, U4
confine	9	L1, U10
confirm	7	L4, U10
conflict	5	L1, U2
conform	8	L4, U7
consent	3	L4, U7
consequent	**2**	**L2, U3; L0, U4**
considerable	3	L3, U8
consist	**1**	**L4, U2, U9; L0, U7**
constant	3	L4, U8
constitute	1	L1, U4
constrain	3	L1, U8
construct	**2**	**L3, U1; L0, U5**
consult	5	L1, U6
consume	**2**	**L2, U2; L0, U10**
contact	5	L2, U10
contemporary	8	L1, U7
context	1	L1, U4
contract	1	L3, U9
contradict	8	L2, U2
contrary	7	L1, U6
contrast	4	L1, U7
contribute	3	L1, U9
controversy	9	L2, U3
convene	3	L1, U4
converse	9	L2, U8
convert	7	L2, U2
convince	10	L1, U3
cooperate	6	L1, U2
coordinate	3	L2, U6
core	3	L2, U5
corporate	3	L2, U2
correspond	3	L3, U9
couple	7	L3, U1
create	**1**	**L2, U1; L0, U1**

Oxford 3000™ words

Word	Sublist	Location
credit	2	L3, U6
criteria	3	L3, U3
crucial	8	L3, U10
culture	**2**	**L4, U10; L0, U6**
currency	8	L3, U9
cycle	4	L4, U5
data	**1**	**L2, U3; L0, U10**
debate	4	L2, U4
decade	7	L1, U7
decline	5	L1, U2
deduce	3	L4, U7
define	**1**	**L3, U2; L0, U4**
definite	7	L3, U4
demonstrate	3	L1, U5
denote	8	L4, U6
deny	7	L4, U10
depress	10	L2, U4
derive	**1**	**L4, U10; L0, U10**
design	**2**	**L1, U1; L0, U5**
despite	4	L3, U2
detect	8	L1, U6
deviate	8	L2, U8
device	9	L2, U3
devote	9	L3, U9
differentiate	7	L1, U4
dimension	4	L4, U5
diminish	9	L4, U4
discrete	5	L2, U6
discriminate	6	L1, U10
displace	8	L2, U7
display	**6**	**L3, U5; L0, U8**
dispose	7	L4, U6
distinct	2	L3, U7
distort	9	L3, U6
distribute	1	L4, U8
diverse	6	L2, U8
document	3	L4, U9
domain	6	L2, U8
domestic	4	L1, U3
dominate	3	L1, U5
draft	5	L3, U6
drama	8	L3, U5
duration	9	L4, U1
dynamic	7	L1, U5
economy	1	L1, U7
edit	6	L4, U8
element	2	L4, U1
eliminate	7	L2, U9
emerge	4	L2, U1
emphasis	3	L2, U9
empirical	7	L3, U4
enable	5	L3, U10
encounter	10	L3, U5
energy	5	L2, U5
enforce	5	L4, U7
enhance	6	L3, U1
enormous	10	L3, U8
ensure	**3**	**L2, U5; L0, U6**
entity	5	L4, U5
environment	**1**	**L2, U1; L3, U8; L0, U3**
equate	2	L2, U2
equip	7	L2, U3
equivalent	5	L3, U10
erode	9	L1, U9
error	4	L1, U10
establish	1	L1, U6
estate	6	L4, U6
estimate	1	L2, U10
ethic	9	L2, U9
ethnic	4	L2, U1; L3, U3
evaluate	2	L1, U10
eventual	8	L4, U3
evident	**1**	**L4, U2; L0, U8**
evolve	5	L2, U7
exceed	6	L4, U1
exclude	3	L4, U7
exhibit	8	L2, U5
expand	5	L1, U7
expert	6	L3, U8
explicit	6	L1, U3
exploit	8	L1, U5
export	1	L1, U3
expose	5	L3, U5
external	5	L2, U10
extract	7	L3, U2
facilitate	5	L4, U1
factor	**1**	**L3, U8; L0, U4**
feature	**2**	**L4, U1; L0, U2**
federal	6	L2, U3
fee	6	L1, U1
file	7	L4, U6
final	2	L4, U3
finance	1	L2, U2
finite	7	L1, U9
flexible	6	L3, U9
fluctuate	8	L2, U7
focus	2	L3, U8
format	9	L4, U8
formula	1	L4, U8
forthcoming	10	L4, U3
found	9	L4, U8
foundation	7	L4, U4
framework	3	L1, U1
function	**1**	**L3, U1; L0, U1**
fund	3	L3, U3
fundamental	5	L4, U4
furthermore	6	L4, U9
gender	6	L2, U8
generate	5	L1, U5
generation	5	L1, U7
globe	7	L3, U2
goal	4	L3, U3
grade	7	L1, U7
grant	4	L2, U9
guarantee	7	L2, U8
guideline	8	L3, U3
hence	4	L3, U5
hierarchy	7	L3, U4
highlight	8	L4, U3
hypothesis	4	L4, U7
identical	7	L4, U5
identify	**1**	**L4, U2; L0, U7**
ideology	7	L4, U6
ignorance	6	L2, U9
illustrate	3	L4, U9
image	5	L3, U5
immigrate	3	L2, U1
impact	2	L1, U9
implement	4	L1, U2
implicate	4	L4, U7
implicit	8	L1, U3
imply	3	L4, U7
impose	4	L1, U10
incentive	6	L1, U10
incidence	6	L3, U10
incline	10	L1, U7
income	1	L1, U3
incorporate	6	L4, U4
index	6	L1, U4
indicate	**1**	**L2, U4; L0, U10**
individual	1	L1, U1
induce	8	L3, U7
inevitable	8	L2, U8
infer	7	L1, U8
infrastructure	8	L4, U6
inherent	9	L1, U1

Oxford 3000™ words

Word	Sublist	Location
inhibit	6	L1, U5
initial	**3**	**L3, U7; L0, U8**
initiate	6	L2, U10
injure	2	L1, U1
innovate	7	L1, U3
input	6	L3, U6
insert	7	L2, U9
insight	9	L3, U7
inspect	8	L3, U3
instance	3	L1, U6
institute	2	L2, U8
instruct	6	L4, U2
integral	9	L1, U4
integrate	4	L2, U7
integrity	10	L3, U7
intelligence	6	L3, U8
intense	8	L1, U2
interact	3	L1, U8
intermediate	9	L2, U7
internal	4	L3, U7
interpret	1	L3, U3
interval	6	L2, U5
intervene	7	L2, U8
intrinsic	10	L4, U4
invest	2	L2, U4
investigate	4	L4, U8
invoke	10	L1, U3
involve	1	L2, U3
isolate	7	L3, U4
issue	**1**	**L4, U2; L0, U8**
item	**2**	**L3, U10; L0, U7**
job	4	L1, U1
journal	2	L2, U6
justify	3	L2, U3
label	4	L2, U2
labor	1	L1, U2
layer	3	L3, U4
lecture	6	L4, U2
legal	1	L2, U3
legislate	1	L3, U3
levy	10	L2, U9
liberal	5	L2, U1
license	5	L3, U9
likewise	10	L4, U5
link	**3**	**L1, U8; L0, U1**
locate	**3**	**L2, U1; L0, U1**
logic	5	L1, U6
maintain	**2**	**L4, U1; L0, U9**
major	**1**	**L3, U2; L0, U5**
manipulate	8	L4, U4
manual	9	L3, U10
margin	5	L4, U3
mature	9	L1, U8
maximize	3	L2, U8
mechanism	4	L3, U9
media	7	L1, U5
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medium	9	L2, U2
mental	5	L2, U6
method	1	L4, U9
migrate	6	L3, U2
military	9	L1, U4
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minimize	8	L1, U1
minimum	6	L4, U5
ministry	6	L1, U2
minor	3	L3, U7
mode	7	L4, U7
modify	5	L2, U3
monitor	5	L2, U3
motive	6	L1, U6
mutual	9	L3, U3
negate	3	L4, U2
network	5	L3, U2
neutral	6	L2, U10
nevertheless	6	L4, U10
nonetheless	10	L4, U7
norm	9	L4, U6
normal	2	L3, U8; L4, U2
notion	5	L4, U9
notwithstanding	10	L2, U1
nuclear	8	L2, U7
objective	5	L1, U10
obtain	**2**	**L3, U6; L0, U10**
obvious	4	L3, U7
occupy	4	L1, U9
occur	1	L1, U2
odd	10	L1, U8
offset	8	L4, U8
ongoing	10	L3, U3
option	4	L4, U7
orient	5	L2, U5
outcome	3	L3, U4
output	4	L1, U7
overall	4	L2, U6
overlap	9	L1, U7
overseas	6	L1, U1
panel	10	L1, U6
paradigm	7	L2, U6
paragraph	8	L3, U6
parallel	4	L3, U9
parameter	4	L4, U5
participate	2	L1, U8
partner	3	L3, U1
passive	9	L2, U8
perceive	2	L2, U9
percent	1	L2, U10
period	1	L2, U6
persist	10	L2, U4
perspective	5	L3, U2
phase	4	L1, U8
phenomenon	7	L2, U5
philosophy	3	L4, U5
physical	**3**	**L4, U4; L0, U4**
plus	8	L4, U5
policy	1	L3, U3
portion	9	L3, U9
pose	10	L3, U1
positive	2	L1, U5
potential	**2**	**L4, U8; L0, U10**
practitioner	8	L1, U2
precede	6	L2, U4
precise	5	L3, U10
predict	4	L2, U1
predominant	8	L1, U8
preliminary	9	L4, U1
presume	6	L2, U2
previous	**2**	**L2, U5; L0, U5**
primary	2	L1, U1
prime	5	L4, U4
principal	4	L4, U5
principle	**1**	**L3, U9; L0, U9**
prior	4	L3, U6
priority	7	L1, U2
proceed	**1**	**L4, U9; L0, U3**
process	1	L1, U9
professional	4	L1, U5
prohibit	7	L3, U10
project	4	L4, U4,U9
promote	4	L2, U6
proportion	3	L1, U10
prospect	8	L2, U6
protocol	9	L2, U4
psychology	5	L4, U2
publication	7	L3, U1
publish	3	L1, U3

Oxford 3000™ words

Word	Sublist	Location
purchase	**2**	**L2, U9; L0, U7**
pursue	5	L3, U8
qualitative	9	L3, U9
quote	7	L4, U10
radical	8	L3, U4
random	8	L2, U7
range	2	L3, U1
ratio	5	L1, U8
rational	6	L3, U3
react	**3**	**L2, U6; L0, U3**
recover	6	L3, U4
refine	9	L4, U4
regime	4	L2, U10
region	2	L3, U1
register	3	L2, U2
regulate	**2**	**L3, U6; L0, U9**
reinforce	8	L2, U5
reject	5	L1, U7
relax	9	L1, U8
release	7	L4, U1
relevant	2	L4, U8
reluctance	10	L2, U4
rely	**3**	**L3, U2; L0, U6**
remove	**3**	**L3, U2; L0, U8**
require	**1**	**L4, U2; L0, U9**
research	1	L4, U2
reside	2	L1, U2
resolve	4	L3, U4
resource	2	L3, U8
respond	1	L4, U7
restore	8	L3, U5
restrain	9	L2, U7
restrict	**2**	**L2, U9; L0, U5**
retain	4	L4, U3
reveal	6	L3, U8
revenue	5	L2, U2
reverse	7	L2, U7
revise	8	L3, U6
revolution	9	L1, U1
rigid	9	L2, U7
role	1	L1, U5
route	9	L2, U5
scenario	9	L3, U7
schedule	8	L4, U9
scheme	3	L4, U3
scope	6	L4, U8
section	1	L2, U5
sector	1	L1, U3
secure	**2**	**L4, U6; L0, U8**
seek	**2**	**L4, U3; L0, U4**
select	2	L3, U1
sequence	3	L3, U5
series	4	L3, U5
sex	3	L1, U3
shift	**3**	**L4, U9; L0, U2**
significant	**1**	**L3, U10; L0, U6**
similar	**1**	**L2, U1; L0, U2**
simulate	7	L3, U1
site	2	L1, U6
so-called	10	L2, U8
sole	7	L4, U1
somewhat	7	L1, U4
source	**1**	**L3, U2; L0, U10**
specific	1	L1, U6
specify	3	L4, U6
sphere	9	L3, U7
stable	5	L4, U5
statistic	4	L4, U7
status	4	L3, U2
straightforward	10	L3, U4
strategy	**2**	**L2, U5; L0, U9**
stress	4	L4, U4
structure	**1**	**L2, U1; L0, U5**
style	5	L1, U4
submit	7	L2, U9
subordinate	9	L4, U3
subsequent	4	L1, U1
subsidy	6	L2, U2
substitute	5	L1, U1
successor	7	L2, U9
sufficient	**3**	**L2, U10; L0, U4**
sum	4	L1, U10
summary	4	L2, U10
supplement	9	L4, U10
survey	2	L1, U3
survive	7	L3, U2
suspend	9	L1, U10
sustain	5	L2, U4
symbol	5	L2, U2
tape	6	L1, U6
target	5	L3, U10
task	3	L1, U8
team	9	L2, U6
technical	3	L1, U6
technique	**3**	**L2, U1; L0, U6**
technology	**3**	**L3, U8; L0, U7**
temporary	9	L1, U9
tense	8	L1, U10
terminate	8	L1, U9
text	2	L2, U4
theme	8	L2, U2
theory	**1**	**L4, U4; L0, U9**
thereby	8	L4, U3
thesis	7	L4, U7
topic	7	L3, U3
trace	6	L1, U9
tradition	**2**	**L3, U6; L0, U4**
transfer	**2**	**L4, U1; L0, U3**
transform	6	L2, U7
transit	5	L3, U5
transmit	7	L4, U4
transport	**6**	**L4, U10; L0, U9**
trend	5	L4, U6
trigger	9	L3, U7
ultimate	7	L1, U9
undergo	10	L4, U1
underlie	6	L4, U6
undertake	4	L2, U3
uniform	8	L3, U1
unify	9	L4, U5
unique	**7**	**L2, U1; L0, U7**
utilize	6	L3, U8
valid	3	L4, U10
vary	**1**	**L3, U10; L0, U2**
vehicle	8	L4, U3
version	5	L3, U5
via	8	L1, U4
violate	9	L3, U6
virtual	8	L2, U10
visible	7	L3, U5
vision	9	L4, U3
visual	8	L3, U7
volume	3	L2, U4
voluntary	7	L1, U10
welfare	5	L4, U1
whereas	5	L4, U2
whereby	10	L1, U4
widespread	8	L4, U10

Oxford 3000™ words

VIDEO TRANSCRIPT

Speaker 1: It is being inside a person's body but more than this, it is being inside organs in the person's body.

Speaker 2: The images you see were not shot on a movie set. It's not a laser light show, or a videogame. This is the Cave.

Speaker 1: Now we are inside a cell.

Speaker 2: Cave is tucked inside a small room on the 13th floor of Weill Cornell Medical College in New York City. It's cutting-edge technology that may revolutionize how we understand our bodies and treat diseases ranging from cancer to blindness. Time now to enter the three-dimensional world of modern medicine. Let's go inside the Cave. All right, doc, what do we have? Oh, wow. We got a tour by Weill Cornell's Doctor Harel Weinstein.

Speaker 1: We can both walk straight into the image that we saw.

Speaker 2: Incredible!

Speaker 1: So that now we are inside the skull.

Speaker 2: Yeah, you probably can't appreciate this at home because you don't have the glasses on, but it is incredible. Cave builds on medical technology that's been around for decades, like the MRI, by using the two-D slides with a sophisticated network of computers and cameras. So what about your career? Did you ever think something like this would be possible?

Speaker 1: I was dreaming about it, but I didn't think that I would be able to implement it and work with it.
Speaker 3: We are inside your eye, as if you were shrunk down and tossed inside the eye.

Speaker 2: It's helping physicians like Doctor Szilard Kiss, an ophthalmologist who uses Cave to see the eye in ways never seen before.

Speaker 3: You're examining the relationship of these mounds to each other.

Speaker 2: By looking at this patient's retina in the cave, Doctor Kiss was able to see the visible bumps of fluid that lay beneath the surface of the retina.

Speaker 3: And so the prognosis for visual recovery in this case is very good.

Speaker 2: It's a finding like this that gives hope to doctors and patients alike. To know that this exists has got to be, I would think, such a bright spot for medicine.

Speaker 1: It should give us all hope that we will understand more and therefore be able to do more for all of us.

VIDEO TRANSCRIPT

Speaker 1: It's that time of year, time to spring forward an hour. We do it, but do you know why we do it? Who started it?

Speaker 2: I'm not even sure anymore when it's daylight -- when I lose an hour, gain an hour.

Speaker 3: I thought it had something to do with farming. And having more usable daylight.

Downing: The farmers, more than any other Americans, hated Daylight Saving Time.

Speaker 1: Professor and author Michael Downing knows whereof he speaks, and it turns out, we got it wrong about farmers.

Downing: From the beginning they told Congress, "Roosters can't tell time! They're going to get up with the sunrise!"

Speaker 1: To find the true origin of this timely tradition, you need to walk the dusty streets of post-Victorian England.

Downing: Daylight Saving really begins in 1907 with a man on a horse in London. William Willett, an architect, but importantly to this story, a golfer, is riding through London at sunrise and he notices all of London has its shutters closed, and he thinks, "What a terrible waste of a natural resource!"

Speaker 1: So, eager to have that extra hour of daylight for his golf game, the avid golfer published a proposal.

Downing: The British debated for 10 years. As soon as they go to adopt it, Germany beats them to the punch. It's a sneak attack, the Germans in World War I get Daylight Saving first, the British are second, and then the Americans and Europe follow.

Speaker 1: And as a result...

Downing: There was a bus trip in the Virginia area at one point before we had uniform time, where to go about 35 miles you had to pass through seven different times.

Speaker 1: And it's not just we Americans who are confused by it all.

Downing: 1930. Joseph Stalin turns all the clocks in the Soviet Union ahead by an hour in April. Unfortunately, that October he forgets to fall backward. Apparently no one dare tell Stalin that he forgot. 61 years, I'm not making this up; every clock is off by an hour because of the confusion over Daylight Saving Time.

Speaker 1: Here at home, the debate over spring forward/fall back continued, until 1966, when the Federal Government passed the Uniform Time Act, to make life easier. Unless of course you find yourself riding a train on that October Sunday when the clock falls back an hour. Rather than run the risk of arriving an hour early, Amtrak stops its trains in their tracks.

VIDEO TRANSCRIPT

Downing: And you sit on the railroad tracks with your fellow passengers enjoying an hour of going nowhere.

Child: Woo...

Speaker 1: Some frolic in the extra daylight, others fret.

Speaker 2: I am devastated. I'm already behind on sleep and this isn't going to help me one bit.

Speaker 1: Though some dread turning the clocks ahead, there's really naught to fear, because that hour of missing sleep just means that spring is here.

VIDEO TRANSCRIPT

Speaker 1: When the Big East colleges held a job fair recently, Jason Zema was at the front of the line.

Jason Zema: I was out there at 5 o'clock this morning. Are you waiting in line for this table?

Speaker 1: A business major, Zema graduated from the University of Connecticut last summer.

Jason Zema: Quite a big turnout and you know you only got about 30 seconds where you can talk to an employer.

Speaker 1: Employers do plan to hire more new graduates this year, surveys say. You've been looking for work for over a year.

Jason Zema: Oh yeah, internships, full-time positions, anything.

Speaker 1: Are you getting discouraged?

Jason Zema: Ah, yeah.

Speaker 1: The job market may be improving slightly but with the sea of competition so deep, some students have decided they're not going to wait on line at job fairs anymore.

Campbell: The job fair is 400 people competing for 10 jobs.

Speaker 1: John Campbell is a senior at Babson College outside Boston.

John Campbell: It's all about creating your own destiny.

Speaker 1: Campbell was just a sophomore when he found a storefront here in Saugus, Massachusetts and set up shop in the back room. He took the money he'd raised working summer jobs, pooled it with two college friends and together they opened Foot Traffik. You're in the collectable athletic footwear business?

John Campbell: I guess you could say that, yeah, yeah, I'm a sneaker head.

Speaker 1: Through the store and a website he's selling limited edition sneakers to high school and college kids.

Campbell: That's good.

Speaker 1: Colleges reported growing interest in entrepreneurship courses.

Scott Gerber: Right now you should be focusing on two things.

Speaker 1: Twenty-seven year old Scott Gerber, who started several businesses. . .

Scott Gerber: Be somebody who is going to think about, how am I going to get started?

VIDEO TRANSCRIPT

Speaker 1: . . .now teaches seminars to other aspiring entrepreneurs.

Scott Gerber: Entrepreneurship has become a viable career path, whereas it used to be considered a renegade's choice.

Speaker 1: Christy Tyler is what they call a "sidropreneur." Tyler got a job as a paralegal while she was in school.

Christy Tyler: Can you guys kiss again?

Speaker 1: But she's using that money to start her own photography business. The risks of entrepreneurship are high; roughly half of all new businesses fail in the first five years, but John Campbell says, "It's worth it."

John Campbell: The security that the job market offered, you know, 20 years ago isn't there.

Speaker 1: By selling fancy footwear he's run around the job market, and he's charting his own path.

John Campbell: Take care, man.

Speaker 5: Later on man.

VIDEO TRANSCRIPT

Speaker 1: At the heart of China's rapidly expanding six-trillion-dollar economy is a massive building boom. Skyscrapers, shopping malls, high-speed trains, even new cities are popping up. One of those cities is Dantu. Located 150 miles northwest of Shanghai, its streets are modern and freshly paved. Cranes dot the skyline amid new plazas, parks, and housing developments. But the bustling crowds have yet to materialize.

Leo: It's strangely quiet.

Speaker 1: Leo is a teacher in Dantu, who recently bought a home here with a loan from a bank. Can you show me where the apartment that you bought is?

Leo: Oh, it's over there, and that is one of the best walls in this area.

Speaker 1: One of China's so-called "empty cities," Dantu was created by the government to spur economic growth and to help urbanize the country's largely rural population. Here in the center of Dantu, you can feel the emptiness. It plays to the old thinking, "If you build it, they will come." And the Chinese government is hoping the people eventually will. China's steady economic growth has made it the second strongest economy in the world. Its population, at 1.3 billion, is the largest. Yet only a tiny fraction of the Chinese people can afford to live in a city like Dantu.

Roger Baker: In many places, these cities are going empty, while right around the city, there's actually a shortage of housing for China's attempts to urbanize.

Speaker 1: Analysts like Roger Baker say the overdevelopment could set off a real estate crisis, even larger than what we faced in the United States.

Roger Baker: I think that people would certainly call this a bubble. We see the prices continuing to rise. We see them being fed, in many ways, by speculation.

Speaker 1: Baker warns that could take a serious toll, not just on China, but on the world.

Roger Baker: At a time when the European economies are in a state of crisis and the Chinese economy goes into a state of crisis, you basically knock offline — what, two-thirds of world's economic activity.

Speaker 1: But for locals like Leo, less concerned with the value of his home, he's happily enjoying something rare in China, the quiet of a big city.

Leo: It's quite relaxing, I think. This is really clean and the quality of the house is really good.

VIDEO TRANSCRIPT

Speaker 1: June 26th, 1974, 31 years ago today, the date of the biggest development in modern retailing, bar none.

Speaker 2: Scan, scan, scan.

Speaker 3: You hear the beep, beep, beep.

Speaker 4: Neh, neh, neh.

Speaker 5: I don't think any of us realized at the time how far this was going to go.

Speaker 1: No one knew at first how big the bar code scanning would become. They eventually found out. In 1992, President Bush seemed to be one of the last people to find out.

Bush: You just cross this oval plate?

Speaker 1: Today, we relive it every time we enter a modern supermarket, where every item bears an identifying series of vertical bars; where the laser scanner at the check-out, tallies the prices and tracks the inventory, with a never ending chorus of chirping beeps. New uses for bar codes and scanners are being dreamed up all the time. Prescription drug labels, for example, now feature this updated version of bar coding called "reduced space symbology." Not everyone is convinced of the bar code's merits. Some privacy advocates worry that the bar code technology is being used to track us and our buying habits, while some shoppers see them as just one more impersonal touch in an impersonal age. Whatever you think, there's little doubt that bar codes and scanners are here to stay. Until, that is, somebody makes the technological breakthrough that adds up our bill even faster.

VIDEO TRANSCRIPT

Speaker 1: The horse had long bolted by the time police were shutting the barn door at the Paris Museum of Modern Art, examining the discarded frames of the stolen artworks. Police said the thief or thieves simply cut a padlock and broke a window to get in last night. No alarm went off; three guards inside apparently heard nothing. No leads, just speculation.

Julian Radcliffe: There were a thousand stolen Picassos on the database. So, that's been recovered.

Speaker 1: Julian Radcliffe keeps tabs on stolen art for galleries and collectors worldwide.

Julian Radcliffe: Those who steal the art won't put them up for public sale.

Speaker 1: Charlie Hill is a transplanted American, ex-London cop who has recovered several famous stolen paintings. "The art theft world," Hill says, "is not like in the movies."

Charlie Hill: The first thing to do is put out of your mind Dr. No or Mr. Big, saying, "I want that Rembrandt. Go steal it for me." No, it's too risky for them.

Speaker 1: But that doesn't seem to stop them.

VIDEO TRANSCRIPT

Mary Seton Corboy: We grow eggplant, peppers. We grow beets in the spring and all different kinds of greens.

Speaker 1: Mary Seton Corboy loves showing off what she grows.

Mary Seton Corboy: These are fat figs and you know that a fig is ready to go when it pulls away very easily from the stem.

Speaker 1: But she's equally proud of where she grows it, on a once vacant, one acre lot in an inner city neighborhood near downtown Philadelphia. She bought the place ten years ago for $25,000 and dubbed it Greensgrow Farm. And weren't there some environmental problems when you started it?

Mary Seton Corboy: Well, that was why it was so cheap. This was a galvanizing plant.

Speaker 1: Land once polluted by arsenic, lead and zinc has undergone a massive cleanup. As an additional precaution everything is grown either hydroponically or in raised beds filled with organic soil. Corboy, a former chef, is at the forefront of a nationwide trend known as the urban farm movement.

Mary Seton Corboy: It's a very short distance from fruitcake to pioneer, I think, very short.

Speaker 1: The idea is to turn a city's vacant lots into green spaces.

Mary Seton Corboy: What we offer people is food that's just been harvested, that's just been picked.

Speaker 1: Greensgrow, a non-profit that makes enough money to pay its 11 employees, sells produce right on site. It's better than the grocery store food?

Speaker 2: Oh yeah, honey. It's so fresh and tasteful. String beans are good, the corn is fabulous.

Speaker 1: But most of the food grown here goes to restaurants like Standard Tap. Chef Carolyn Engle often builds her menu around Greensgrow produce, like these heirloom tomatoes.

Carolyn Engle: It's straight from the farm and it's a beautiful product. I love supporting that and they're doing a great thing for the neighborhood.

Speaker 1: And it's not just Philadelphia. Urban farms are blossoming all over the country, including here in Chicago. On a plot of land between the city's upscale Gold Coast and the notorious Cabrini Green Public Housing project, Ken Dunn runs City Farm, what's called a mobile farm stand on city-owned land.

Ken Dunn: It's a deal that we agreed to clean up, beautify, and protect a property that they own in exchange for a lease but no payment. And so they get a lot for what they give us.

Speaker 1: The farm, the second that Dunn has developed on city land, is self-supporting. He likes the idea that he can put vacant lots to good use until the city needs them for something else.

Ken Dunn: So, that was the initial agreement; we can do this if you tell us where to put our farm when you use this property again.

VIDEO TRANSCRIPT

Speaker 1: Chicago also has permanent urban farms like Growing Home, on the city's south side.

Speaker 3: These branches, that's already got this all here, you break them down smooth.

Speaker 1: It's not just crops that are nurtured. There's also a program that employs and trains the homeless, recovering addicts, and ex-cons. Executive Director, Harry Rhodes.

Harry Rhodes: When you're growing food, planting that seed and seeing it grow, it has a huge effect on people.

Speaker 1: People like Paris Brewer. How long were you in jail?

Paris Brewer: Thirteen years and nine months.

Speaker 1: So, what has working here done for you?

Paris Brewer: It kept me grounded and really just helped me all the way around. I like everything about working here.

Speaker 1: Now he is the farm's market coordinator.

Paris Brewer: Alright, you ain't got to be no stranger. Just come on back, check us out.

Speaker 1: And though the people eagerly buying may not know the stories of those who grow the food, they are aware that everything here is produced with tender loving care right in their own city.

VIDEO TRANSCRIPT

David Shukman: Inch by inch, a new source of energy is emerging, the size of a submarine. Here at the dockside in Leith near Edinburgh, a vast wave power machine. Nearby, mounds of coal. It was coal that fueled the Industrial Revolution. Could sea power be next? And this component is now being lowered into the sea, an operation that'll have to be repeated thousands of times at the start of what's been described as a new era of harnessing the power of the sea. This system captures the swell. Each wave passing along the cylinders moves the hinges that connect them, and that motion drives generators.

I'll just follow along. In the assembly hall I was given the chance to see inside, down through the hatch. Oh, it's just like being inside a submarine. It's a strange new technology. So far it's cost some 40 million pounds. Out at sea, there'll be no one in here to feel the rocking of the waves. And here at the end of this giant cylinder is where they actually generate the power. Let me show you how that's done. Every time a wave passes along this system, the cylinders move. And where they're hinged, there are these huge hydraulic pumps, like bicycle pumps. And that captures the energy of the waves, is channeled into a generator like this, and ends up producing electricity. Cables will bring the power ashore. But what if there are no waves? This thing will be useless on a flat day.

Speaker 2: On a flat day we won't produce any power, that's right. But the important thing is the contribution on average over the year. Every megawatt we generate is a megawatt that doesn't need to be created by fossil fuels.

David Shukman: This plan to harness the power of the sea is the largest of its kind in the world. Electricity for 750,000 homes could be produced, if all the projects go ahead. That's 1.2 gigawatts, what a conventional power station generates—a bold ambition from the official agency leasing out 10 areas of sea bed.

Speaker 3: This is a very important day. What we've actually done is taken a very big step to making a new technology—a renewable energy technology, wave and tidal, commercially deployable on a grand, on a big scale.

David Shukman: The designs range from wave machines swaying in the swell, to giant turbines spinning in the tides, and huge propellers harnessing the currents. Another component is launched. There may yet be unexpected costs or challenges. It's still early days. David Shukman, BBC News, in Leith.