

5

READING EXPLORER

THIRD EDITION

TEACHER'S BOOK

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 NATIONAL
GEOGRAPHIC
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National Geographic Learning,
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**Reading Explorer Teacher's Book 5
Third Edition**

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ISBN-13: 978-0-357-12469-7

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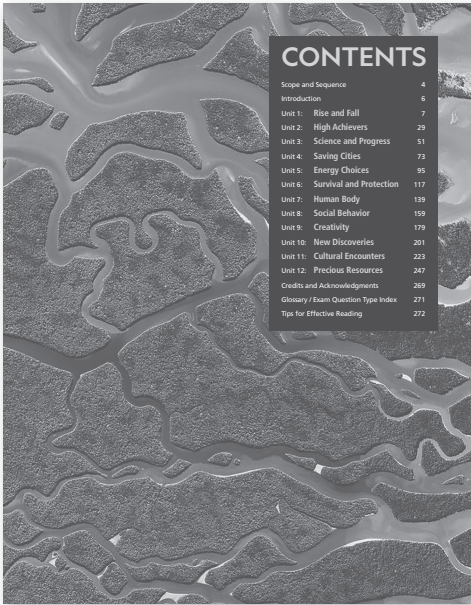
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TAKE A TOUR OF READING EXPLORER

Thank you for choosing to use *Reading Explorer* 3rd Edition Level 5.
Here are 7 steps to help you get familiar with the course:

- 1 First, look at the list of **Contents** on page 3 of the Student's Book. You'll see the book is organized into 12 units. The book can be used for a short course of 24–36 hours using just the core units or can be extended for longer courses, for example, by using the **Video** activities in class. **Split editions** are also available for shorter courses.
- 2 Look at the **Scope and Sequence** on pages 4–5 of the Student's Book. You'll see that each unit is based on a theme of general interest, for example, "Science and Progress." Within each unit are two lessons, each based around a reading passage. Each lesson covers a range of reading skills and vocabulary building activities. An **introduction** on page 6 of the Student's Book highlights the new features of the Third Edition.
- 3 Skim through a **Unit** of the Student's Book and compare it against the Unit Walkthrough on the following pages of this Teacher's Book. The Teacher's Book also provides teaching suggestions and background notes for each unit.



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SCOPE AND SEQUENCE			
UNIT	THEME	READING	VIDEO
1	Rise and Fall	A: Secrets of the Maya B: The Collapse of Angkor	Legacies of the Maya
2	High Achievers	A: The Sky Runner B: The Free Soloist	Soloing Safely
3	Science and Progress	A: The Age of Disbelief B: Goalkeepers for the Planet	Energy Entrepreneur
4	Saving Cities	A: City Under Siege B: Rising Seas	Hurricanes
5	Energy Choices	A: Our Energy Diet B: Plugging into the Sun	Eco-Detectives
6	Survival and Protection	A: Quicksilver B: Building the Ark	Life on Ice
7	Human Body	A: Secrets of the Brain B: Human Bionics	A Giant Step
8	Social Behavior	A: The Genius of Swarms B: Of Ants and Humans	Crane Migration
9	Creativity	A: Decoding Leonardo B: The Power of Writing	Infinity Artist
10	New Discoveries	A: Cosmic Dawn B: Element Hunters	Black Holes
11	Cultural Encounters	A: The World of Süleyman the Magnificent B: When the Moors Ruled Spain	Crossroads of the World
12	Precious Resources	A: Gold Fever B: The Rush for White Gold	The Lure of Lithium

ACADEMIC SKILLS		
READING SKILL	VOCABULARY BUILDING	CRITICAL THINKING
A: Understanding Complex Infographics (1) B: Evaluating Arguments (1)	A: Collocations with <i>grueling</i> B: Word root: <i>reg</i>	A: Analyzing Evidence B: Applying Ideas; Reflecting
A: Guessing Meaning from Context—Idioms and Colloquial Language B: Understanding Rhetorical Purpose	A: Word usage: <i>merely</i> B: Collocations with <i>plummet</i>	A: Applying Ideas B: Inferring Reasons; Reflecting
A: Identifying Figurative Language B: Making Inferences (1)	A: Word usage: <i>bias, prejudice, discrimination</i> B: Collocations with <i>initiative</i>	A: Applying Ideas B: Evaluating Ideas; Evaluating Problems
A: Recognizing Literal versus Figurative Language B: Evaluating Arguments (2)—Reading Critically	A: Word usage: <i>complement and compliment</i> B: Expressions with <i>take</i>	A: Analyzing Arguments B: Evaluating Solutions; Applying Ideas
A: Distinguishing Main Ideas and Supporting Information B: Determining Similarities and Differences	A: Collocations with <i>obstacle</i> B: Prefixes and Suffixes	A: Evaluating Solutions B: Analyzing Arguments; Applying Ideas
A: Understanding Words with Multiple Meanings B: Determining the Meaning of Root Words	A: Word root: <i>turb</i> B: Synonyms for <i>imminent</i>	A: Identifying Evidence B: Analyzing Arguments; Synthesizing Information
A: Understanding the Use of the Passive Voice B: Distinguishing Fact from Opinion	A: Collocations with <i>unprecedented</i> B: Collocations with <i>valid</i>	A: Reflecting B: Justifying Opinions; Applying Ideas
A: Making Inferences (2) B: Identifying Multiple Answers to Questions	A: Collocations with <i>coherent</i> B: Collocations with <i>fatal</i>	A: Identifying Pros and Cons B: Analyzing Arguments; Applying Ideas
A: Understanding Complex Infographics (2) B: Using Graphic Organizers to Organize Key Ideas	A: Collocations with <i>deny</i> B: Word root: <i>man</i>	A: Justifying Opinions B: Identifying Pros and Cons; Synthesizing Information
A: Increasing Your Reading Speed B: Understanding Long Sentences	A: Word root: <i>mit</i> B: Collocations with <i>quest</i>	A: Justifying Opinions B: Identifying Pros and Cons; Inferring Information
A: Creating a Mental Map of a Text B: Inferring an Author's Attitude	A: Word usage <i>bias and biased</i> B: Collocations with <i>violate</i>	A: Identifying Evidence B: Reflecting; Personalizing
A: Identifying Coherence Devices B: Synthesizing Ideas Across Readings	A: Suffix: <i>-ship</i> B: Word root: <i>vers</i>	A: Evaluating Pros and Cons B: Evaluating Arguments; Synthesizing Ideas

1A

BEFORE YOU READ

DISCUSSION A. Look at the photo and read the caption. What do you know about the Maya civilization? Share your ideas with a partner.

PREDICTING B. Why do you think cenotes were important to the ancient Maya? Discuss your ideas with a partner. Then read the passage to check your answer.

➤ Archaeologist Guillermo de Anda descends into the Holtún cenote in Mexico's Yucatán Peninsula. Experts believe that cenotes—deep holes formed in limestone—were important to the ancient Maya, which ruled this part of the world from around 250 to 900 A.D.

SECRETS OF THE MAYA

The study of caves and wells in Mexico's Yucatán Peninsula is shining new light on the beliefs of the ancient and modern Maya.

A From deep in a well near the ruins of the Maya city of Chichén Itzá, archaeologist Arturo Montero shouts to his colleague on the surface, "I saw it, I saw it! Yes, it's true!" Learning over the mouth of the well, archaeologist Guillermo de Anda hopes to hear what he has suspected for many months. "What is true, Arturo?" he shouts. And Montero yells up again, "The zenith! light, it really works! Get down here!"

B The two archaeologists are anxious to confirm whether this cenote could have acted as a sacred sundial¹ and timekeeper for the ancient Maya. On two days every year—May 23 and July 19—the sun reaches its zenith over this part of Mexico. At those moments, the sun is vertically overhead and there is no shadow. On the morning of their descent, on May 24, Montero and de Anda see that the sun's rays are nearly vertical. The day before, they realized, a beam of light would have plunged straight down into the water.

C Beneath its narrow mouth, the walls of the cenote open up to become a giant dome. It looks like a cathedral, except for the roots of trees that penetrate the rock. The beam of sunlight dances like fire on the surrounding stalactites,⁴ and it turns the water a beautiful transparent blue. The archaeologists were probably the first people in centuries to watch the sun move slowly across the cenote's water.

1 An **archaeoastronomer** is someone who studies archaeological artifacts to determine what ancient people believed and understood about astronomy.
2 The **zenith** is a point directly above a particular location.
3 A **sundial** is a device used for telling the time when the sun is shining. The shadow of a pointer falls onto a surface marked with the hours.
4 **Stalactites** are rock formations hanging from cave ceilings, slowly formed by dripping water.

4 Turn to one of the **Reading Passages** (e.g., Student's Book 5 page 8). The passages are adapted from authentic National Geographic sources, which are listed in the Credits at the back of the Student's Book. Each passage is also available as an audio recording in the **DVD/Audio CD Package** and on the **Classroom Presentation Tool**, providing a useful model for pronunciation. Useful, high-frequency words, aligned with the CEFR, are highlighted in each reading passage.

5 Check out the **Video clips** on the **DVD/Audio CD Package**. The clips can be used with the **Video** section at the end of each Student's Book unit, and also with the video comprehension activities in the **Online Workbook**.

6 The following **support components** are available for each level of the series:

- **Online Workbook** featuring the 12 video clips from the Student's Book and a variety of interactive, self-grading activities.
- **Classroom Presentation Tool** with answer keys for the Student's Book activities and extra practice questions for target vocabulary.
- **Student's eBook** as a digital version of the Student's Book.
- An **Assessment Suite** containing ExamView® question banks is available for teachers who want to create customized tests or give students additional language practice.

7 A **Website** is also available at ELTNGL.com/readingexplorerseries. It contains audio recordings of the 24 reading passages, 12 video clips from each unit, video scripts of each video, a list of key vocabulary for that particular level, class worksheets, graphic organizers, ExamView® question banks, and the Teacher's Book.

INSTRUCTIONS ▲
Watch the video. Complete the summary.



communicate take care of behavior smaller extinct large

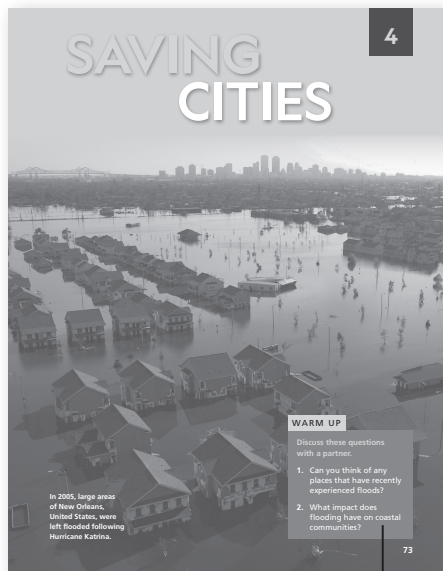
As most people are aware, the lion is a _____ cat. Lions can weigh several hundred pounds and grow to be over 10 feet long. But lions have many other interesting qualities.

For one thing, a lion's roar is very loud. Lions roar for different reasons; for example, to _____ with other lions and to keep other lions away from their territory. Another aspect of lion _____ is that they live in groups called prides. Prides usually consist of one male and several females. Prides work together to find food and _____ their offspring.

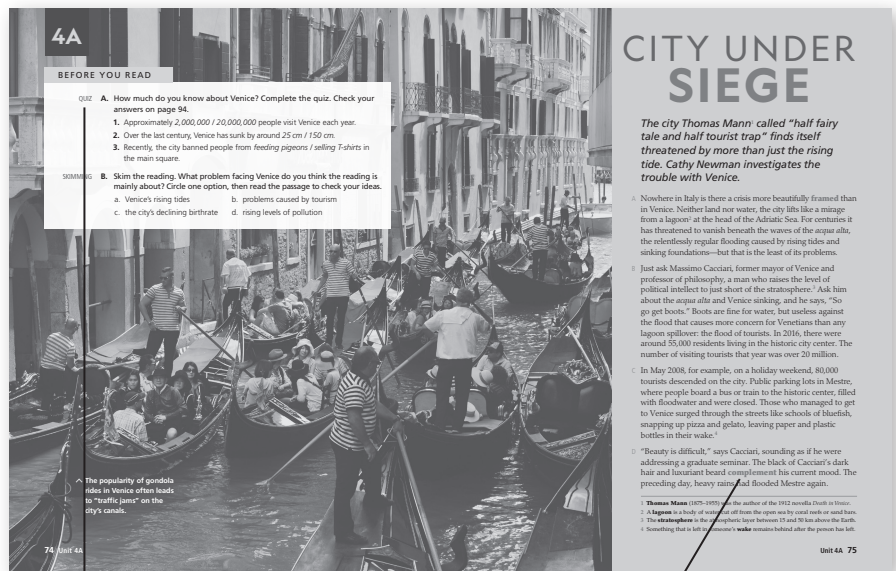
In the past, there were several lion species, but today, most are _____. Only two types remain, the African lion and the Asiatic lion. Sadly, today's lion population is getting _____ due to a combination of illness, hunting, and human impact on their habitats.

Show Answers Submit

UNIT WALKTHROUGH



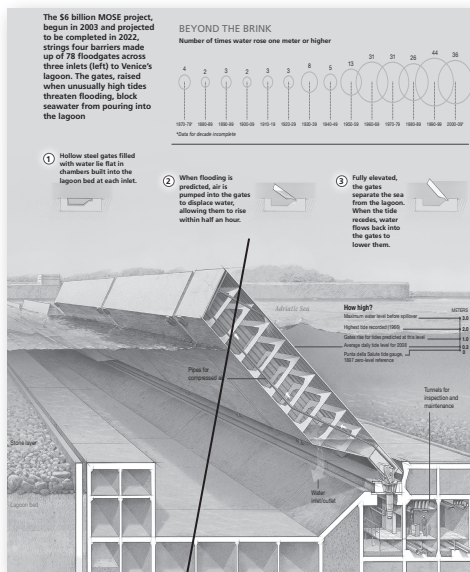
Warm Up discussion questions raise learners' interest in the unit theme and activate prior knowledge.



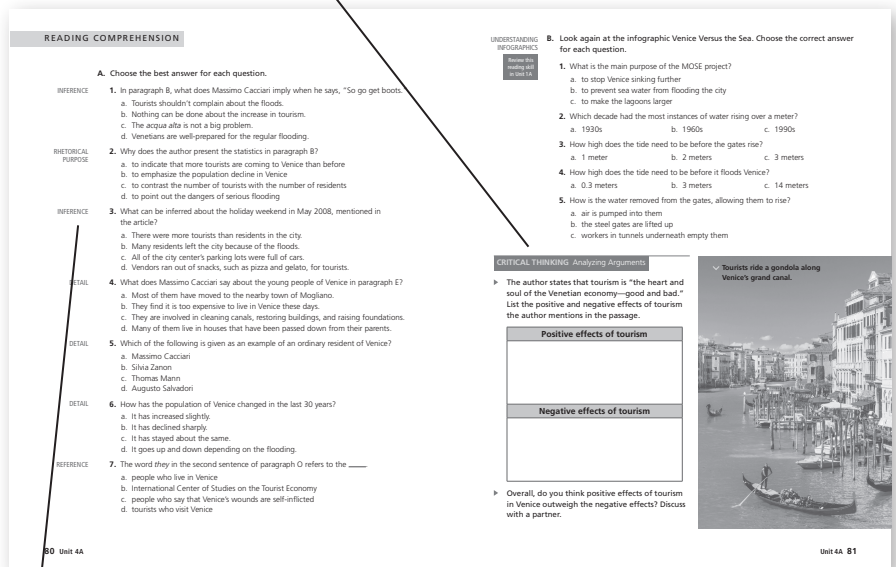
Before You Read tasks introduce key terms that learners will encounter in the reading passage, and develop previewing skills such as skimming and making predictions.

Each **Reading Passage** is adapted from an authentic National Geographic source. **Target vocabulary** is carefully selected in line with CEFR leveling.

Critical Thinking sections challenge learners to analyze, evaluate, and reflect on what they've read, and form their own opinions.



Infographics, maps, and charts support the reading passages and develop learners' visual literacy.



Reading Comprehension activities include various types of multiple choice questions as well as **exam-style question types** commonly encountered in standardized tests such as IELTS and TOEFL®.

READING SKILL

Recognizing Literal versus Figurative Language

It is important to be able to recognize when words and phrases are being used figuratively instead of literally. Figurative language—such as similes, metaphors, and personification—uses words with a meaning that is different from the literal interpretation.

The farmer plowed their fields. (Plow is used literally—farmers had real plows.)

The ship plowed through the sea. (Plow is used as a metaphor—the ship moved like a plow.)

CLASSIFICATION A. Find these words or phrases in Reading A. Write L if they are used literally or F if they are used figuratively.

1. _____ flooding (paragraph A)
2. _____ flood (paragraph B)
3. _____ foundations (paragraph E)
4. _____ elevated (paragraph G)
5. _____ defender (paragraph K)
6. _____ eggplant (paragraph N)
7. _____ wounds (paragraph O)
8. _____ bruised (paragraph Q)

INTERPRETING B. Read the excerpts from Reading A. Underline any figurative language, then choose the sentence that best describes what the author means.

1. Neither land nor water, the city lifts like a mirage from a lagoon at the head of the Adriatic Sea.
 - a. The city rises in a way that almost seems unreal.
 - b. The city looks like something you might see in a desert.
2. Just ask Massimo Cacciari, former mayor of Venice and professor of philosophy, a man who raises the level of political intellect to just short of the stratosphere.
 - a. Cacciari is the highest-ranking politician in Venice.
 - b. Cacciari is one of the smartest politicians in Venice.
3. Those who managed to get to Venice surged through the streets like schools of bluefish, snapping up pizza and gelato, leaving paper and plastic bottles in their wake.
 - a. The tourists moved in large, hungry groups.
 - b. The tourists raced through quickly and carelessly.
4. Ortolani thinks Venice will end up as simply a theme park for the rich, who will jet in to spend a day or two in their palaces, then leave.
 - a. In the future, Venice will not be a real, functioning city.
 - b. In the future, Venice will be a really fun place.

82 Unit 4A

4B

BEFORE YOU READ

DISCUSSION A. Look at the photo and read the caption. Why might rising sea levels be an issue for coastal communities? Discuss your ideas with a partner.

SKIMMING AND PREDICTING B. The reading passage discusses some of the challenges of rising sea levels. Read the headings and captions, and skim the passage. In your own words, write what you think these sections are mainly about. Then read the article to check your ideas.

Storm of the Century _____
Coastlines at Risk _____
Retreat from the Coast _____
Dutch Lessons _____

A roller coaster in New Jersey, United States, lies damaged and partially submerged in water following Hurricane Sandy.

84 Unit 4B

Reading Skill sections provide learners with the tools they need to become effective and critical readers. Core reading skills are recycled and reinforced throughout the book.

VOCABULARY PRACTICE

COMPLETION A. Complete the information. Circle the correct words.

A popular image of the European Alps consists of cowbells, cheese-making, and quiet villages framed / impressed against a background of snow-capped mountains. But that picture must also include the millions of trucks and cars that cross the mountains each year.

Transporting millions of tons of goods annually implements / inflicts significant damage on the local environment. Carbon dioxide from vehicle emissions becomes trapped in the narrow valleys. The steep valley walls also amplify the sounds generated by the traffic. The inadequate / elevated levels of noise and pollution are even thought to have affected the health of Alpine residents.

Laws have been elevated / implemented to lower the number of vehicles in residential areas, but they have so far proved inadequate / maximized at reducing traffic. There are hopeful signs, however: June 2016 saw the completion of the Gotthard Base Tunnel—the GBT—which is the world's longest rail tunnel. It is hoped that the tunnel will lessen the environmental strain on one of the world's most famous landscapes.



The Gotthard Base Tunnel while under construction

DEFINITIONS B. Match each word in the box with its definition.

complement impose maximize sentimental so-called

1. _____ commonly referred to by the specified name
2. _____ to increase as much as possible
3. _____ related to emotions rather than reason
4. _____ to form a good combination
5. _____ to force something on someone

WORD USAGE C. The words complement and compliment are sometimes confused. Compliment means "to say something nice to or about someone." Circle the correct word in these sentences.

1. It's nice to get complemented / complimented on a great essay.
2. A pink tie can complement / compliment a light gray suit.
3. Peanut butter is the perfect complement / compliment to jam.
4. Some diners like to send their compliments / compliments to the chef after dinner.

Unit 4A 83

Vocabulary Practice

sections focus on the target vocabulary items from the reading passage.

This section also provides expanded vocabulary practice focusing on collocations, word usage, and word families.

A second reading in each unit expands learners' knowledge of the unit theme and further builds vocabulary. Reading B is also followed by Reading Comprehension, Reading Skill, and Vocabulary Practice sections.

Each unit concludes with a video related to the unit theme, supported by previewing and viewing activities.

VIDEO

Hurricane Irma strikes the Florida coast.

HURRICANES

BEFORE YOU WATCH

DEFINITIONS A. Read the excerpts from the video. Match each word in bold with its definition.

"Scientists have a **thorough** understanding of how hurricanes form and **sustain** their power."
"Hurricanes form from a **cluster** of thunderstorms."
"Hurricanes can cause mass **devastation**."

1. sustain • (n) extreme damage or destruction
2. cluster • (adj) complete, including the finest details
3. thorough • (v) to continue or maintain
4. devastation • (n) a group of things that are close together

QUIZ B. What do you know about hurricanes? Complete the sentences by circling the best options.

1. Hurricanes form over cold / warm waters.
2. The very center of a hurricane is called the "eye" / "heart".
3. A storm is classed as a hurricane when wind speeds reach 74 / 174 mph.
4. Most deaths caused by hurricanes are a result of storm surges / falling trees.

Video 93

WHILE YOU WATCH

GST A. Watch the video. Check your answers in Before You Watch B.

DETAILS B. Watch the video again. Complete the sentences.

1. In the Atlantic Ocean, most hurricanes occur during _____.
2. Hurricanes form from groups of _____.
3. The "eyewall" is the _____ around the center of a hurricane.
4. The Saffir-Simpson scale ranks hurricanes on a scale of 1 to 5 based on wind speed and _____.
5. Hurricanes benefit our climate as they move heat from _____ to the poles, keeping the Earth's temperature stable.
6. As scientists learn more about hurricanes, they will be able to improve _____ systems and help _____ build better infrastructure.

CRITICAL THINKING: Applying Ideas

► In addition to hurricanes, what are some other natural disasters? Note your ideas below.

► Look back at your list. Which natural disaster do you think is the deadliest? Why? Note your ideas below, then discuss with a partner.

VOCABULARY REVIEW

Do you remember the meanings of these words? Check (✓) the ones you know. Look back at the unit and review any words you're not sure of.

- Reading A**
- | | | | | |
|--------------------------------------|----------------------------------|------------------------------------|--------------------------------------|------------------------------------|
| ☐ complement* | ☐ elevate | ☐ frame | ☐ implement* | ☐ impose* |
| ☐ inadequate* | ☐ inflict | ☐ maximize* | ☐ sentimental | ☐ so-called |
- Reading B**
- | | | | | |
|---------------------------------|---|-------------------------------------|-------------------------------------|------------------------------------|
| ☐ comply | ☐ die | ☐ envision | ☐ evacuation | ☐ retreat |
| ☐ surge | ☐ take for granted | ☐ vulnerable | ☐ will | ☐ withstand |

*Academic Word List

Answers to Before You Read A, page 74: 1. 20,000,000, 2. 25 cm, 3. feeding pigeons

94 Video

Critical Thinking encourages learners to connect the video's content with what they have learned in the rest of the unit.

Vocabulary Review sections give learners the chance to check their understanding of the unit's target vocabulary. Extra practice activities can be found on the Classroom Presentation Tool.

PACING GUIDE

One unit of *Reading Explorer* typically takes between 2.5–3 hours to complete. All 12 units require approximately 30–36 hours.

By setting aside portions of each unit as homework, or by using extension activities and ancillaries, the length of a *Reading Explorer* course can be adapted to suit a wide range of course durations. Here are some examples:

Recommended Course

- Total course length = **36 hours** (1 unit = 3 hours)
- 12-week course = 3 hours of instruction per week
- 24-week course = 1.5 hours of instruction per week
- This option assumes that the teacher covers all Student's Book content in class. Supplementary activities are given as homework.

Short Course

- Total course length = **24 hours** (1 unit = 2 hours)
- 12-week course = 2 hours of instruction per week
- 24-week course = 1 hour of instruction per week
- This option assumes that the teacher does not use the Student's Book video activities in class. Other sections of the Student's Book (e.g., Vocabulary Practice) are given as homework.

Longer Course

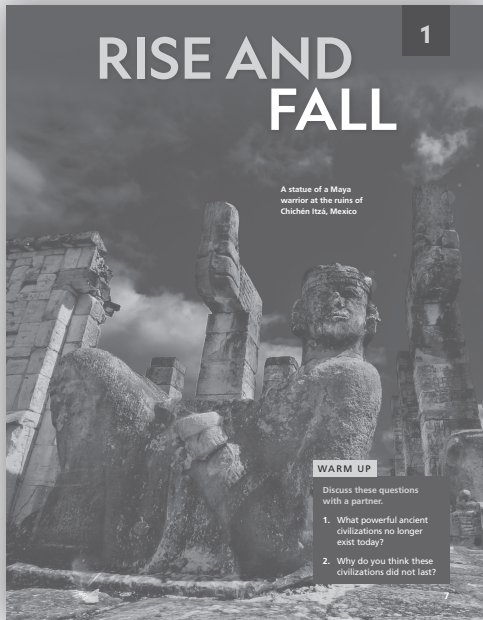
- Total course length = **48 hours** (1 unit = 4 hours)
- 12-week course = 4 hours of instruction per week
- 24-week course = 2 hours of instruction per week
- This option assumes that the teacher covers all Student's Book content in class. Lessons are often extended using supplementary worksheets from the *Reading Explorer* website.

Extended Course

- Total course length = **60 hours** (1 unit = 5 hours)
- 12-week course = 5 hours of instruction per week
- 24-week course = 2.5 hours of instruction per week
- This option assumes that the teacher covers all Student's Book content in class. Supplementary worksheets are used in each lesson. ExamView® quizzes are used regularly to monitor students' progress.

RISE AND FALL

1



UNIT INTRODUCTION

This unit focuses on ancient civilizations. In “Secrets of the Maya,” students read about the importance of cenotes to the Maya civilization. In “The Collapse of Angkor,” students read about the fall of the city of Angkor in Cambodia. In “Legacies of the Maya,” students will watch a video about the Maya in the past and today. Students will also read about the collapse of the Maya civilization, and water conservation in California.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *Maya, Holtún cenote, archeology, Yucatán, Chichén Itzá, Angkor, Angkor Wat, Greater Angkor Project, Bernard-Philippe Groslier, cultural collapse, Khmer Empire*

WARM UP

Answer Key

Possible answer(s):

1. The Ancient Greeks, the Romans, the Aztecs, the Incas, Rapa Nui
2. Many were conquered by other civilizations. Others maybe succumbed to disease or famine.

TEACHING NOTES

Chichén Itzá is an archeological site located in the Yucatán peninsula in Mexico and was one of the largest Maya cities built around 400 A.D. It quickly

rose in prominence, and by about 600 A.D., it had become the region’s capital. It is now a UNESCO World Heritage Site.

- Read the Unit Title aloud as students look at the photo. Have students discuss if the photo refers to a civilization in the past or today, and how it relates to the title “Rise and Fall.”
- Read the caption aloud, and have students say how *statues* and *ruins* relate to past civilizations.
- Have students discuss the questions with a partner, and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *blessing, constitute, demise, flourish, grueling, inspect, penetrate, plunge, sacrifice, soil*

Reading Passage Summary: The passage covers recent discoveries by archeologists about the practices of the ancient Maya people. Archeologists have learned that caves, or cenotes, in Mexico could act like sundials, and helped the Maya create their incredibly accurate calendars. The cenotes were also part of their religious beliefs and are linked to their planting cycles.

Answer Key

Before You Read

- A.** Possible answer(s): they built pyramids; they developed a writing system; they had a calendar system
- B.** Possible answer(s): I think cenotes were important as a water source.

Reading Comprehension

- A. 1.** c (Para A); **2.** b; **3.** a; **4.** a; **5.** c (Para I); **6.** d (Para J); **7.** a
- B. 1.** b; **2.** a; **3.** c; **4.** g; **5.** e

Critical Thinking

Possible answer(s): **1.** They could have acted as a sundial and timekeeper. **2.** They were a place to make offerings to their water god and give thanks for a good harvest. **3.** They were the door to Chaak's world. **4.** They are the only permanent source of fresh water. **5.** They may have determined where to site buildings.

Reading Skill

- A. 1.** b; **2.** d; **3.** c; **4.** a
- B. 1.** T; **2.** F (During the sun's zenith, its rays are vertical.); **3.** F (It's 70 meters from ground level to the bottom of the cenote.); **4.** T; **5.** F (The broken jaguar man was found on the floor of the cenote.)

Vocabulary Practice

- A. 1.** flourished; **2.** grueling; **3.** demise; **4.** inspected; **5.** soil
- B. 1.** jump in suddenly; **2.** religious leader; **3.** killing; **4.** parts that form it; **5.** enters it
- C. 1.** journey; **2.** training; **3.** schedule

Before You Read



A. Discussion: Have students look at the photo and read the caption. Make sure they understand the meaning of *cenote*, *Maya*, and *limestone*, and make sure they know where in the world the photo was taken. Have students share ideas with a partner.

B. Predicting: Have students answer the question and then share their ideas with a partner before reading the passage to check.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: For NOT questions, point out that students have to confirm that the men are investigating three things, but not the fourth. It functions almost like four true/false questions.
- Question 4: Paragraph E states that Chaak is the god of rain. In paragraph H, the author says that when the Chaak moved, the planting season would soon arrive.
- Question 5: Because most of the region is made of limestone, rainwater immediately sinks down to groundwater levels and no rivers run. This makes farming difficult.

B. Matching: Have students match each paragraph with the information it contains (a–g). Remind students that two pieces of information are extra. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students try to make a list of evidence the author uses before looking back at the text. Then have them complete and check their lists as they refer to the passage. Have students share their ideas with a partner.

Reading Skill

Level 5 *Reading Explorer* teaches students two different ways of understanding complex graphics. Have students read the paragraph **Understanding Complex Infographics (1)**. Encourage students to locate the main sections first by looking at the size of the text and placement of graphics, which can give clues about which information is most important. Next, students need to link captions and text boxes with the graphics before finally looking for keys and legends to help explain the images and text.

A. Understanding Infographics: Have students look back at the infographic on pages 12–13, and match the descriptions (a–d) to the relevant sections on the infographic. Check answers in pairs.

B. Understanding Infographics: Have students read the statements then look back at the infographic to decide if the information is true or false. Have students correct the false information. Check answers as a class.

- As with all true/false questions, suggest students identify key words in each statement that they can scan for in the infographic. For example, students might identify a *broken jaguar man* and *rock shelf* in the last item. If they scan the infographic, they will notice *shelf*

with offerings and see that some artifacts (but not *Jaguar man*) were found here, and/or notice *Jaguar man* as part of the other artifacts found on the floor of the cenote.

Vocabulary Practice

A. Completion: This passage is about the collapse of the Maya civilization. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage using the correct form of the words in the box. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

- As students read the information, have them identify the parts of speech of the words in the box. Then have them list other forms of these words as they will need to use the correct form in this activity. As you check answers, ask students to explain how they knew which form of the word to use. Students will have to change the word form in 1 and 4. Elicit how students know which form to use (they will need to use simple past as the entire passage is in the past).

B. Words in Context: Have students complete the definitions (1–5) by choosing the correct word or phrase. Check answers as a class.

- Question 3: Point out that *sacrifice* can either be a noun or a verb.

C. Collocations: The word *grueling* has a negative connotation and means “extremely tiring or demanding.” Have students complete the sentences and check answers in pairs. If time allows, have students write a new sentence for each collocation with *grueling*.

LESSON OVERVIEW

Target Vocabulary: *channel, disperse, doomed, ingenuity, invader, mechanism, regime, reservoir, subsequent, subversive*

Reading Passage Summary: The passage covers possible reasons for the downfall of the Khmer city of Angkor. These reasons include invaders, changes in religion, a shift to maritime trade, and droughts that impacted the waterways of the kingdom.

Answer Key

Before You Read

- A.** Jayavarman II; northern Cambodia; 1300s
B. foreign invaders, a religious change of heart, a shift to maritime trade; Possible answer(s): disease, climate change, natural disaster, migration

Reading Comprehension

- A. 1.** b; **2.** c; **3.** c; **4.** d; **5.** d; **6.** d (Para L); **7.** b
B. 3. "Theravada Buddhism gradually took over from Hinduism, and its principles of social equality may have threatened Angkor's elite" (Para E); **5.** "The most logical explanation is that the dam failed" (Para K); **6.** "The world around Angkor was changing. Society was moving on. It would have been a surprise if Angkor persisted." (Para N)

Critical Thinking

- Possible answer(s): **1.** Ayutthaya conquered Angkor. **2.** Buddhism gradually took over from Hinduism and threatened the elite in Angkor and might have led to a worker rebellion.
3. The system of canals might have failed, and there was no longer a steady supply of water.
 ► Possible answer(s): I think drought is a big problem in the world today that threatens many modern civilizations.

Reading Skill

- A. 1.** f; **2.** b; **3.** e; **4.** c; **5.** a; **6.** d
B. Possible answer(s): may have, some, not likely, might have, maybe, most likely

- C.** I think the most likely argument is climate change, which resulted in a lack of food.

Vocabulary Practice

- A. 1.** mechanism; **2.** channels; **3.** dispersing; **4.** reservoirs
B. 1. cleverness; **2.** destroyed; **3.** after; **4.** harsh; **5.** weaken; **6.** by force
C. 1. regalia; **2.** regimented; **3.** regulations; **4.** regularity

TEACHING NOTES

Before You Read

A. Previewing: Have students read the timeline and caption. Point out the arrow and make sure they understand the sequence of events. Have students answer the questions.

B. Skimming and Predicting: Have students skim paragraphs A and B and answer the questions before sharing their ideas with a partner.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: Paragraph A refers to the size of New York City, but not its population.
- Question 6: Paragraph L refers to extreme weather in Southeast Asia. Extreme cold is mentioned as a specific example in Europe, but this does not refer to Southeast Asia.

B. Evaluating Statements: Have students read the statements and check the ones that support Roland Fletcher's views and underline the information in Reading B which helped them decide. Elicit answers from the class and discuss which parts of the reading students underlined.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students note down three challenges that Angkor faced, looking back at the passage if necessary.
- Have students answer the question and then share their ideas with a partner.

Reading Skill

Level 5 *Reading Explorer* looks at evaluating arguments in Unit 1 and Unit 4. Have students read the paragraph **Evaluating Arguments (1)**. This unit teaches students how to evaluate arguments by asking a set of questions. Good arguments are supported by facts and credible sources with plenty of evidence. The author may not be so confident if they use hedging language in their arguments.

A. Analyzing: Have students match each argument (1–6) with evidence from the reading passage (a–f). Check answers in pairs.

B. Analyzing: Have students find the evidence from activity A in Reading B and circle the hedging language. Elicit answers from the class.

C. Evaluating: Have students note their ideas about which argument was strongest for why Angkor declined. Have them consider the hedging language used to help them decide. Have students discuss their ideas with a partner.

Vocabulary Practice

A. Completion: This passage is about water conservation in California. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct words to complete the passage. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

B. Words in Context: Have students circle the correct words or phrases to complete the sentences, and then compare answers in pairs. Suggest students find the words in the passage to get more context for the words.

C. Word Link: Have students complete the sentences and share answers with a partner. Remind them to use a dictionary to help. If time allows, have students write a new sentence for each word in the box.



Video Summary: This video is about the achievements of the Maya civilization and why it might have declined. It also tells about how the Maya today follow many of their ancestors' practices.

Key Vocabulary: *agrarian, decipher, inscribe, prevalent*

Answer Key

Before You Watch

A. 1. c; **2.** d; **3.** a; **4.** b

B. 1. Mexico and Central America;
2. 250–900 AD; **3.** corn; **4.** drought

While You Watch

A. See answers in Before You Watch B.

B. 1. 40; **2.** 50,000; **3.** pyramid temples;
4. zero; **5.** calendar system; **6.** pottery;
7. 900; **8.** volcanic eruption; **9.** seven million;
10. agricultural

Critical Thinking

Possible answer(s): My grandmother and I make traditional food that has been passed down from my ancestors. We also wear traditional dress at ceremonies and celebrations.

TEACHING NOTES

Before You Watch

A. Definitions: Have students read the excerpts from the video and match the words (1–4) with their definitions (a–d). Then have students compare with a partner.

B. Quiz: Have students try to answer the questions (1–4) without looking back at Reading A and then compare ideas with a partner. Explain that they will check their answers in the video.

While You Watch

A. Gist: Play the video. Then have students check their answers to the quiz in Before You Watch B.

B. Details: Have students read and complete the notes before watching the video again. Then play the video again and have students check answers in pairs.

Critical Thinking

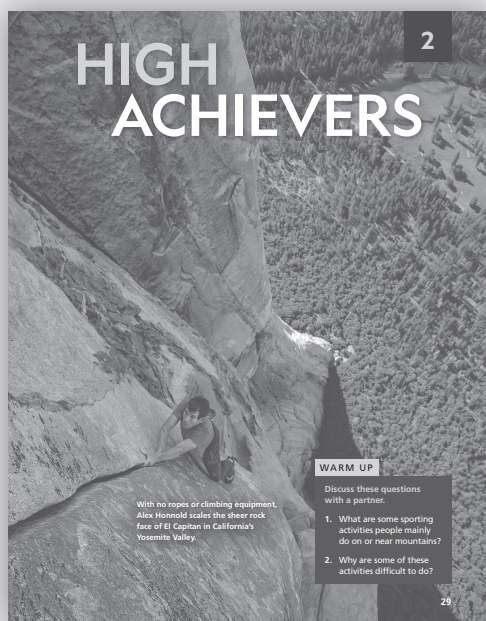
Have students read the question and share their ideas with a partner.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

HIGH ACHIEVERS



UNIT INTRODUCTION

This unit focuses on amazing athletes. In “The Sky Runner,” students read about Mira Rai, a female trail runner who is leading the way toward gender equality in Nepal. In “The Free Soloist,” students read about Alex Honnold, a mountain climber who completed a solo climb up El Capitan. In “Soloing Safely,” students will watch a video about a free solo climber who has come up with ways to make the sport a little bit safer. Students will also read about the Ultra-Trail du Mont Blanc, and how climber Jimmy Chin filmed Honnold’s ascent up El Capitan.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *Mira Rai, Nepali women, Kathmandu West Valley Rim 50K, Wasfia Nazreen, Alex Honnold, El Capitan, free solo*

WARM UP

Answer Key

Possible answer(s):

1. skiing, snowboarding, mountain climbing, rock climbing, abseiling
2. Mountains are steep, so it’s exhausting to go up. Snow can be icy and dangerous. Avalanches are possible. There is less oxygen at higher altitudes. The terrain is difficult.

TEACHING NOTES

El Capitan is a vertical rock formation located in Yosemite National Park in California. It rises up about 3,000 feet (914 meters) above the valley floor. This iconic landmark is a popular location for

visitors and rock climbers alike, and has become one of the world’s ultimate challenges for climbers.

- Read the Unit Title aloud as students look at the photo. Have students discuss what the man is doing, and how it relates to the title “High Achievers.” Point out that a *high achiever* is a person who wants to accomplish something very difficult. Explain that the word *high* is also used here to refer to altitude.
- Read the caption aloud and have students say how Alex Honnold is scaling the rock face in the photo. Ask: *What other things can be scaled?*
- Have students discuss the questions with a partner, and then follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *gear, humble, merely, odds, pace, persistent, pursue, rural, stereotype, throughout*

Reading Passage Summary: Mira Rai is a trail and ultramarathon runner who spent her childhood traveling up and down steep terrain in Nepal. Women in Nepal are expected to stay at home and raise families, but Rai managed to follow her dream—to run marathons and break gender stereotypes. She has chosen an unconventional path in life, and continues to strive to better herself as both a person and as an athlete. Today, she is on a mission to help both women and men through sports, and she believes her work to empower others has only just begun.

Answer Key

Before You Read

- A.** Possible answer(s): physically fit, strong leg muscles, stamina and endurance, big lungs, patience and tolerance
- B.** Possible answer(s): She had to overcome her family's expectations that she would stay in her village and continue doing what all females before her had done.

Reading Comprehension

- A. 1.** b; **2.** b (Para A); **3.** c; **4.** a; **5.** d; **6.** b; **7.** c
- B. 1.** conventional; **2.** bags of rice; **3.** training; **4.** first trail race; **5.** potential; **6.** role models; **7.** gender equality

Critical Thinking

Possible answer(s): Malala Yousafzai is another strong woman who became successful after overcoming hardships in her life. She has become an activist for female education and even won the Nobel Peace Prize after having been shot by the Taliban in her native Pakistan.

Reading Skill

- A. 1.** a; **2.** b; **3.** b; **4.** b; **5.** b
- B. 1.** know one's place; **2.** on a mission; **3.** at a snail's pace

- C.** Possible answer(s): **1.** My best friend passed her exam, against all odds! **2.** My brother broke the mold when he decided to open his own company instead of finishing college. **3.** I'm on a mission to get a good job when I graduate.

Vocabulary Practice

- A. 1.** merely; **2.** rural; **3.** throughout; **4.** gear; **5.** pace
- B. 1.** humble; **2.** pursue; **3.** odds; **4.** stereotype; **5.** persistent
- C. 1.** merely stopped; **2.** merely trying; **3.** merely mentioning

Before You Read



A. Discussion: Have students look at the photo and read the caption. Make sure they understand the physical demands placed on an ultramarathon runner. Have students share ideas with a partner.

B. Predicting: Point out that reading the first paragraph and predicting answers to the question helps students do two things: activate background knowledge and anticipate content. Both strategies will help them understand and remember information better. Have students read the first paragraph and note down their answer to the question. In pairs, have students discuss their ideas before reading the passage to check their answers.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: Although paragraph A does not explicitly state that Rai worked on a farm, this can be inferred because she tended to crops and livestock.

- Question 4: The antecedent of “it” appears in the second sentence—*doing anything out of convention*.
- Question 7: Although Rai says—in reference to going back home—*the people there are living the same sort of lives as I saw when I was a kid*, there is no mention of whether education in the village has improved.

B. Summarizing: Have students complete the summary of paragraphs A–G with information from the passage. Remind students to use no more than three words for each answer. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students think about another person they know or have read about who has overcome challenges and hardships in their life. Have students note their ideas and describe the person to a partner.

Reading Skill

Have students read the paragraph **Guessing Meaning from Context—Idioms and Colloquial Language**. Idioms and colloquial language are informal and so they are often used when people are speaking in an interview. Remind students to look at context first to try to determine meaning.

A. Inferring Meaning: Have students find the expressions in bold in Reading A and choose the correct meaning (a or b). Check answers in pairs.

B. Inferring Meaning: Have students read the noted paragraphs in Reading A and find expressions that have the same meaning as the definitions (1–3). Check answers as a class.

C. Relating: Have students choose three expressions in Activity A or B, write three sentences, and share them with a partner. Invite volunteers to share sentences with the class.

Vocabulary Practice

A. Completion: This passage is about the Ultra-Trail du Mont Blanc. Direct students’ attention to the photo and caption next to activity A. Have students read the information and then complete the passage with the correct form of the words from the box. Check answers as a class, then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students complete the definitions using the unused words from the box in Activity A. Check answers as a class.

C. Word Usage: The word *merely* means “only” or “just.” Have students mark where it goes in the sentences, and check answers in pairs. If time allows, have students write three sentences of their own including the adverb *merely*.

LESSON OVERVIEW

Target Vocabulary: *artificial, ascend, contemplate, delicate, devoid of, plummet, scheme, stamina, successive, tackle*

Reading Passage Summary: Alex Honnold completed an amazing free solo climb in 2017. He scaled El Capitan, a 3,000-foot sheer rock face, without any ropes or assistance. Mark Synnott was there for the ascent, and he recounts how Honnold's meticulous planning and training prepared him for the "ultimate climb."

Answer Key

Before You Read

- A.** Possible answer(s): The rock face is very steep, and he has no rope. It's very dangerous. He might get tired and fall at any point.
- B.** Possible answer(s): stamina, endurance, strength, determination, will, grit, willing to take risks, bravery

Reading Comprehension

- A. 1.** d; **2.** c; **3.** d; **4.** b; **5.** b (Para H); **6.** c; **7.** a
- B. 1.** h; **2.** f; **3.** c; **4.** e; **5.** a; **6.** g; **7.** d; **8.** b
- C. 1.** hailed; **2.** lash; **3.** squint; **4.** jerky

Critical Thinking

Possible answer(s): I think Honnold's main reason was to prove to himself that he could do it. In paragraph J, the author says that he doesn't think Honnold wanted to do it on a whim or boast about it, so I don't think the main reason was for "reckless showmanship."

Reading Skill

- A. 1.** c; **2.** c; **3.** d; **4.** a
- B.** Possible answer(s): I don't think the focus is on whether Honnold completed the climb successfully. The focus is on what went into the planning and training to prepare for this challenge.

Vocabulary Practice

- A. 1.** contemplate; **2.** ascended; **3.** artificial; **4.** delicate; **5.** plummet; **6.** stamina
- B. 1.** scheme; **2.** devoid of; **3.** successive; **4.** tackle
- C. 1.** price; **2.** popularity; **3.** temperatures

TEACHING NOTES

Before You Read

A. Discussion: Have students look at the photo and read the caption. Then have students read the first paragraph of Reading B. Point out the words *steep*, *vertical*, and *ascent*. Have students answer the question and discuss ideas with a partner.

B. Predicting: Have students answer the question and discuss their ideas with a partner.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: The word *unlike* in paragraph C (which introduces *divots*, *pebble-size nubs*, and *tiny cracks that Alex can cling onto*) tells the reader that these things are helpful as opposed to a sheer vertical surface that does not have any hand grips.
- Question 2: Paragraph E uses phrases such as *it feels like an eternity*, *makes me nauseated*, and *where Alex will land if he slips*, which show he is anxious.

B. Inferring Meaning: Remind students that they learned about inferring meaning in Unit 2A. If necessary, have students turn back to that section of the Student's Book and review this skill again. Have students scan Reading B for the words 1–7, study the context around each word, and match each to its definition (a–h). Have students check answers with a partner.

C. Inferring Meaning: Have students read the paragraphs noted in 1–4 and find the words or phrases that mean the same. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Make sure students understand the meaning of *reckless showmanship*. Have them answer the question, and then share their ideas with a partner.

Reading Skill

Have students read the paragraph **Understanding Rhetorical Purpose**. When you understand the author's reason for writing a text, you can better understand the meaning and why the author included certain details and information. This type of exam question asks why an author has included a particular piece of information in a text. The reason is not stated directly; to infer the answer to this type of question, you need to have a clear understanding of the main points in a text, as well as the information being referenced. The question tends to use the same words as the author, so if the paragraph letter is not included in the question, scan for the key words in the questions.

A. Rhetorical Purpose: Have students answer the multiple choice questions (1–4) and check answers in pairs.

- Question 2: Students should have a clear understanding that this passage gives an account of Honnold's most difficult climb. They also know that it would be very challenging to try and climb up a smooth surface such as glass, so students can infer from this that option "c" is correct.
- Question 4: The main idea that Alex's chosen route challenges *a climber in practically every possible way* is then followed by examples to illustrate the difficulties.

B. Rhetorical Purpose: Have students answer the question and share their ideas with a partner.

Vocabulary Practice

A. Completion: This paragraph is about Jimmy Chin's movie *Free Solo* about Honnold's free solo climb of El Capitan. Have students read the information and then complete the passage with the correct form of the words from the box and cross the words off as they use them. Remind students that four words are extra. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students complete the definitions (1–4) with the remaining words from the box in activity A, then compare answers in pairs.

C. Collocations: The word *plummet* means to fall sharply. Have students complete the sentences (1–3) and share answers with a partner. If time allows, have students write new sentences for each of the three nouns collocating with *plummet*.

Video Summary: This video is about Matt Maddaloni, a free solo climber who came up with ways to make the sport a little bit safer.

Key Vocabulary: *adrenaline, fringe, reckless, terrain*

Answer Key

Before You Watch

A. 1. b; 2. c; 3. d; 4. a

B. Possible answer(s): They could climb in small groups or pairs. They could put a net underneath to catch them in a fall.

While You Watch

A. climbing over water, climbing over a net

B. 1. Maddaloni mentions *sneezing* to show how dangerous free soloing is. If you sneeze, you might fall and die. **2.** He wanted to push the physical and mental challenge. **3.** He set up a trapeze net. **4.** He's not like the main group of climbers.

Critical Thinking

► Possible answer(s): Yes, I think many climbers would be inspired by the movie to free solo.

Positive: It could challenge them and push them outside their comfort zone.

Negative: It's very dangerous, and they may not prepare adequately.

► Possible answer(s): I think promoting extreme sports can be a problem because more resources need to go into rescuing those athletes that get injured. Also, more people will die as a result.

TEACHING NOTES

Before You Watch

A. Definitions: Have students read the information and match each word (1–4) with its definition (a–d). Then have students compare answers with a partner.

B. Discussion: Have students answer the question and discuss their ideas with a partner.

While You Watch

A. Gist: Play the video. Then have students answer the question and check answers with a partner.

B. Details: Have students answer the questions (1–4) before watching the video again. Then play the video again and have students check answers in pairs.

Critical Thinking

► Have students note their answer as to whether they think documentaries or films encourage more climbers to free solo, and make a list of the positive and negative consequences of this. Allow time for students to discuss their ideas with a partner.

► Have the same pairs discuss whether there are any ethical issues with promoting sports such as free soloing. Elicit answers from the class and have a class discussion on the ethical issues raised.

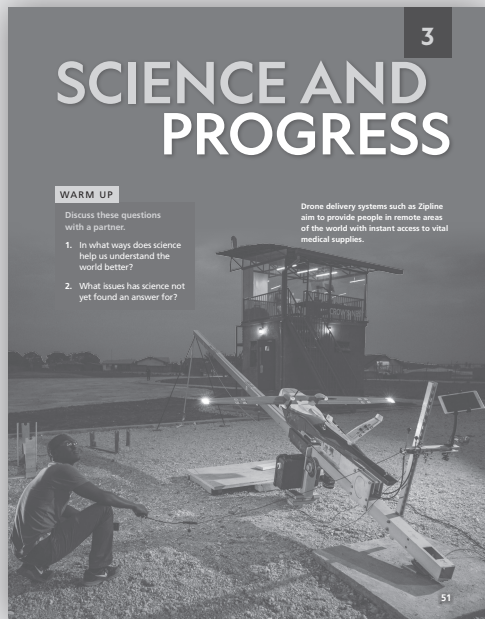
Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

SCIENCE AND PROGRESS

3



UNIT INTRODUCTION

This unit focuses on how science is progressing in the world today. In “The Age of Disbelief,” students read about increasing numbers of people who doubt the claims of scientists today. In “Goalkeepers for the Planet,” students read about the UN’s 17 Sustainable Development Goals, and Goalkeepers, an initiative led by the Gates Foundation. In “Energy Entrepreneur,” students will watch a video about Sanga Moses, the CEO of Eco-Fuel Africa. Students will also read about how some people question the 1969 moon landing, and a success story about water sanitation in Sierra Leone.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *skeptic, vaccine safety, GMO safety, airborne Ebola, filter bubble, United Nations, 17 Sustainable Development Goals, the Gates Foundation, Goalkeepers*

WARM UP

Answer Key

Possible answer(s):

1. Scientific facts are difficult to dispute. Science gives us tools to prove why things are as they are, and to make advances in technology.
2. Science has not yet fully answered the question of how life began on Earth. We also do not yet know if there is life elsewhere in the universe.

TEACHING NOTES

Delivery drones deliver lightweight packages—with the packages attached underneath the body of the drone. Drones today are being used for delivering time-sensitive items such as medicine, and for

deliveries to isolated places where traditional transportation is difficult. These machines have the potential to change the way goods are sent and received around the world.

- Read the Unit Title aloud as students look at the photo. Have students discuss what the man is doing, and how the drone relates to the title “Science and Progress.”
- Read the caption aloud and have students say how the drone is helpful to the community. Ask students what the drone is delivering.
- Have students discuss the questions with a partner, and then follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *bias, consensus, discipline, distinguish, exposed to, fundamental, implication, institution, rational, retain*

Reading Passage Summary: While there are plenty of advantages to living in the Information Age, facts and scientific knowledge are often met with doubt and skepticism. As humans, we now face risks we cannot always analyze, and many people today believe what they want to believe—even if it goes against scientific evidence.

Answer Key

Before You Read

1. Possible answer(s): They are concerned that vaccines are not safe, and believe that these vaccines are poisoning their children.
2. Possible answer(s): It's easy to get misinformation on the Internet. People don't trust the government or scientists. Example of skepticism: Modern biology makes no sense without the concept of evolution, but some people believe that creationism should be taught as an alternative to evolution.

Reading Comprehension

A. 1. d; 2. d (Para M); 3. b (Para G); 4. c (Paras H and I); 5. c (Para J); 6. b; 7. d

B. Egalitarian: b, f, g; **Hierarchical:** a, d, e;
Both: c

Critical Thinking

- ▶ Possible answer(s): I believe that wealthy people should pay higher taxes, the government should regulate industry, and we should accept the findings of climate scientists. All of these things are necessary for a society to function as a whole and make the world a better place.
- ▶ Possible answer(s): I am more of an egalitarian / community-minded person.
- ▶ Possible answer(s): Yes, unfortunately the world today is much more polarized than ever before. It's easier to divide people into these two groups.

Reading Skill

A. 1. b; 2. b; 3. c; 4. a; 5. c

B. 1. Doubters have declared war; an evil villain had put something in the water; **2.** images of mad scientists running wild; **3.** a cluster of cancer cases ... caused the cancers; **4.** She has personal experience with this: ...

C. Possible answer(s): Figurative language is used to make the reader feel a stronger connection to the text. These examples help the reader see the author's point of view.

Vocabulary Practice

A. 1. fundamental; **2.** exposed; **3.** implication; **4.** retain; **5.** consensus

B. 1. has strict rules; **2.** banks and universities; **3.** different than; **4.** clear

C. 1. b; 2. c; 3. a

Before You Read



A. Discussion: Have students look at the photo and read the caption. Make sure they understand the words *alleged* and *vaccine*. Have students answer the questions and discuss ideas with a partner.

B. Predicting: Have students read the first two paragraphs of Reading A and then answer the questions. Make sure students understand the *skeptic* family of words. In pairs, have students discuss their ideas before reading the passage to check.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: In paragraph M, the author gives specific facts about climate change. In addition, the word *however* in the last sentence conveys the point of view that “other people” have doubts and would, therefore, disagree with the author.

- Question 5: In paragraph J, the word *announce* in the last sentence can mean “publish,” which rules out option “d.”

B. Comparing and Contrasting: Have students look back at paragraph N and complete the Venn diagram with the descriptions a–g. Check answers as a class. Students will need to infer that option “c” applies to both groups. The article implies that most people will access information that reinforces their own particular beliefs.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students look at the Venn diagram in activity B and think about which of the examples listed they believe in. Have them explain their reasons to a partner.
- Ask students to be self-critical and answer the question whether they think they are a more egalitarian or hierarchical person.
- Have students answer the question and then share their ideas with a partner.

Reading Skill

Have students read the paragraph **Identifying Figurative Language**. Authors use figurative language to help the reader visualize the details of the text. When reading, try to identify the type of figurative language used and ask why the author is using it.

A. Identifying Figurative Language: Have students read the sentences 1–5 and choose the correct option of what type of figurative language (a–c) is used in each case. Check answers in pairs.

B. Identifying Figurative Language: Have students look back at the paragraphs noted and find the examples of figurative language 1–4. Check answers as a class.

C. Interpreting: Have pairs look back at activity B and discuss why the author chose these examples and why they help support the author’s ideas. Elicit ideas from the class.

Vocabulary Practice

A. Completion: This passage describes the false reasoning behind conspiracy theories about the 1969 moon landing. Direct students’ attention to the photo and caption next to activity A. Have students read the information and then choose the correct words in red to complete the passage. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students circle the correct answer to complete sentences 1–4. Check answers as a class.

C. Word Usage: *Discrimination* is an action while *prejudice* is a feeling. Have students match the words to their definitions and check answers in pairs.

LESSON OVERVIEW

Target Vocabulary: *accountable, dynamics, initially, initiative, innovation, instability, intervention, investment, outlier, productivity*

Reading Passage Summary: In 2015, world leaders at the UN adopted 17 Sustainable Development Goals with a vision to improve life for all across the planet. Bill and Melinda Gates have worked hard to address these goals, focusing on issues such as combating poverty and improving education. In 2017, the Gates Foundation launched an initiative to track and monitor progress towards reaching the UN's goals, and the report reveals that the results have been successful.

Answer Key

Before You Read

- A.** Possible answer(s): **1.** ending poverty and hunger, providing quality education to all; **2.** getting access to modern energy for all; achieving gender equality
B. Possible answer(s): I predict we have made the most progress in reducing poverty and providing quality education.

Reading Comprehension

- A. 1.** a; **2.** b; **3.** d (Para D); **4.** b; **5.** c; **6.** c (Para F); **7.** a
B. 1. F (It was produced by the Gates Foundation.); **2.** NG; **3.** F (As the century moves forward, over half the young people will be there, but this is not the case now.); **4.** T; **5.** F (Poverty has decreased.); **6.** F (It is below the world average.); **7.** NG

Critical Thinking

Possible answer(s): I think the most important goals for my country are Goals 3, 4, and 13.

Goal 1: Good Health and Well Being: We should provide after-school programs so children will stay off their devices and provide healthy eating classes and sports activities. We should also provide more support for the elderly to be involved in their communities. **Goal 2:** Quality Education:

We need to provide support to inner city schools and make further education courses accessible to people living in poverty. **Goal 3:** Climate Action: We should provide more tax incentives for clean energy, and make solar panels more affordable.

Reading Skill

- A. 1.** a; **2.** b; **3.** d; **4.** c
B. Possible answer(s): **1.** In 2015, at the United Nations, world leaders adopted 17 Sustainable Development Goals. **2.** We think that the news isn't really out there. We want to make sure that we hold people accountable for that progress. **3.** but they have learned the lessons of what has helped people make progress from around the world; **4.** That's one of the longest-standing pieces of global health research we have ...

Vocabulary Practice

- A. 1.** investments; **2.** instability; **3.** initiative; **4.** productive; **5.** outlier
B. 1. accountable; **2.** initially; **3.** intervention; **4.** innovation; **5.** Dynamics
C. 1. take the initiative; **2.** global initiatives; a lack of initiative

TEACHING NOTES

Before You Read



A. Discussion: Have students read the first paragraph and then look at the infographic on page 66. Have students answer the questions and discuss their ideas with a partner.

B. Predicting: Have students answer the question and discuss their ideas with a partner before reading the passage to check their answers.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: Although Bill Gates mentions each country in paragraph D, no one country has made significant improvements in all three areas.
- Question 7: Bill Gates is most concerned about the development of children. Goal 2 is to end hunger and promote nutrition, which is a crucial part of a child's development.

B. Scanning: Have students read each statement and then scan the passage for the relevant information. Have students share answers in pairs and correct the false statements.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students work in small groups to look at the Sustainable Development Goals and choose the three most important ones for their country. Have groups work together to complete the activity. Ask groups to present their Sustainable Development Goals to the class, outlining why they think their chosen three are important and the steps people could take to help meet each goal.

Reading Skill

Level 5 Reading Explorer teaches students two different ways of making inferences. Have students read the paragraph **Making Inferences (1)**. The context and details of a text will help the reader infer the meaning of information that is not explicitly stated. An inference question asks you to look at the information given in a reading passage and draw a logical conclusion from that information. To answer these questions, identify key words in the question and locate them in the appropriate part of the reading passage. There should be information that is obvious from reading the passage, but is not stated outright. Remind students to consider each answer option carefully. Inference questions may take a little longer to answer than other questions.

A. Making Inferences: Have students look back at Reading B and choose the best answer (a–d) for each question (1–4). Check answers as a class.

B. Making Inferences: Have students underline the evidence or information in Reading B that helped them infer the correct answers in activity A. Have them share their ideas with a partner.

Vocabulary Practice

A. Completion: This passage is about access to safe drinking water. Have students read the information and then complete the passage using the correct form of the words from the box. Remind students that one word is extra. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students complete the definitions 1–5 with the words in the box. Have them compare answers in pairs.

C. Collocations: Have students complete the sentences 1–3 with the expressions from the box. Have students share answers with a partner. If time allows, have students write a new sentence for each expression in the box.



Video Summary: This video is about the CEO of Eco-Fuel Africa, Sanga Moses, and how his company uses farm waste to provide cleaner cooking fuel.

Key Vocabulary: *act upon, crisis, enable, retailers*

Answer Key

Before You Watch

- A. 1.** The forests are being lost and smoke from indoor cooking causes respiratory diseases. **2.** This could be addressed by finding cleaner fuels for cooking which does not involve cutting trees down.

While You Watch

- A.** Sanga Moses's company turns farm waste into clean cooking fuel. His products have helped to reduce the number of trees being felled for firewood, have enabled farmers to make some money from their farm waste, and helped local women to earn a living by selling the fuel back to their community.
- B. 1.** He saw that his sister was unable to go to school because she had to collect wood for fuel, and he wanted to improve people's lives. **2.** One of his university professors was supportive, asking his class who could help Sanga fix the energy crisis. **3.** 16.6 million households **4.** environmental benefits: cleaner fuel and stopping deforestation; economic benefits: farmers and local people can earn a living; educational benefits: more children in education

Critical Thinking

- Possible answer(s): I think Sanga Moses faced many challenges to try and solve Uganda's energy crisis. He first had to quit his job to start the project, and find people who could help him achieve his idea. He had a very small amount of money to finance the project, and had to sell his belongings. He had to figure out how to turn farm waste into a cheap and clean fuel. Finally, he had to persuade the

local community of the benefits of using this alternative fuel.

- Possible answer(s): I think the most difficult challenge must have been to develop the fuel so that it was cleaner, cheaper, and preferable to firewood. A lesser product would have been more difficult to sell to poor communities.

TEACHING NOTES

Before You Watch

A. Previewing: Have students read the information and answer questions 1 and 2. Then have students compare answers with a partner.

While You Watch

A. Gist: Play the video. Then have students answer the questions and check answers with a partner.

B. Details: Have students answer the questions 1–4 before watching the video again. Then play the video again and have students check answers in pairs.

Critical Thinking

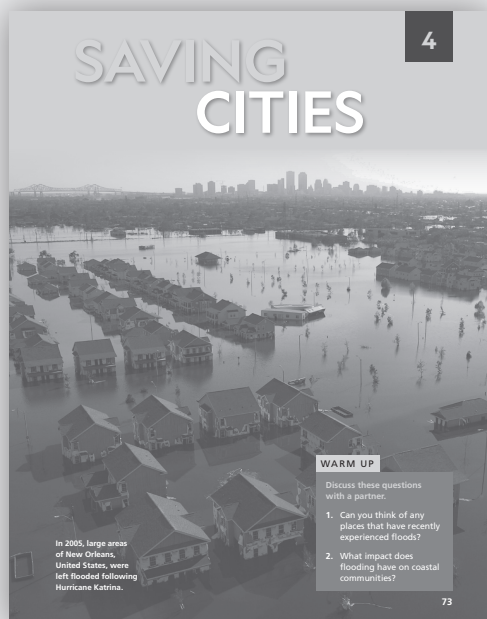
- Have students read the question and note down what challenges Sanga Moses faced as he tried to solve his country's energy crisis.
- Have students discuss with a partner which challenge they think was the most difficult to overcome and why.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

SAVING CITIES



UNIT INTRODUCTION

This unit focuses on the dangers faced by coastal cities. In “City Under Siege,” students read about the low-lying city of Venice and the threat posed by tourists. In “Rising Seas,” students read about the threat that coastal areas face from rising sea levels due to climate change. In “Hurricanes,” students will watch a video about hurricane facts and details. Students will also read about how cars and trucks are affecting the Alps, and how rising sea levels may affect cultural resources.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *Venice, Piazza San Marco, tourism in Venice, climate change, rising seas, Hurricane Sandy, Delta Works*

WARM UP

Answer Key

Possible answer(s):

1. New Orleans, the coasts of Florida, Bangladesh, and Mozambique
2. People might need to evacuate, roads can be washed away, and houses can be damaged.

TEACHING NOTES

Hurricanes are rotating systems of clouds and thunderstorms that form over tropical or subtropical waters. They can pose threats to people, and damage can occur from wind, heavy rainfall, and storm surges. Hurricane Katrina was

a Category 5 hurricane that caused extensive destruction and damage: at least 1,836 people died in the hurricane and subsequent floods.

- Read the Unit Title aloud as students look at the photo. Have students discuss why this city needs to be saved.
- Read the caption aloud and have students say how the floods are directly related to the hurricane (heavy rain from the storm clouds, the heavy wind raises the sea level and the storm surge comes ashore).
- Have students discuss the questions with a partner, and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *complement, elevate, frame, implement, impose, inadequate, inflict, maximize, sentimental, so-called*

Reading Passage Summary: The city of Venice is threatened by the increasing number of tourists who come to see the picturesque city of canals. Tourism is driving out the residents who can no longer afford to live in a city that caters to wealthy travelers. The costs of maintaining the beauty of a city that is subject to flooding are high, making it very expensive to live in Venice. In addition, services for tourists drive out local businesses.

Answer Key

Before You Read

A. 1. 20,000,000; 2. 25 cm; 3. feeding pigeons
B. b

Reading Comprehension

A. 1. c; 2. c; 3. a; 4. b; 5. b (Para H); 6. b (Para I);
7. a

B. 1. b; 2. c; 3. a; 4. b; 5. a

Critical Thinking

- ▶ Possible answer(s): **Positive:** tourists bring money; **Negative:** tourists leave trash behind, they are replacing the locals, everything is for sale, the city is only affordable to the rich and elderly, it's too crowded
- ▶ I don't think the positive effect of tourism outweighs the negative. If locals are pushed out of Venice, the city will become a museum to the past and won't be a real working city.

Reading Skill

A. 1. L; 2. F; 3. L; 4. L; 5. L; 6. L; 7. F; 8. F
B. 1. mirage, head: a; 2. just short of the stratosphere: b; 3. surged, schools, snapping up, wake: a; 4. theme park for the rich: a

Vocabulary Practice

A. 1. framed; 2. inflicts; 3. elevated;
4. implemented; 5. inadequate

B. 1. so-called; 2. maximize; 3. sentimental;
4. complement; 5. impose

C. 1. complimented; 2. complement;
3. complement; 4. compliments

Before You Read



Have students look at the photo before they read the information. Ask them where it is and how they know. To help students connect to the topic, ask students if they have ever been to Venice. Activate background knowledge by eliciting what they already know about Venice, focusing on what makes it attractive to tourists.

A. Quiz: Have students read the questions and complete the sentences with their best guesses. Then have students check their answers on page 94.

B. Skimming: Have students skim Reading A, circle the best answer, and then read the passage to check.

- If students look at the first sentence of every paragraph, they will notice that *tourist* and *tourism* appear often.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: Three of the answers have correct information. However, option "a" and "b" only convey half of the relevant information, which makes "c" the best answer.
- Question 3: Students are asked to make an inference, so they are working with information that is not stated directly. Options "b," "c," and "d" may be true, but there is no evidence in the passage to support them. Option "a" is

supported by facts provided in paragraph C. It states that 80,000 tourists visited on one holiday weekend in May 2008, which is many more people than those who live in the city.

- Question 6: We learned from paragraph B that the population is about 55,000, and so has decreased by more than half in 30 years.

B. Understanding Infographics: Remind students that they learned about understanding infographics in the reading skill in Unit 1A. If necessary, have students turn back to that section of the Student's Book and review this skill again. Have students read the questions before looking again at the infographic and choosing the correct answers. Then have them check answers with a partner.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- ▶ Have students refer to Reading A to list the positive and negative effects of tourism the author mentions.
- ▶ Have students discuss their opinion about tourism in Venice with a partner and then share their ideas in a class discussion.

Reading Skill

Have students read the paragraph **Recognizing Literal versus Figurative Language**. Figurative language is often a comparison between two things. Sometimes the comparison is direct, as with similes that use *as* or *like* (e.g., *I'm as hungry as a bear*). Indirect comparisons often use verbs in an unusual way to suggest what is being compared. In the example in the Reading Skill paragraph, the use of *plow* compares the movement of a ship with a plow.

A. Classification: Have students find the words or phrases in Reading A and decide if they are used literally (L) or figuratively (F). Elicit answers as a class, asking students how they decided each

one. Note that students may be most familiar with the word *defender* in the context of sports and therefore may decide the word is being used figuratively. However, the word *defender* in this article is being used with its broader, literal meaning: "a person who defends someone or something."

B. Interpreting: Have students read the excerpts from Reading A, underline any figurative language, and then choose the correct meaning of the sentences. Have students check answers with a partner.

Vocabulary Practice

A. Completion: This passage is about the negative effects of cars and trucks in the European Alps. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage by choosing the correct words in red. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Students can use their knowledge of word parts to help them with this activity. In many cases, *im-* or *in-* means "not" as in *impossible* or *inadequate*.

B. Definitions: Have students match each word in the box to its definition (1–5). Check answers as a class.

C. Collocations: Point out that *compliment* and *complement* are pronounced the same. Have students choose the correct word to complete each sentence (1–4) and check answers in pairs. If time allows, have students write a new sentence for each word.

LESSON OVERVIEW

Target Vocabulary: *comply, dire, envision, evacuation, retreat, surge, take for granted, vulnerable, will, withstand*

Reading Passage Summary: Coastal cities around the world are endangered by climate change and rising sea levels. In 2012, New York was hit hard by Hurricane Sandy, and storms are predicted to be stronger in the future. The Netherlands took steps to combat rising sea levels in the mid-20th century, and experts believe other countries need to do the same in order to protect their cities from the inevitable.

Answer Key

Before You Read

- A.** Possible answer(s): Coastal communities may suffer damage due to rising sea levels and will need to consider ways of protecting themselves.
- B. Storm of the Century:** the damage Hurricane Sandy caused; **Coastlines at Risk:** ways to try and prevent coastal storm damage; **Retreat from the Coast:** moving away from coastal areas; **Dutch Lessons:** how the Dutch reduced their threat by building a sea barrier

Reading Comprehension

- A. 1.** a; **2.** d (Para A); **3.** d; **4.** a; **5.** b; **6.** b (Para N); **7.** a
- B. 1.** h; **2.** f; **3.** a; **4.** e; **5.** b; **6.** d; **7.** g; **8.** c

Critical Thinking

Possible answer(s): If I were Mayor of New York City, I would want to try to prevent another sea surge by putting in local measures to help each area, such as dams, dikes, and levees. Another possibility is building storm-surge barriers in areas where they would be most effective. I think increasing the height of sea walls and building a chain of barrier islands might be too costly for the length of the coastline.

Reading Skill

A. Main Argument: First sentence of the excerpt. **Supporting Details:** Columbia University geophysicist Klaus Jacob sees most of Manhattan's population fleeing to higher ground ... At different times in different countries, engineering solutions will no longer be enough. ...

- B. 1.** Possible answer(s): very important; dramatically, will drastically, if not sooner, people will have to, we'll have to, we may have to, will no longer be; **2.** Possible answer(s): There is no source information in the first sentence. I would like to know how we can change course and what will happen if we don't. What scientific evidence is there to prove this assertion? **3.** Wanless: He works at the University of Miami's Department of Geological Science so his opinion is valid. Klaus Jacob: He is a geophysicist at Columbia University so his opinion is valid. **4.** Possible answer(s): When I read the main argument in the first sentence, I thought the author sounded biased due to the pessimistic language used. He does back up his claims with expert opinions though. Maybe he could have given other expert opinions with different ideas and views.

Vocabulary Practice

- A. 1.** envision; **2.** vulnerable; **3.** dire; **4.** take for granted; **5.** withstand; **6.** retreat
- B. 1.** follow; **2.** determined; **3.** away from; **4.** increase
- C. 1.** take advantage of; **2.** take for granted; **3.** take it seriously; **4.** take sides

TEACHING NOTES

Before You Read

A. Discussion: Have students look at the photo and read the caption. Make sure they understand the connection between rising sea levels and the people who live along the coast. Have students answer the question and share ideas with a partner.

B. Skimming and Predicting: Have students skim the reading and write about each section. Then have students read the passage carefully to check their predictions.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: Remind students that they learned about recognizing figurative language in the reading skill in Unit 4A. If necessary, have students turn back to that section of the Student's Book and review this skill again. The word *retreat* is used with its literal meaning, "to move away."
- Question 5: The author uses negative words such as *unless we change dramatically, drastically, abandon, fleeing, subject, no longer be enough*.

B. Understanding Purpose: Remind students that they learned about understanding rhetorical purpose in the reading skill in Unit 2B. If necessary, have students turn back to that section of the Student's Book and review this skill again. Have students read each paragraph again and think about its purpose before completing the activity. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students consider the situation and answer the question. Then have students share their ideas with a partner and decide jointly what action they would take. Have pairs report their plans to the class.

Reading Skill

Have students read the paragraph **Evaluating Arguments (2)—Reading Critically**. Reading critically requires more thought than passive

reading. It's important to read critically and ask questions in order to fully understand the writer's point of view. Elicit the ways in which students have already been reading critically. They should notice that all of the critical thinking tasks help them do this. Focus on the importance of reading the passage twice, each time with a different purpose.

A. Reading Critically: Have students read the excerpt, highlight the author's main argument, and underline the supporting details. Check answers in pairs.

B. Reflecting: Have students read the excerpt again, answer the questions, and then discuss ideas with a partner before reporting to the class. The questions are designed to encourage critical thinking, prompting students to identify persuasive language (*dramatically, drastically, fleeing*) and to scrutinize the author's use of evidence.

Vocabulary Practice

A. Completion: This passage is about how sea level rises could affect cultural resources in coastal cities. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage by choosing the correct words in red. Students can refer to the passage to guess meaning from context. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

- Question 1: The target word *envision* has an ending that might suggest it is a noun, but it is a verb.
- Question 6: *Retreat* can be both a noun and verb. Ask students how it functions in the passage and in the activity.

B. Words in Context: Have students circle the correct options to complete the sentences (1–4) and then compare answers in pairs.

C. Word Link: Have students complete the sentences (1–4) with the correct expression from the box and share answers with a partner.

Video Summary: This video gives facts and information about hurricanes, including how they form and ways they help our planet.

Key Vocabulary: *cluster, devastation, sustain, thorough*

Answer Key

Before You Watch

A. 1. c; 2. d; 3. b; 4. a

B. 1. warm; 2. "eye"; 3. 74; 4. storm surges

While You Watch

A. Check answers in Before You Watch B.

B. 1. late summer; 2. thunderstorms; 3. ring of clouds; 4. potential damage; 5. the equator; 6. early warning

Critical Thinking

- ▶ Possible answer(s): volcanoes, tornadoes, earthquakes, tsunamis, forest fires
- ▶ Possible answer(s): I think a tsunami can kill thousands of people. The terrible tsunami in 2004 killed more than 230,000 people.

While You Watch

A. Gist: Play the video. Then have students check their answers to Before You Watch B.

B. Details: Have students complete the sentences (1–6) before watching the video again. Then play the video again and have students check their answers in pairs.

Critical Thinking

- ▶ Have students make a list of other natural disasters.
- ▶ Have students decide which natural disaster on their list is the deadliest and share their ideas with a partner.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

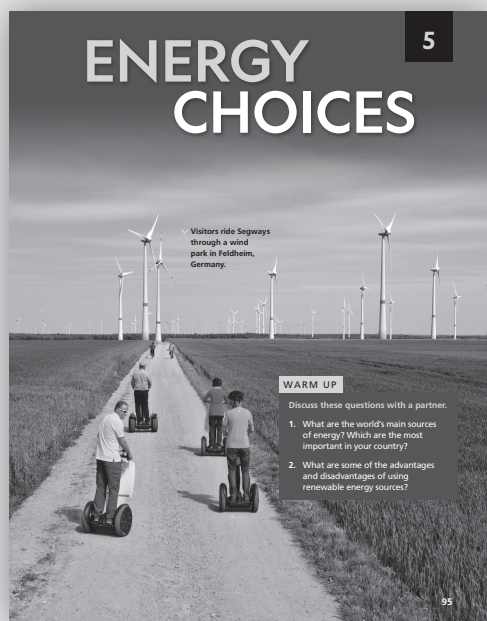
TEACHING NOTES

Before You Watch

A. Definitions: Have students read the excerpts from the video and then match the words (1–4) with their definitions (a–d). Then have students compare with a partner.

B. Quiz: Have students circle the best options for each sentence (1–4). Explain that they'll find the answers in the video.

ENERGY CHOICES



UNIT INTRODUCTION

This unit focuses on how we can live in more eco-friendly ways, primarily by reducing our usage of fossil fuels. In “Our Energy Diet,” students read about a couple who conduct an experiment to see if it’s possible for them to significantly lower their carbon emissions in one month. In “Plugging into the Sun,” students read about how solar power is used in the United States and Germany. In “Eco-Detectives,” students will watch a video about simple ways to save money on home energy. Students will also read about making the Boston Marathon eco-friendly, and an ingenious way to store wind power.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *carbon footprint, CO₂ emissions, Nevada Solar One, solar energy, photovoltaic panels, Solarsiedlung, solar energy in Germany*

WARM UP

Answer Key

Possible answer(s):

1. Fossil fuels, solar power, wind power, nuclear power; fossil fuels are still used the most in my country, but wind power is becoming more important.
2. The advantages are that renewable energy is unlimited and is also kinder to the environment than fossil fuels; the disadvantages are that they can be weather dependent and the initial set-up costs are high.

TEACHING NOTES

As renewable energy technology continues to advance and grow in popularity, wind parks like

the one in Feldheim, Germany have become an increasingly common sight in fields and on hills and even offshore in the ocean.

- Read the Unit Title aloud as students look at the photo. Have students discuss how the photo relates to the unit title.
- Read the caption aloud and make sure students understanding the meaning of *wind park*. Have students discuss what type of energy the Segways might be using and whether they think it is from a renewable source of energy.
- Have students discuss the questions with a partner, and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *appliance, audit, commonplace, commute, compact, incentive, mode, obstacle, threshold, utility*

Reading Passage Summary: Most of us could reduce our carbon emissions if we just learned more about how we are wasting energy. The author decided to try an experiment to see if he and his wife could reduce their carbon emissions by making lifestyle changes in order to meet their goal. At the end of the month, their carbon emissions were much lower, and worked out to be about half of the national average.

Answer Key

Before You Read

- A.** Possible answer(s): I drive myself to school every day, I use air conditioning in the summer and central heating in the winter, I have a lamp by my desk and turn lights on when I'm in a room, and I have a fridge that is constantly running.
- B.** Possible answer(s): **1.** The author wants to see if he and his wife can track and cut back their CO₂ emissions for one month. **2.** He found out that with little or no hardship and no major cash outlays, they could cut day-to-day emissions of CO₂ in half—mainly by using less energy at home and on the highway.

Reading Comprehension

- A. 1.** b; **2.** c; **3.** a (Para C); **4.** d (Para E); **5.** d; **6.** b; **7.** d
- B. 1.** one; **2.** 80; **3.** 13; **4.** 30; **5.** two; **6.** 32; **7.** 50

Critical Thinking

Possible answer(s): I think it would be easiest to require that all students recycle by installing recycling bins throughout the school. It might also be easy to require all food and drink be locally sourced by only providing that type of food in the cafeteria (although the cost to students could be greater). It would be most

challenging to stop using fossil fuels, because changing the current heating system would involve a major overhaul. I think providing incentives to walk or cycle to school could have the greatest impact because this could result in a reduction in the number of car journeys and the amount of fossil fuel used.

Reading Skill

A. Possible answer(s): **The author performed an experiment to see** how much he and his wife could reduce their carbon emissions. They analyzed where their main sources of energy loss were and started to make changes in order to meet their goal.

B. 1. f, a; **2.** c, g; **3.** d, e; **4.** b, h

Vocabulary Practice

- A. 1.** threshold; **2.** incentive; **3.** commonplace; **4.** audit; **5.** obstacles
- B. 1.** utility; **2.** appliances; **3.** mode; **4.** compact, commute
- C. 1.** present; **2.** major; **3.** overcome

Before You Read



A. Discussion: Have students read the question, consider the areas mentioned, and then share their ideas with a partner.

B. Skimming and Predicting: Have students skim paragraphs A–C, answer the questions, and then discuss their ideas with a partner. Have them read the passage to check their ideas.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: Paragraph C states that 80 kilos is more than twice the European average, which means the European average is around 40 kilos.

- Question 4: The correct answer hinges on the word *initially*. The author's initial response in paragraph E to the idea of reducing his family's CO₂ production by 80 percent is that "it seemed unlikely to me, too," which reflects option "d." He later agrees to the 80 percent reduction, reflecting option "a;" however, this is not his *initial* reaction and is therefore incorrect.
- Question 6: Review the strategies for paraphrasing (use of synonyms, different word forms, etc.). Have students identify key words in the sentence and look for synonyms (e.g., *trimmed* – *reduced*). They will need to understand the relationship between twice as much of A and half as much of B.

B. Summarizing: Have students read the summary and complete it using numbers from the reading passage. Then have students check their answers with a partner.

- Question 7: Paragraph N states they trimmed their emissions to half the national average, which means 50 percent.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking



Have students read the ideas for reducing their school's carbon footprint and decide which would be easy to implement and which would be more challenging. Have them also consider which would have the greatest impact. Have students discuss ideas with a partner, and then have a class discussion.

Reading Skill



Have students read the paragraph **Distinguishing Main Ideas and Supporting Information**. A main idea gives the most important information about a topic, and the supporting details give reasons and facts to strengthen the main idea.

A. Main Idea: Have students complete the main idea of the whole reading and then share their answer with a partner. Elicit answers from the class.

B. Main and Supporting Ideas: Have students read all eight sentences (a–h), noting which are more general and which more specific before they do the activity. Have students complete the chart with the main ideas and supporting ideas for each section of the passage. Check answers as a class.

Vocabulary Practice



A. Completion: This passage is about the Boston Marathon and ways to make it more sustainable. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct words to complete the passage. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Question 3: *Commonplace* is a compound word formed from the adjective *common* and the noun *place*. It is also an adjective, although students may misidentify it as a noun.
- Question 4: Point out that *audit* can be used as either a noun or verb. Have students read through the text to identify the part of speech needed.

B. Completion: Have students circle the correct word to complete each sentence. Check answers as a class. Suggest students find the words in the passage to get more context for the words.

- Question 1: *Utility* is a noun, but is used as an adjective/noun modifier in Reading A and in this sentence.

C. Collocations: Point out that *obstacle* describes something negative that is in a person's way. Have students choose the correct word to complete each sentence. If time allows, have students write a new sentence for each collocation using *obstacle*.

LESSON OVERVIEW

Target Vocabulary: *circulate, deadline, ingenious, offset, panel, premium, renewable, subsidy, subtract, yield*

Reading Passage Summary: Advances are being made in the use of solar energy. In 2007, the first large solar plant to be built in the United States in almost two decades came online outside of Las Vegas; since then, solar technology has grown. In Germany, the government pays residents to produce solar energy, and the solar boom has transformed towns. There is a growing feeling worldwide now that solar energy is the way of the future.

Answer Key

Before You Read

A. 1. 27 percent; about 7 percent; **2.** It is much higher than the United States (12 percent) and China (21 percent).

B. Possible answer(s): the weather, the funds available for the financial investment, the willingness for people to make the switch

Reading Comprehension

A. 1. c (Para D); **2.** d; **3.** b; **4.** c; **5.** c; **6.** a; **7.** c

B. 1. b; **2.** f; **3.** a; **4.** d; **5.** c

Critical Thinking

Possible answer(s): **Idealist:** People who are concerned about the environment; people who feel that ethically and morally we must find a way to reduce our dependence on non-renewable fossil fuels. Some incentives could be to produce material to prove how solar power will work and create ways to make it affordable for everyone. **Financially-motivated:** People who want to reduce their bills or make money from having a PV system. Some incentives could be to give them tax breaks and other financial programs to show them they can benefit financially.

Reading Skill

A. Germany: a, b, f, g; **USA:** c, e, h; **Both:** i; **Neither:** d

B. Possible answer(s): I think the solar energy industry in Germany is more advanced and widespread than it is in the United States. The initial investment costs are coming down in the United States though, so I think it might be possible for the United States to catch up. Because it is such a vast country with large areas of sunshine, perhaps they could be energy leaders in the future (so long as the government is able to see the importance of protecting the environment).

C. Possible answer(s): My country offers tax incentives for people to install solar panels on their roofs and buy cars that are hybrid or run on battery power. If you own this type of car, you can drive in special lanes with less traffic. There are also incentives to buy energy efficient appliances and lightbulbs.

Vocabulary Practice

A. 1. renewable; **2.** ingenious; **3.** circulates; **4.** offset; **5.** premium

B. 1. deadline; **2.** subsidy; **3.** yield; **4.** panel; **5.** subtract

C. 1. unbelievable; **2.** unrespectable, disrespectful, disrespected; **3.** indescribable; **4.** subconsciously, unconsciously; **5.** reorganization, disorganization; **6.** unequally, inequality

TEACHING NOTES

Before You Read

A. Understanding Infographics: Have students look at the infographic on page 110, answer the questions, and then check with a partner. Make sure they understand the meaning of *renewable sources*.

B. Predicting: Have students answer the question and then discuss their ideas with a partner before reading the passage to check.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: Paragraph D states that it was the first large solar plant to be built in the United States in more than 17 years (which doesn't mean it was the first ever built).
- Question 3: In making inferences with vocabulary, students should use context as well as dictionaries as needed. In this case, *barely tapped* means that only a small part of a much larger supply has been used.

B. Paraphrasing: Have students scan the passage for the people listed (1–5) and match each person to a paraphrase of their quote (a–f). Remind students that one paraphrase is extra. Have students check answers with a partner.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students read the question and consider both types of people (idealists and financially motivated) and think about the differences in their points of view. Then have students complete the chart and discuss their ideas with a partner.

Reading Skill

Have students read the paragraph **Determining Similarities and Differences**. Comparing ideas helps the reader better understand the details that support the main ideas, as well as how the text is organized. A Venn diagram is a good way to visualize how ideas are similar and different.

A. Classification: Have students read each sentence (a–i), then match these to Germany, the United States, both, or none of these (write it outside the diagram). Remind them that if they find the information true for one country, it can still be true for the other. Check answers as a class.

B. Making Comparisons: Have students answer the question with their opinion. Have a class discussion to see which country the class thinks is more likely to be an energy leader in the future.

C. Discussion: Have students read the questions and share their ideas with a partner.

Vocabulary Practice

A. Completion: This passage is about how a company in Germany found an ingenious way to store wind power. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage by choosing the correct words in red. Students can refer to the passage to guess meaning from context. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Questions 3: Note that in the passage, *circulation* is an adjective. In this exercise, it is in verb form (*circulates*).

B. Definitions: Have students match vocabulary words to their definitions (1–5) and then compare answers in pairs.

C. Word Link: Make sure students understand how the prefixes and suffixes listed change a word's meaning. Have students create new words and share answers with a partner.

Video Summary: This video is about how houses use too much energy and gives details about simple ways for us to cut down on our energy consumption.

Key Vocabulary: *common sense, employ, façade, to spare*

Answer Key

Before You Watch

A. 1. b; 2. d; 3. c; 4. a

B. Possible answer(s): make sure hot and cold air cannot leak out, use energy efficient lightbulbs and appliances, use solar panels to collect energy from the sun

While You Watch

A. 1, 4

B. 1. houses and buildings; **2.** The outside of the freezer feels too cold. **3.** appliances that continuously use energy; **4.** It doesn't need a furnace.

Critical Thinking

Possible answer(s): To make my home more energy efficient, I could get energy-efficient appliances and lightbulbs, only use the heating at certain times, take shorter showers, unplug appliances, seal doors and windows, and use solar panels.

While You Watch

A. Gist: Play the video. Then have students check the statements that the eco-detectives would agree with. Have students check answers in pairs.

B. Details: Have students answer the questions before watching the video again. Then have students check their answers in pairs.

Critical Thinking

Have students note ways they could make their house more energy efficient, then share their ideas with a partner. Discuss ideas as a class.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

TEACHING NOTES

Before You Watch

A. Previewing: Have students read the excerpts and then match the words (1–4) with their definitions (a–d). Have students compare answers with a partner.

B. Discussion: Have students read the questions and discuss their ideas with a partner.

SURVIVAL AND PROTECTION

6



UNIT INTRODUCTION

This unit focuses on endangered wildlife. In “Quicksilver,” students read about how scientists are helping save the bluefin tuna. In “Building the Ark,” students read about endangered species and the conservation efforts zoos are making to help them survive. In “Life on Ice,” students will watch a video about how and why scientists are collecting frozen samples of certain species. Students will also read about marine conservation on the island of Kiribati, and changes in status to species on the IUCN’s Red List.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *bluefin tuna, Tuna Research and Conservation Center, Bronx Zoo, Cincinnati Zoo, San Diego Zoo, the Frozen Zoo, the Photo Ark*

WARM UP



Answer Key

Possible answer(s):

1. Asian elephant, Bengal tiger, rhino, bluefin tuna, Irrawaddy dolphin, mountain gorilla, poison dart frog, polar bear, snow leopard, sloth. They are endangered because they are losing their habitats.
2. I think all animals should be equally protected. The challenge is to make people aware of and care about the smaller animals.

TEACHING NOTES

Established in 1964, the International Union for Conservation of Nature maintains the Red List, which

details the conservation status of endangered species. The Sumatran rhino has been on this list for a number of years and is now listed as critically endangered. The population is decreasing at an extreme rate, and it is thought there are fewer than a hundred left in the world. The Cincinnati Zoo has seen three successful births with one of the offspring being transferred back to a breeding center in Sumatra.

- Read the Unit Title aloud as students look at the photo. Have students discuss the connection to the words *survival* and *protection*.
- Read the caption aloud and ask students why they think *critically endangered* animals might be kept in zoos.
- Have students discuss the questions with a partner and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *alarming, collaborate, deserted, detrimental, haul, mingle, scholar, shield, startling, turbulence*

Reading Passage Summary: The bluefin tuna has only become desirable as a source of food in recent years. This huge fish is now hunted, usually for sushi, and sold for thousands of dollars per fish. Researchers are finding ways to protect the fish by tagging them to learn more about their movements. Wise management is needed to protect the species.

Answer Key

Before You Read

- A.** Possible answer(s): tuna is a popular food, it's a big powerful swimmer; overfishing is probably its biggest threat
- B.** Possible answer(s): **The King of Fish:** Bluefin tuna are large and powerful. **Tagging a Giant:** People catch and tag the huge fish. **Bluefin Migration:** bluefin tuna movements around the world; **Uncertain Future:** the possibility that the bluefin tuna will become extinct

Reading Comprehension

- A.** 1. c; 2. d; 3. b; 4. c; 5. d (Para K); 6. c (Para N); 7. a
- B.** 1. They need to be moving through the water in order to extract oxygen from it. 2. cranial cavity, red muscle, and internal organs; 3. large tail, tapered body, and fins pull in; 4. A mackerel swims side to side, and it has less red muscle. 5. They stabilize the fish.

Critical Thinking

- Possible answer(s): The relationship between humans and tuna lately has been detrimental to the bluefin. They are among the most overfished species. If more than a handful are to see the 22nd century, things have to change before they plunge past the dotted

line representing sustainable yield and are headed for zero.

- Possible answer(s): **Ban all commercial fishing of bluefin tuna:** pros: the numbers will start to increase; cons: people will eat other fish, which means another species may become endangered; **Protect key bluefin tuna habitat areas:** pros: they'll be able to thrive; cons: there may then become an overabundance of tuna, which could harm the ecosystem; **Forbid restaurants and stores from selling bluefin tuna:** pro: people will stop expecting to eat tuna; cons: there will be an illegal market for tuna; **Only use bluefin tuna from sustainable fish "farms":** pros: the fish will be cheaper and easier to control; cons: the fish might not be as healthy and it's an unnatural environment for them

Reading Skill

- A.** 1. a; 2. a; 3. a; 4. b; 5. a; 6. b; 7. b; 8. a; 9. b; 10. b
- B.** 1. (n) time period when something significant happened; 2. (n) enclosure full of water for a sea creature; 3. (prep) such as; 4. (adj) obvious

Vocabulary Practice

- A.** 1. startling; 2. collaboration; 3. Scholars; 4. detrimental; 5. hauled
- B.** 1. protection; 2. no one lives; 3. mix together; 4. sudden and violent; 5. worrying
- C.** 1. turbulent; 2. disturb; 3. perturb

Before You Read

A. Discussion: Have students look at the photo and read the caption. Make sure they understand the meaning of *uncertain*. Have students share ideas with a partner.

B. Skimming and Predicting: Have students skim the first paragraph and each of the four sections, predict what information they will read about, and then read the passage to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: The verb *drive* in option “c” means to propel forcefully, and it is not figurative language. This may confuse students because we usually think of the other meaning (to drive a car), and this might sound figurative.
- Question 7: Paragraph O uses words such as *alarming* and *abandoned*, which suggest negative consequences. The word *warn* in option “a” matches the same tone. Also, the writer associates the location of Hopkins Marine Station with the abandoned canneries nearby. This physical association provides a way for the writer to compare the fates of the two species and suggest implications.

B. Understanding Infographics: Remind students they studied infographics in Unit 1A. If necessary, have students turn back to that section of the Student’s Book and review this skill again. Have students look closely at the Super Fish infographic, answer the questions (1–5), and then check answers with a partner.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students note down evidence from Reading A and then compare ideas with a partner.
- Have students think about what can be done to save the bluefin tuna by considering the pros and cons of each of the solutions given. Have students share their ideas with a partner.

Reading Skill

Have students read the paragraph **Understanding Words with Multiple Meanings**. Using the context of a text is important when trying to understand words with multiple meanings. Identifying the part of speech and looking closely at the details of the sentence are good clues to help understand the meaning of the word.

A. Identifying Meaning: Have students look back at Reading A, scan for the words in bold (1–10), and then circle the correct meaning (a or b). Remind students to use context to help identify the meaning. Have students check answers in pairs.

B. Identifying Meaning: Have students find the words in bold (1–4) in paragraphs O and P. Then have students write the part of speech and a definition for each word. Have students check answers with a partner.

Vocabulary Practice

A. Completion: This passage is about how the tiny island nation of Kiribati is creating one of the largest marine protected areas. Direct students’ attention to the photo and caption next to activity A. Have students read the information and then complete the passage by choosing the correct words in red. Suggest students find the words in Reading A to guess their meaning from context. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students complete the definitions (1–5) with the correct word or phrase. Check answers as a class.

- Question 1: *Shield* can be both a noun and a verb that have similar meanings.

C. Word Link: Have students complete the sentences (1–3) and check answers in pairs. If time allows, have students write a new sentence for each word in the box.

LESSON OVERVIEW

Target Vocabulary: *captive, extinction, imminent, oblivion, refuge, shrink, state-of-the-art, struggle, supplement, tide*

Reading Passage Summary: Zoos are becoming increasingly important in the race to preserve endangered animals. Most of these efforts focus on breeding programs, such as the one at the Bronx Zoo that helped save the bison. In some cases, the programs reintroduce the species to the wild. Another effort involves freezing genetic material of endangered animals so that they might be helped if they do near extinction. Zoos are having to answer difficult questions today about which animals they should save.

Answer Key

Before You Read

- A.** Possible answer(s): **1.** Zoos can keep endangered animals safe and encourage them to breed. **2.** cost, how endangered the animal is, climate, space
- B.** Sumatran rhinoceros: Cincinnati Zoo; American bison: Bronx Zoo; red wolf: Miller Park Zoo, Kihansi spray toad: Bronx Zoo; Amur leopard: San Diego Zoo

Reading Comprehension

- A. 1.** c; **2.** c (Para B); **3.** b; **4.** a (Para H); **5.** d; **6.** c (Para K); **7.** b (Para M)
- B. 1.** conservation; **2.** expensive; **3.** large; **4.** save; **5.** declared; **6.** habitat; **7.** cells; **8.** vials

Critical Thinking

Possible answer(s): **Arguments for saving a few large, popular species:** people love them and will donate a lot of money to survival efforts; they may be better studied and understood so saving them might be an easier task; **Arguments for saving many smaller unpopular species:** people can learn to love them; it may be cheaper and easier to save a smaller species; by saving many species it helps keep a wide diversity of species

Reading Skill

- A. 1.** a; **2.** b; **3.** b; **4.** a; **5.** c
- B. 1.** self; **2.** earth; **3.** write; **4.** study of; **5.** sound; **6.** distant; **7.** hear; **8.** speak; **9.** carry; **10.** feel; **11.** earth; **12.** see

Vocabulary Practice

- A. 1.** shrinking; **2.** struggle; **3.** imminent; **4.** refuge; **5.** extinction
- B. 1.** supplement; **2.** captive; **3.** state-of-the-art; **4.** tide; **5.** Oblivion
- C.** about to happen; approaching; forthcoming; impending; looming

TEACHING NOTES

Before You Read

A. Completion: Have students look at the photo and read the caption. Make sure they understand what a breeding program is and why a zoo would have one. Have students answer the questions and share ideas with a partner.

B. Scanning: Have students scan Reading B to find the names of the animals and write down the names of the zoos involved. Have students share answers with a partner.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

Question 1: The first question may be difficult for some students because the passage touches on three out of four of the questions (a, b, and c) to some degree. However, students should see that the subtitle *Who to Save?* makes the answer clear. For an additional challenge, have students discuss all the ethical questions in small groups.

Question 5: To help, have students look at the sentence and identify its purpose. Ask the students to guess what kind of information might be contained in a preceding sentence. The sentence in the question gives specific statistics about species that are endangered. It should be placed at the end of the paragraph, which gives a more general statement about the danger species face, so option “d” is correct.

B. Summarizing: Have students read the sections again and complete the summaries with one word from the passage for each blank. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students note down arguments for each viewpoint and then share their ideas with a partner. Have a class discussion to find out which viewpoint is more popular, and why.

Reading Skill

Have students read the paragraph **Determining the Meaning of Root Words**. A number of root words are of Greek or Latin origin. Learning the meaning of these roots can greatly increase students’ vocabulary as they can make a better guess of the meaning of new words.

A. Determining Meaning: Have students work with a partner to choose the correct meaning (a, b, or c) of the underlined root in the words (1–5). Elicit answers from the class.

B. Determining Meaning: Have students work with a partner to complete the chart with the words in the box. If time allows, have pairs add additional examples for each root.

Vocabulary Practice

A. Completion: This passage is about species that have had their status changed by the IUCN. Direct students’ attention to the photo and caption next to activity A. Have students read the information and then complete the passage by choosing the correct words in red. Students can refer to Reading B to guess meaning from context. Check answers as a class then choose a volunteer to read the completed passage aloud to the class.

- Question 2: Note that *struggle* is used as a verb in Reading B and as a noun in this passage.

B. Definitions: Have students complete the sentences (1–5) using the words in the box. Remind students that one word is extra. Have students compare answers in pairs.

C. Word Web: Have students complete the word web with synonyms for *imminent*. Remind students that three words are extra. If time allows, have students write sentences for each of the five synonyms. Ask students if the synonyms are interchangeable in their sentences.

Video Summary: This video is about how and why scientists at the Smithsonian Museum of Natural History are preserving specimens in liquid nitrogen to add to their collections.

Key Vocabulary: *archive, ecology, elaborate, genome, instantaneous, mechanism, plunge, the gold standard*

Answer Key

Before You Watch

A. 1. e; 2. d; 3. h; 4. f; 5. a; 6. c; 7. b; 8. g

B. Possible answer(s): 1. Researchers can use the frozen samples at any time in the future to do genomic or toxicology work, for example.
2. The specimens are stored in liquid nitrogen at -190° .

While You Watch

A. See answers in Before You Watch B.

B. 1. sequencing the genomes; **2.** liquid nitrogen; **3.** painless; **4.** silk and poison; **5.** drying and pinning; **6.** 200,000–500,000

Critical Thinking

Possible answer(s): I think using zoos as modern-day conservation “arks” is the best way to conserve animals as long as all animals are given an equal chance.

While You Watch

A. Gist: Play the video. Then have students check their answers to the questions in Before You Watch B.

B. Summarizing: Have students read and complete the summary before watching the video again. Remind students to use no more than three words for each answer. Then play the video again and have students check answers in pairs.

Critical Thinking

Have students read the four different ways of conserving animals as described in this unit. Then have students answer the question and discuss their ideas with a partner. If time allows, have students split into four distinct groups for each way of conserving animals. Have each group formulate an argument as to why their way would be better. Then have each group present their argument to the class.

Vocabulary Review

Have students work individually to check their understanding of the unit’s target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

TEACHING NOTES

Before You Watch

A. Definitions: Have students match the words (1–8) with their definitions (a–h). Remind students to use a dictionary to help. Then have students compare their answers with a partner.

B. Previewing: Have students look at the photo, read the caption at the top of page 137, and then discuss the questions with a partner. Explain that they will check their answers while watching the video.

HUMAN BODY

7



UNIT INTRODUCTION

This unit focuses on the amazing human body. In “Secrets of the Brain,” students read about advances made in mapping the brain. In “Human Bionics,” students learn about human bionics through the example of Amanda Kitts, whose bionic arm replaced one lost in an accident. In “A Giant Step,” students will watch a video about how bionic technology helped a paraplegic man walk again. Students will also read about how our brains find meaning in shapes, and how bionic technology continues to improve.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *brain mapping, Van Wedeen, fMRI, bionic, Jeff Lichtman, Allen Institute, CLARITY, Rehabilitation Institute of Chicago*

WARM UP

Answer Key

Possible answer(s):

1. People can use smart devices to monitor their health. Lost limbs can be replaced with prosthetics. Doctors use advancements in medical technologies in surgery.
2. People might be able to have “bionic” body parts, which will allow them to push past human strength as we know it today.

realistic than ever before. Each prosthetic limb is unique and must be custom fitted and built to match the patient’s needs. This customization allows many people with prosthetics to continue an active lifestyle.

- Read the Unit Title and caption aloud as students look at the photo. Have students say what they think *prosthetic* means, and discuss how the man is able to use his body even though he has lost a leg.
- Have students discuss the questions with a partner, and follow up with a class discussion.

TEACHING NOTES

Prosthetics have existed for centuries, but advances in medical technology mean that modern prosthetic limbs are lighter, stronger, and more

LESSON OVERVIEW

Target Vocabulary: *dazzle, disorder, exquisitely, forefront, neural, organ, originate, scrutinize, tricky, unprecedented*

Reading Passage Summary: The passage looks at current research being done on the brain. It discusses imaging using MRI scanning to understand the genetic landscape of human brains. Other researchers have made mouse brains transparent, and then used chemicals to color the neural pathways, allowing researchers to see inside the brain while it is still intact. The neuroscientist leading this research hopes to be able to make a human brain transparent, and one day he hopes his research may help patients with autism or depression. Brain mapping has begun to change lives through brain-machine interfaces that allow paralyzed patients to communicate and even “move.”

Answer Key

Before You Read

- A. 1.** Possible answer(s): Brain researchers might hope to learn about how the brain functions, where memories are stored, how involuntary movement occurs, and how people think in different ways. **2.** Possible answer(s): A greater knowledge of the brain could help cure certain medical conditions. It could predict how different groups of people might react to certain situations.
- B.** Possible answer(s): I think the passage will be about a man who had his brain studied in detail, and what the findings were.

Reading Comprehension

- A. 1.** c (Para C); **2.** d; **3.** b (Para H); **4.** a (Para K); **5.** c; **6.** d (Para P); **7.** d
- B. 1.** radio signals; **2.** electron microscope; **3.** grain of salt; **4.** neurons; **5.** MRI scanner; **6.** transparent; **7.** motor cortex; **8.** full-body exoskeletons

Critical Thinking

- Possible answer(s): I don’t think I could sit still and stay calm for as long as Zimmer did. So I wouldn’t do it. / I think this research is really exciting. I’d love to see a map of my brain showing all the nerve fibers.
- Possible answer(s): If the test or procedure was noninvasive, I might consider it if I felt strongly that it could help someone.

Reading Skill

A. is then used, are put in order, is built, is revealed; the scientists

B. 1. a; **2.** a; **3.** b; **4.** a; **5.** a

Vocabulary Practice

- A. 1.** forefront; **2.** organ; **3.** neural; **4.** originate; **5.** scrutinize
- B. 1.** never; **2.** abnormally; **3.** difficult; **4.** beautifully; **5.** impressed
- C. 1.** detail; **2.** opportunity; **3.** scale

Before You Read

A. Discussion: Make sure students understand what a *brain researcher* does. Point to the photo and read the caption aloud. Have students read the questions and discuss their ideas with a partner.

B. Skimming: Have students read the title of Reading A and the three subheadings and then discuss their answer to the question with a partner. Have students read the passage to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: In paragraph G, Lichtman says that the human brain has a thousand times more neurons than a mouse brain, which is very complicated.
- Question 4: Students have to identify the way the author feels about something. Review the kinds of clues students can look for (e.g., the use of subjective adjectives, the use of other sources that hold the same attitude). Two such clues: In paragraph J, Carl Zimmer uses the phrase *perhaps the most remarkable* and in paragraph K, he uses the positive words *dazzle* and *awestruck*.

B. Summarizing: Have students complete the summary with no more than three words from Reading A in each blank, and then check answers with a partner.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Make sure students understand that a “guinea pig” is someone or something used in research to test things on. Have them answer the questions and then share their ideas with a partner.

Reading Skill

Have students read the paragraph **Understanding the Use of the Passive Voice**. Explain why it is not always important to know who did the action, especially when the “doer” is obvious or when the writer doesn’t know who it was. Go over each reason for using the passive in the Reading Skill box and ask questions such as these: *Who slices the brain? Why doesn’t the writer know who left the box of chocolates?* You may want to discuss situations in which the speaker or author wishes to be vague, including when they do not want to blame someone directly, and when they want to avoid responsibility. Elicit other examples of each use of the passive voice. Make sure students understand how to form the passive (*be* + past participle).

A. Identifying Passive Sentences: Have students read the excerpt from Reading A, underline the passive verbs, and then identify the doer of the actions. Have students discuss their answers with a partner.

B. Understand Author’s Purpose: Have students circle the most likely reason (a or b) why the writer used the passive voice in each sentence (1–5). Check answers as a class.

Vocabulary Practice

A. Completion: This passage is about how the brain finds meaning in random shapes. Direct students’ attention to the photo and caption next to activity A. Have students read the information and then complete the passage using the words in the box. Remind students that three words are extra. Students can refer to Reading B to guess meaning from context. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- For the word *forefront*, it may be useful to point out how it is commonly used in the phrase *at the forefront of*. Consider also drawing students’ attention to the fact that *originate* is a verb form of the noun *origin*, a word that they are likely to be more familiar with.

B. Definitions: Have students complete the definitions (1–5) with the correct word or phrase. Remind students they can use context in the reading passage. Check answers as a class.

C. Collocations: Have students complete the sentences (1–3) and check answers in pairs. Remind students that one word is extra. If time allows, have students write new sentences for each collocation.

LESSON OVERVIEW

Target Vocabulary: *assign, compatible, crude, embed, intricate, licensed, salvage, sensation, valid, vibrate*

Reading Passage Summary: Amanda Kitts lost her left arm in an accident in 2006 and, thanks to medical advances in the field of prosthetics, now has a bionic arm that she controls with her brain. Researchers continue to develop new prototypes and find innovative ways to help people use their brains to control their new limbs.

Answer Key

Before You Read

- A. 1.** Possible answer(s): **1.** A robot arm that replaces a lost limb; perhaps your brain sends signals that the arm can sense, in order to make it move; **2.** Possible answer(s): It must be very difficult to make the arm move the way you want it to move.
- B. 1.** She lost her arm in an accident. **2.** make a sandwich; feel how hard she's grabbing; differentiate between materials she touches; pick up small objects; **3.** feel sensation; clap in time to the songs the children are singing

Reading Comprehension

- A. 1.** a; **2.** b; **3.** d; **4.** b (Para F); **5.** c; **6.** a; **7.** a
- B. 1.** phantom; **2.** bionic arm; **3.** nerve fibers; **4.** tingles and twitches; **5.** lifelike; **6.** tools; **7.** trials

Critical Thinking

- Possible answer(s): **1.** 3; **2.** 3; **3.** 2; **4.** 1; **5.** 2
- Possible answer(s): I don't agree much with any of the statements. I think bionic limbs are great tools for people who have suffered a loss of a body part. I don't think they'll be used by choice to improve the lives of people who don't need them.

Reading Skill

- A. 1.** F; **2.** O; **3.** F; **4.** F; **5.** O; **6.** O; **7.** F; **8.** O
- B. 2.** Tommy Kitts; **5.** the author; **6.** Kuiken; **8.** Joseph Pancrazio

Vocabulary Practice

- A. 1.** sensations; **2.** intricate; **3.** embedded; **4.** compatible
- B. 1.** simple and basic; **2.** sensible; **3.** better; **4.** small, quick; **5.** given to; **6.** qualification
- C. 1.** reason; **2.** concern; **3.** data; **4.** point

TEACHING NOTES

Before You Read

A. Previewing: Have students look at the photo and read the caption. Make sure they understand the connection between the wires, her arm, and the computer. Have students answer the questions and share ideas with a partner. Some vocabulary may be unfamiliar to students (e.g., artificial, transmit, manipulate, stimulate, capture, convert). Students can use their dictionaries or work in pairs to determine the meaning from context.

B. Skimming and Predicting: Have students skim Reading B to find the answers first, and then read it in detail to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 5: Paragraph J says that Kuiken needed an amplifier to connect the signals from the nerves to an electrode placed on the skin.

B. Summarizing: Have students complete the sentences with no more than three words for each blank from Reading B. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- ▶ Have students decide how much they agree or disagree with each opinion and circle an appropriate number.
- ▶ Have students discuss their opinions with a partner, giving reasons for their choices. Have a class discussion to find out which opinions are popular.

Reading Skill

Have students read the paragraph **Distinguishing Fact from Opinion**. A fact is supported with evidence, and it can be verified. An opinion, on the other hand, is what the author thinks about a topic, and it cannot be verified.

A. Fact or Opinion: Elicit or provide examples of facts and opinions before students start the activity. Have students read the sentences (1–8) and write F or O. Check answers in pairs.

- When checking answers with the class, highlight the key words that signify opinions, such as the hedging verb *seems* in question 2 and the adjective *amazing* in sentence 5. Predictions about the future (sentences 6 and 8) should also be classed as opinions, as the information cannot be verified at the present time.

B. Scanning: Have students identify who expresses each opinion from activity A by looking back at the paragraphs in the passage. Have students compare their answers with a partner.

Vocabulary Practice

A. Completion: This paragraph is about improvements to bionic technology. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct words to complete the paragraph. Students can refer to Reading B to guess meaning from context. Check answers as a class, and then choose a volunteer to read the completed paragraph aloud to the class.

B. Definitions: Have students circle the correct options to complete the sentences (1–6) and then compare answers in pairs. Remind students they can use context in the reading passage.

- Question 3: *Salvage* comes from the same root as *save*, but it often refers to goods, as in rescuing goods from a wrecked ship. Here, the best answer is *better*, because you are saving something from the difficult situation.

C. Collocations: Have students complete the sentences (1–4) with the correct words and share answers with a partner. Consider asking students to name other words that contain the root *val* (e.g., *validate*, *validity*, *valuable*). If time allows, have students write new sentences with each collocation.

Video Summary: This video is about how a paraplegic was able to walk again, thanks to advancements in bionic technology.

Key Vocabulary: *overwhelming, paralyzed, paraplegic, rehabilitation*

Answer Key

Before You Watch

A. 1. b; 2. d; 3. a; 4. c

While You Watch

- A. 1. in a motorcycle accident; 2. stand and walk; 3. position his feet to support himself and maintain his balance; 4. It's overwhelming, but it makes her feel her son is whole again.
- B. 1. an important moment; 2. not likely to succeed; 3. doing well; 4. doing something amazing

Critical Thinking

- ▶ Possible answer(s): exploration: humans could survive in space; military: bionic eyes could see in the dark; medical: people could have new working body parts; sports: people could be stronger and fitter than ever before; transportation: people could fly
- ▶ Possible answer(s): Bionic technology isn't natural, and it could create a new subset of humans.

TEACHING NOTES

Before You Watch

A. Previewing: Have students match the words (1–4) with their definitions (a–d). Then have students compare answers with a partner.

While You Watch

A. Gist: Play the video. Then have students note answers to the questions (1–4) before checking answers with a partner.

B. Definitions: Have students read the quotes (1–4) before watching the video again. Then have students write what they think each bold phrase means and compare answers in pairs. Have a class discussion eliciting students' answers to check their understanding.

Critical Thinking

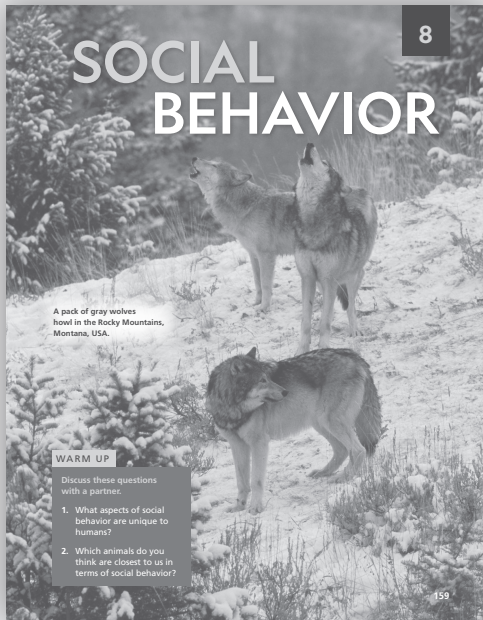
- ▶ Have students think about ways to apply bionic technology to each of the fields then discuss their ideas with a partner.
- ▶ Have students answer the question in pairs, and then have them share their ideas with the class.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

SOCIAL BEHAVIOR



UNIT INTRODUCTION

This unit focuses on social behavior in different species of animals. In “The Genius of Swarms,” students read about the social behavior of ants and bees and how it is similar to humans. In “Of Ants and Humans,” students read an interview with the noted naturalist Edward O. Wilson. In “Crane Migration,” students will watch a video about the migration pattern of cranes in Nebraska. Students will also read about why caribou travel in groups, and how ants kill their prey.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *ant colonies, bee colonies, Iain Couzin, Air Liquide, Thomas D. Seeley, Edward O. Wilson, The Superorganism*

WARM UP

Answer Key

Possible answer(s):

1. concern about style (haircut, clothing, body image), celebrating events, humor
2. apes, elephants, wolves

TEACHING NOTES

A wolf pack is a highly complex social unit. Wolves have individual personalities, and they take care of their own sick and injured. The pack is structured to facilitate communication, education of the young, and the transfer of knowledge across generations.

- Read the Unit Title aloud as students look at the photo. Have students discuss what the wolves are doing and how it demonstrates social behavior.
- Read the caption aloud and make sure students understand the word *howl*. Have students name other animal sounds and describe the social behavior that might be connected to those sounds.
- Have students discuss the questions with a partner and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *aggregate, code, coherent, criteria, faculty, imitate, index, procedure, protocol, territory*

Reading Passage Summary: The social behavior of ants and bees is an amazing phenomenon—individuals are not very intelligent, but colonies are. This is because the individuals play a role in a larger whole. No single individual is in charge or makes decisions; rather the group works together to perform key functions such as locating food or choosing a new home.

Answer Key

Before You Read

Possible answer(s):

- A. 1.** advantages: They attack together so they stay safe. They help provide warmth and locate food more easily in a group.
disadvantages: There is competition for food and space.
- B.** Maybe researchers are interested to see if there are similarities between the social behavior of insects and that of humans.

Reading Comprehension

- A. 1.** b; **2.** a; **3.** c; **4.** c; **5.** b; **6.** c; **7.** c
B. 1. b; **2.** b; **3.** c; **4.** a; **5.** c; **6.** b

Critical Thinking

Possible answer(s):

- ▶ Collaborative encyclopedias like Wikipedia are a good example. Government by democracy is also a form of collective intelligence.
- ▶ The results are usually positive. An exception, for example, could be when people in a country elect a leader who doesn't do a good job.
- ▶ Pros: Huge numbers of people use the Internet, so applying the ideas of swarm intelligence should be very effective. Cons: Fake news and false conspiracy theories spread quickly via the Internet. An online "swarm" of people who believe false

information cannot really be considered intelligent.

Reading Skill

- A. 1.** c; **2.** c; **3.** b; **4.** b; **5.** b
B. Students' own answers

Vocabulary Practice

- A. 1.** territory; **2.** coherent; **3.** aggregate;
4. criteria; **5.** protocols
B. 1. imitate; **2.** index; **3.** procedure; **4.** faculty;
5. code
C. 1. whole; **2.** message; **3.** strategy

Before You Read



- A. Discussion:** Have students look at the photo and read the caption. Make sure they understand what a *single entity* is. Have students read the question and discuss their ideas with a partner.
- B. Skimming:** Have students skim Reading A, and then answer the question. Check answers as a class before students read again to check their ideas.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: Students should notice that option "d" does not include ants, only bees, that option "c" cannot be correct because other insects are not mentioned, and that option "a" is not correct because the two insects are not contrasted in the passage.
- Question 2: In paragraph A, the author uses the phrase "I used to think," and follows it with his thoughts about how smart ants are. The phrase *used to* means he does not think this now.

B. Main Ideas: Have students read the paragraphs mentioned in each question (1–6) and choose the best headings (a, b, or c) for each section. Then have students compare answers with a partner. Elicit answers from pairs asking students how they chose their answers.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students look back at paragraphs R–T, and then answer the questions with a partner. Have pairs share their ideas with the class.

Reading Skill

Have students read the paragraph **Making Inferences (2)**. Remind students they have already learned about this concept. An author does not always state all the details in a text, which makes it more interesting for the reader. This means that the reader needs to decide certain details for themselves by using clues to make inferences. Many standardized international tests include inference questions. To help students identify such question types, draw their attention to the phrases and examples highlighted in the box.

A. Making Inferences: Have students read each question (1–5) and choose the best answer (a, b, or c). Ask students to identify any hedging words.

B. Justifying: Have students compare their answers with a partner and explain their reasoning for each one.

Vocabulary Practice

A. Completion: This passage is about how caribou stay safe traveling together in herds. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct words to complete the passage. Suggest students find the words in Reading A to guess their meaning from context. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students match each word in the box with its definition (1–5). Remind students they can use context in the reading passage. Check answers as a class.

- Questions 2: Although *index* is more likely to be a noun, it can also be used as a verb.
- Question 4; *Faculty* is always a noun, but it can also mean a mental or physical power or ability.
- Question 5: *Code* is more likely to be a noun, but it can also be a verb meaning to convert a message into code. Codes are often used to keep some information secret. Codes are also used in computer programming.

C. Collocations: The word *coherent* means “united” or “working as a whole.” Have students complete the sentences and check answers in pairs. If time allows, have students write new sentences for each collocation.

LESSON OVERVIEW

Target Vocabulary: *altruistic, anomaly, consistently, exemplify, fake, fanatically, fatal, organic, solitary, sterile*

Reading Passage Summary: Edward O. Wilson is a well-known naturalist, and this interview covers his early interest in nature, the reasons why he studies ants in particular, why ants evolved the way they did, and some of the ways in which ants are similar to humans.

Answer Key

Before You Read

A. 1. b; 2. c; 3. a

B. Possible answer(s): how Wilson became a naturalist, similarities between ants and humans, Wilson's opinion on young people today, lessons we have learned from ants, whether ants be saved from extinction

Reading Comprehension

A. 1. b (Para C); 2. d (Para E); 3. a (Para F); 4. c (Paras I and J); 5. b; 6. c; 7. b (Para M)
B. 1. T (Para B); 2. NG (Para E); 3. NG; 4. T (Para K); 5. NG; 6. NG; 7. F (Para R: They are all female); 8. T

Critical Thinking

- ▶ social behavior; division of labor
- ▶ Possible answer(s): I think ants are similar to humans in two ways. We live together in social groups, and we can share jobs to get the work done.

Reading Skill

A. 1. b, d; 2. b, c; 3. b, c; 4. b, e

Vocabulary Practice

A. 1. exemplify; 2. solitary; 3. fatal; 4. organic
B. 1. different from; 2. the same; 3. real; 4. an extreme; 5. produce young; 6. unselfish
C. 1. accident; 2. illness; 3. shootings

TEACHING NOTES

Before You Read

A. Definitions: Have students look at the photo, read the caption, and then match the words (a–c) to their definitions (1–3). Check answers in pairs.

B. Predicting: Have students skim Reading B and take notes on three topics they think the interview will cover. Then have them read the whole passage to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage. The last two questions are probably the most difficult as they address rhetorical purpose and main idea rather than specific detail.

- Question 6: To determine rhetorical purpose, have students look at the information immediately before and after the sentences being analyzed. In this case, the information in this section of the interview focuses on ants and humans, not on other ants or other species. Wilson says that ants make up four times the weight of all the land vertebrates put together, and that the weight of ants is about the same as the weight of humans. These statistics are meant to illustrate just how dominant ants are.
- Question 7: Students have to put information together. Option “a” is incorrect because he says ants are the most warlike (para P). Option “d” is incorrect because this is not addressed in the interview. Paragraph N reveals that ants also have an effect (*They dominate ecosystems.*), making option “c” incorrect. Option “b” is therefore the correct choice.

B. Evaluating Statements: Have students read the statements (1–8) and choose true (T), False (F), or not given (NG). Have pairs check answers, correcting any false statements.

- Question 2: There is no mention of which type of insect actually falls into the pitcher plant.
- Question 3: Although paragraph C states that Darwin loved beetles, there is no mention of the amount of time he spent studying them.
- Question 5: The passage does not make the comparison of how many ants would equal the weight of a human, but instead states that the weight of all the world's ants is about the same weight of all humans.
- Question 6: Paragraph P states that ants communicate by taste and smell, but it does not say why.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students choose the ways in which E. O. Wilson thinks ants are similar to humans.
- Have students discuss their choices with a partner.

Reading Skill

Have students read the paragraph **Identifying Multiple Answers to Questions**. It is important to read exam questions carefully to make sure you answer correctly. Remind students to look for key words, synonyms, and paraphrases when scanning for answers.

A. Scanning: Have students read each question (1–4) carefully. Remind them to follow the instructions and circle the answers which have actually been mentioned in the reading passage. Check answers with the class.

Vocabulary Practice

A. Completion: This passage is about how army ants attack in swarms and how this benefits the biodiversity of the forest. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct words to complete the passage. Suggest students find the words in Reading A to guess their meaning from context. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Question 1; Note the change of form from *exemplified* to *exemplify*.

B. Words in Context: Have students circle the correct options to complete the sentences (1–6) and then compare answers in pairs. Remind students they can use context in the reading passage.

- Question 2: Point out the different form of the words *consistently* (adverb in Reading B) and *consistent* (adjective in the definition).

C. Collocations: The word *fatal* means “resulting in death.” Have students complete the sentences and share answers with a partner. If time allows, have students write a new sentence for each collocation.



Video Summary: This video is about the migration of sandhill cranes and gives details and information about when it happens, what they eat, and how the cranes are threatened.

Key Vocabulary: *abundant, adapt, coexist, migration, resilience*

Answer Key

Before You Watch

A. 1. e; 2. c; 3. a; 4. d; 5. b

B. 1. migrations; 2. coexist; 3. resilience; 4. adapted; 5. abundant

While You Watch

A. See answers in Before You Watch B.

B. 1. at least 10,000 years; 2. eating and socializing with other cranes; 3. grain from corn; 4. loss of their habitat; 5. They're arriving about 30 days earlier than they did 20 years ago. 6. They were overhunted and lost a lot of habitat, so the United States legislated to protect them and other native birds.

Critical Thinking

Possible answer(s): Sandhill cranes might use swarm intelligence for their migration patterns, finding food, and protecting themselves.

While You Watch

A. Gist: Play the video. Then have students check their answers to Before You Watch B.

B. Details: Have students try to answer the questions before watching the video again. Then have students check their answers in pairs.

Critical Thinking

Have students look back at the meaning of *swarm intelligence* in Reading A, answer the question, and share their ideas in pairs.

Vocabulary Review

Have students work alone to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

TEACHING NOTES

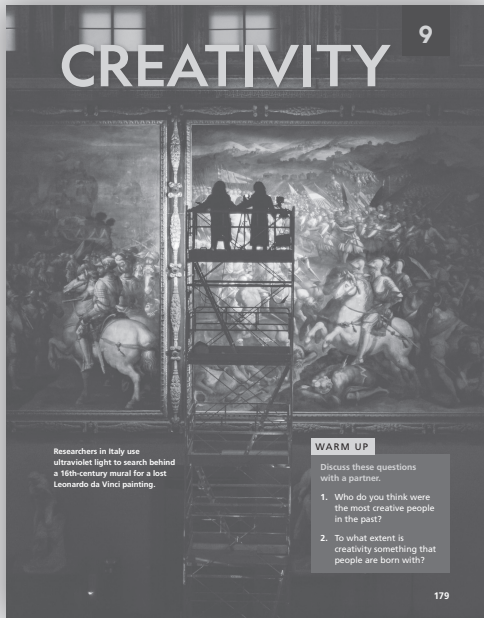
Before You Watch

A. Definitions: Have students match the words (1–5) with their definitions (a–e). Then have students compare answers with a partner.

B. Previewing: Have students read the excerpts and complete them with a word from activity A. Students will check their answers in the next section.

CREATIVITY

9



UNIT INTRODUCTION

This unit focuses on creativity as reflected in both art and writing. In “Decoding Leonardo,” students read about Leonardo da Vinci, focusing on his life and interests. In “The Power of Writing,” students read about the evolution of written language and implications for its future. In “Infinity Artist,” students will watch a video about Japanese artist Yayoi Kusama. Students will also read about how da Vinci’s work is celebrated today, and the contents of a 400-year-old letter found in a Peruvian ruin.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *Leonardo da Vinci, Mona Lisa, Michelangelo, The Last Supper, cuneiform, hieroglyphs, Aristotle, Plato, the Haida, Usama Fayyad, E Ink*

WARM UP



Answer Key

Possible answer(s):

1. artists such as da Vinci, Monet, van Gogh, and Matisse
2. I think you need to be born with the desire to create, but the skill with which you express your creativity can be learned in classes such as art, music, or dance.

TEACHING NOTES

Ultraviolet light can be used to identify whether works of art are authentic. It can also be used to detect whether there is overpainting, repairs, or forged signatures—items that are normally invisible to a naked eye.

- Read the Unit Title aloud as students look at the photo. Have students say what the two people on the scaffolding are looking at (a very large painting). Ask what traits an artist needs to create such a painting, and make a connection between their answer and the title “Creativity.”
- Read the caption aloud and explain the meaning of *ultraviolet light* and *mural*. Ask what a “lost” painting is. Have students say why researchers are interested in finding a lost da Vinci painting.
- Have students discuss the questions with a partner and follow up with a class discussion. Draw up a list of people the class considers to be creative on the board.

LESSON OVERVIEW

Target Vocabulary: *academy, arbitrary, commission, concurrently, deny, draft, ideology, implicit, parameter, preliminary*

Reading Passage Summary: Leonardo da Vinci was born in 1452 in a small town near Florence. He traveled to Florence and studied with another painter, quickly surpassing his mentor's skills. In his lifetime, he painted a number of famous paintings and frescoes, but not all of them have survived because of the technique he used. As well as being highly regarded for his paintings, da Vinci also kept notebooks in which he recorded his innovative ideas and sketches. In his later years he turned his attention to flight.

Answer Key

Before You Read

- A.** Possible answer(s): He painted the famous Mona Lisa, and he was also an inventor and drew sketches of many different machines.
- B.** Possible answer(s): Mona Lisa, Virgin of the Rocks, The Last Supper, the bronze horse, his sketches for innovative machines

Reading Comprehension

- A. 1. b; 2. c; 3. d; 4. c (Para L); 5. d; 6. a; 7. a**
- B. 1. (Vinci) 1452, countryside; 2. (Florence) 6; 3. (Milan) 1482, self-portrait, notebooks; 4. (Florence) 1513, mural; 5. (Rome) 1513; 6. (Amboise) 1519**

Critical Thinking

- ▶ painting: Mona Lisa, Virgin of the Rocks, The Last Supper; sculpture: bronze horse; engineering / architecture / science: parachute, landing equipment, aerial screw, armored carriage, sail shredder, giant crossbow
- ▶ Possible answer(s): In my opinion, the accomplishment that stands out above the others is engineering, because I believe he was the first person to consider modern-day flight.
- ▶ Possible answer(s): I think Bill Gates excels in multiple fields, because he's a computer genius as well as a philanthropist.

Reading Skill

- A. 1. 2; 2. armored carriage; 3. by including a man inside it**
- B. 1. a; 2. a; 3. a; 4. b**
- C.** Possible answer(s): I think there weren't the resources needed to build them, they weren't realistic for the time, and people didn't take them seriously.

Vocabulary Practice

- A. 1. commissions; 2. concurrently; 3. denying; 4. drafts; 5. preliminary**
- B. 1. academy; 2. parameter; 3. implicit; 4. arbitrary; 5. ideology**
- C. 1. access; 2. payment; 3. opportunity**

Before You Read



A. Discussion: Have students look at the photo and read the caption. Have students answer the question and discuss ideas with a partner.

B. Scanning: Have students scan the passage then answer the question. In pairs, have students share their ideas.

- Students know to scan for capital letters to notice names. Review other ways to notice titles (e.g., italics, underlining, quotation marks).

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: Students sometimes confuse the words *infer* and *imply*. Note the use of *imply* in this question. Point out that the speaker or writer implies and the listener or reader infers. Paragraph G states that *he outshone . . . his teacher, in a way that Verrocchio's inhibited style could never do. Some say that Verrocchio never painted again.* This information tells us that

Verrocchio probably stopped painting because he was not as skillful as Leonardo.

- Question 5: The word *battle* has both literal and figurative meanings. First, it refers to the Battle of Anghiari, the subject of a planned mural in the same place as a mural by Michelangelo. Second, it refers to the rivalry between the two painters.
- Question 6: In paragraph S it says *the rivals did their preliminary sketches in separate quarters*, implying that they felt threatened by each other's talents.

B. Understanding Sequence: Have students look back at Reading A and complete the information. Check answers as a class.

- Question 6: Paragraph V says, "three years later" and "the three remaining years" so $1513 + 3 = 1516$; and $1516 + 3 = 1519$.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students note Leonardo da Vinci's accomplishments mentioned in Reading A, then sort them into the appropriate fields shown in the question.
- Have students discuss their opinion about da Vinci's accomplishments with a partner.
- Have students answer the question and then share their ideas with a partner. Elicit ideas from the class.

Reading Skill

Have students read the paragraph **Understanding Complex Infographics (2)**. Remind students that they have already learned about this concept. Authors use infographics with complex details to help the reader better visualize the information.

A. Analyzing: Have students look back at the infographic on page 185 and answer the questions (1–3). Check answers as a class. Ask students how easy it was to find the answers.

B. Understanding Infographics: Have students answer the questions and then compare with a partner. Elicit answers as a class and ask students how they used the infographic to answer the questions.

- Question 3: The man inside the carriage can be used to estimate that the height must be about 3 meters.
- Question 4: A *rower* is a person who rows.

C. Discussion: Have students answer the question then share their ideas with a partner. Lead a class discussion about possible reasons why Leonardo's weapons were never built. The reading passage does state that on his return to Florence in 1500, he was now a *famous man*, but only for his art work—*no one knew or cared much about his science and his inventions, but everyone had heard of his horse and his Last Supper*.

Vocabulary Practice

A. Completion: This passage is about how Leonardo da Vinci's work is celebrated today. Direct students' attention to the photo and caption next to activity A. Have students read the information and then use the correct form of the words in the box to complete the passage. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Students can use their understanding of prefixes to help with meaning (*pre-* before; *com-* / *con-* with, together).
- Students will need to change the form of some words.

B. Definitions: Have students match each word in the box with its definition (1–5). Check answers as a class.

- Students can use their understanding of prefixes to help with meaning (*im-* into; *para-* beside).

C. Collocations: Have students complete the sentences 1–3 with the correct words and then check answers in pairs. If time allows, have students write a new sentence for each collocation.

LESSON OVERVIEW

Target Vocabulary: *alleviate, constraint, correspond, duration, format, incorporate, integrate, literacy, manually, superior*

Reading Passage Summary: Much research has been done in the field of language and writing systems. The earliest examples of written language appeared thousands of years ago, and throughout the centuries writing has evolved to incorporate features such as alphabets and other writing systems. Writing has also been affected by technological advancements such as the printing press, computers, and electronic paper.

Answer Key

Before You Read

- A.** Possible answer(s): My language is similar to English because it conjugates verbs and it uses perfect tenses. Verbs come after subjects, too. It is different from English because nouns are either male or female, adjectives come before nouns, and there are more letters in the alphabet.
- B.** Possible answer(s): the history of writing, the history of letters, tools used to write

Reading Comprehension

- A.** 1. b (Para B); 2. a; 3. d (Para E); 4. c (Para F); 5. c; 6. a (Para M); 7. d (Para R)
- B.** 1. e; 2. c; 3. b; 4. a; 5. d; 6. c; 7. a; 8. b; 9. e; 10. d

Critical Thinking

- Possible answer(s): **Pros:** reduced cost; less pollution; it can be reused; **Cons:** made with plastic; people like traditional pen and paper; I think overall it will have a positive effect on writing.
- Possible answer(s): I think writing will be condensed into a form of shorthand. There might be one universal alphabet, so all languages are written in the same way.

Reading Skill

- A.** 1. Sumerians; 2. 3,500; 3. Latin; 4. 5th century; 5. Aristotle; 6. standard writing system; 7. pages; 8. spaces between words; 9. phonetic; 10. 15th century; 11. printing press
- B.** Possible answer(s): I think the use of pages and spaces between words was very significant, and then the invention of the printing press allowed books to be readily accessible—which made reading a standard practice in many communities.

Vocabulary Practice

- A.** 1. incorporated; 2. format; 3. correspond; 4. integrated; 5. duration
- B.** 1. Literacy; 2. superior; 3. manually; 4. constraint; 5. alleviate
- C.** 1. b; 2. c; 3. d; 4. a

TEACHING NOTES

Before You Read



A. Discussion: Have students read the question and discuss their ideas with a partner.

B. Skimming and Predicting: Have students quickly look at the title, captions, and first two paragraphs of Reading B, then answer the question. Have students read the rest of the article to check their predictions.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: Paragraph B states that over 86 percent of people can now read and write. $100 - 86 = 14$, so this means that 14 percent cannot read and write.

- Question 5: Usually a pronoun refers to a noun or idea that came before. In this case, the idea comes after *it* at the end of the same sentence.
- Question 6: Since Plato was Aristotle's teacher, we can infer that Plato is older.
- Question 7: In paragraph R, Usama Fayyad says *technology will eventually offer efficient and economical ways to bypass keyboards*. So we can infer from this that option "d" is correct. If students have varying answers to question 7, call on them to explain their reasoning to the class. Peer explanations can help students understand process and strategies in making inferences.

B. Scanning: Have students scan Reading B and match the names (a–e) with the sentences (1–10). Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students read the questions and start by making a list of pros and cons about E Ink's e-paper. Have students share their list with a partner and discuss whether they think e-paper will have a positive or negative impact on writing.
- Have students answer the question and discuss it with a partner. Share ideas with the class.

Reading Skill

Have students read the paragraph **Using Graphic Organizers to Organize Key Ideas**. Graphic organizers help the reader understand information in different ways; for example, a Venn diagram compares and contrasts, a timeline shows chronological order, and a T-chart shows pros and cons.

A. Completing a Chart: Have students complete the timeline using no more than three words for each answer. Encourage students to scan Reading B for information as they complete the activity. Students can scan for dates to help find the information in the reading. Check answers as a class.

- Often a text will be organized chronologically, which allows readers to follow the sequence more easily. In Reading B, the author moves around in time as he discusses different aspects of writing. Timelines are especially helpful when events are presented out of chronological order, as in this case.

B. Interpreting: Have students decide which events in activity A they think were the most significant and share their ideas with a partner.

Vocabulary Practice

A. Completion: This passage is about the contents of a 400-year-old document found in Peru. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage by circling the correct words. Check answers as a class and then choose a volunteer to read the completed passage aloud to the class.

B. Words in Context: Have students complete the sentences (1–5) with the words in the box and then compare answers in pairs.

C. Word Link: Have students match the words (1–4) to the definitions (a–d) and share answers with a partner. If time allows, have students write a sentence for each word (1–4).

Video Summary: This video gives details about the life and works of Japanese artist Yayoi Kusama. Kusama is a contemporary artist who works mainly in sculpture and installation. She is best known for her “infinity room” installations and for her signature use of polka dots.

Key Vocabulary: *hallucination, installation, renowned, reputation, stifled*

Answer Key

Before You Watch

A. 1. b; 2. a; 3. c; 4. e; 5. d

B. 1. renowned; 2. hallucination; 3. stifled; 4. reputation; 5. installations

While You Watch

A. See answers in Before You Watch B.

B. 1. It is a prestigious art prize that was given to Kusama. **2.** It was part of a recurring hallucination that inspired Kusama’s polka dot designs. **3.** Kusama moved here when she was 27. **4.** They are two artists Kusama became friends with. **5.** Kusama sometimes worked for 50 hours without rest. **6.** Kusama has lived here since 1973.

Critical Thinking

Possible answer(s): Kusama’s artistic style is abstract and relatively modern whereas Leonardo da Vinci had a traditional and technical style. I prefer the work of Leonardo da Vinci as I like the classic styles of the old artists.

Before You Watch

A. Definitions: Have students match the words (1–5) to the definitions (a–e). Then have students compare with a partner.

B. Previewing: Have students complete the excerpts from the video with the vocabulary words in activity A. They will check their answers when they watch the video.

While You Watch

A. Gist: Play the video. Then have students check their answers to Before You Watch B.

B. Details: Before watching the video again, have students think about why each thing is mentioned and take notes. Then play the video again and have students discuss their ideas with a partner.

Critical Thinking

Have students discuss with a partner how Kusama’s artistic style differs from that of Leonardo da Vinci. Have volunteers share their most interesting ideas in a class discussion.

Vocabulary Review

Have students work individually to check their understanding of the unit’s target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

NEW DISCOVERIES

10



UNIT INTRODUCTION

This unit focuses on new discoveries on Earth and in outer space. In “Cosmic Dawn,” students read about a very powerful telescope in the Chilean desert. In “Element Hunters,” students read about the discovery of elements; those that exist naturally, and those that scientists create. In “Black Holes,” students will watch a video about black holes and how they are studied. Students will also read about the James Webb Space Telescope, and the steps necessary to create new elements.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *cosmic dawn, ALMA, Hernán Quintana, Riccardo Giovanelli, Atacama Desert, Joaquin Vieira, Mendeleyev, Glenn Seaborg, Georgy Flerov, Yuri Oganessian*

WARM UP

Answer Key

Possible answer(s):

1. He’s studying possible spacesuit materials. He’s probably part of a team that’s planning a way to get humans to travel to Mars.
2. I think he meant that you have to have a reason to invent something new.

TEACHING NOTES

A spacesuit for Mars needs to be designed differently from a spacesuit for the moon or the International Space Station. A Mars suit needs to provide enough oxygen for the person, and

needs to protect against the Martian dust, low temperatures, and radiation.

- Read the Unit Title aloud as students look at the photo. Ask students to describe what they see in the picture and to explain how it might link with the Unit Title.
- Read the caption aloud and explain the meaning of *mission* in this context. Have students describe what humans would need to go on a mission to Mars.
- Have students discuss the questions with a partner and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *companion, coordinate, deduce, distort, emit, in operation, interpret, position, precision, prototype*

Reading Passage Summary: The ALMA telescope in Chile is a group of telescopes working together to detect radiation of long wavelengths. ALMA was officially opened in March 2013, allowing astronomers to observe areas of the universe that were previously invisible.

Answer Key

Before You Read

1. Possible answer(s): ALMA is different to regular telescopes because it can detect radiation of long wavelengths.
2. Possible answer(s): **An Eye on the Heavens:** how telescopes work; **The Perfect Location:** finding the best place on the Earth for ALMA; **Assembling the Array:** the building of the observatory and how scientists grouped the telescopes together; **Early Discoveries:** what astronomers have seen with ALMA

Reading Comprehension

- A. 1.** b (Para A); **2.** b; **3.** a (Para E); **4.** b; **5.** d;
6. c; **7.** a
- B. 1.** b; **2.** a; **3.** b; **4.** c; **5.** b; **6.** a; **7.** b

Critical Thinking

Possible answer(s): There is a salt flat in Bolivia, which is the flattest place on earth. I'm not sure how easy it is to get to, but I know that the elevation is high; about 12,000 feet above sea level. The climate is dry with small levels of rainfall between December and February.

Reading Skill

- A.** Students read the text in chunks.
- B.** Possible answer(s): The new image / is the stunning achievement / of the Event Horizon Telescope project, / a global collaboration / of more than 200 scientists / using an array of observatories / scattered around the world, /

from Hawaii to the South Pole. / Combined, / this array acts like a telescope / the size of Earth. / It was able to collect / more than a petabyte of data / while staring at M87's black hole / in April 2017. / It then took two years / for scientists to assemble the shot.

- C.** Possible answer(s): The scientific parts of the passage about how telescopes work are more difficult to read quickly because it's important to focus on the specific details. The parts of the passage that are more narrative and tell about how the site was found are easier to read quickly.

Vocabulary Practice

- A. 1.** operation; **2.** positioned; **3.** emit;
4. precision; **5.** distort
- B. 1.** companion; **2.** interpret; **3.** coordinate;
4. deduce; **5.** prototype
- C. 1.** omit; **2.** transmit; **3.** submit

Before You Read



A. Previewing: Have students look at the photo and read the caption. Have students answer the question and share ideas with a partner.

B. Predicting: Have students skim the section headings, note down their predictions, and then read the passage to check their ideas.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 6: Paragraph H outlines the lengths they had to go to in building the observatory, so the sentence fits best at the end of this paragraph.

- Question 7: Students may presume that ALMA viewed 26 distant galaxies *after* it was officially opened. Paragraph K, however, clearly states that ALMA made these discoveries *before* its official opening, while it was still being set up.

B. Interpreting Infographics: Have students look back at the infographic on pages 206–207 and complete the sentences 1–7 by choosing the correct options (a, b, or c), then share ideas with a partner. Check answers as a class.

- Question 7: Encourage students to draw a diagram to represent five antennas, and draw in the possible baselines, if they have trouble deciding the correct answer.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Remind students that ALMA needs to be positioned on the highest, driest, and flattest place on Earth. Have them consider the factors listed and share their ideas with a partner. Have a class discussion to see which places students chose.

Reading Skill

Have students read the paragraph **Increasing Your Reading Speed**. By reading detailed information slowly, you are more likely to retain the information. Read familiar information more quickly so that you have time to focus more on complicated ideas and abstract concepts. A good reader will vary the pace when reading a passage.

A. Increasing Reading Speed: Have students practice reading the text in chunks. Make sure they understand that the slash marks indicate pauses.

B. Increasing Reading Speed: Have students mark the chunks using slashes, and then practice reading the paragraph as fast as they can.

C. Analyzing: Have students look back at Reading A, answer the questions, and then share ideas with a partner.

Vocabulary Practice

A. Completion: This passage is about the James Webb Space Telescope, which will launch in 2021. Direct students' attention to the photo and caption next to activity A. Have students read the information and then circle the correct words in red to complete the passage. Check answers as a class, then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students write the correct word from the box next to its definition (1–5). Check answers as a class.

C. Word Link: Have students complete the sentences 1–3 with the correct form of the words from the box then check answers in pairs. If time allows, have students write a new sentence for each word.

LESSON OVERVIEW

Target Vocabulary: *attribute, bind, charge, collision, counterpart, dispute, duplicate, prevail, quest, trustworthy*

Reading Passage Summary: The search for existing and new elements started in the past and continues today. Mendeleyev created the periodic table, recognizing that the weights of the elements said something about their organization. The first 92 elements, all existing naturally on Earth, were discovered by 1940. Since then, scientists have created 23 more elements in laboratories.

Answer Key

Before You Read

- A. 1.** Possible answer(s): I know basic elements such as oxygen, nitrogen, helium, hydrogen, and iron. I know that O is oxygen and H is hydrogen, and that H₂O is water.
2. Possible answer(s): Maybe they want to create new elements so that new medicines and technology can be invented.

B. 1. b; **2.** c; **3.** a

Reading Comprehension

- A. 1.** c (Para B); **2.** d (Para E); **3.** a (Para N);
4. a (Para H); **5.** c (Para I); **6.** c; **7.** b
B. 1. d; **2.** a; **3.** c; **4.** b; **5.** a; **6.** c; **7.** b; **8.** d

Critical Thinking

- Possible answer(s): **Gunpowder:** It's an explosive, and it's used to fire a gun. **Oil:** It does not mix with water, it's used for heating and cooking, and it's a fossil fuel. **Electricity:** It's a form of energy, and it results from charged particles. **Penicillin:** It was discovered accidentally, and it's an antibiotic produced by mold.
 ► Possible answer(s): **Gunpowder: Pros:** helped advance certain technologies; **Cons:** led to deadlier weapons of war; **Oil: Pros:** has helped fuel many important industries, e.g., transport; **Cons:** has created large amounts of pollution; **Electricity: Pros:** relatively

cheap power that can be easily delivered to homes; **Cons:** mainly generated by fossil fuels; **Penicillin: Pros:** life-saving drug; **Cons:** some people allergic to penicillin

- Possible answer(s): I think electricity has had the greatest positive effect on the world because it allowed people to work more efficiently (and continue working after the sun went down). I think gunpowder had the most negative effect because it allowed for the development of deadlier weapons.

Reading Skill

- A. 1. a.** Glenn Seaborg; **b.** the plutonium bomb; **c.** at the end of the war; **2. a.** U.S. physicists; **b.** rivals; **c.** give him a small amount of plutonium; **3. a.** Berkeley and Dubna; **b.** as far as element 106; **c.** by shooting light atoms against heavy ones with force; **d.** They created a single superheavy nucleus.

Vocabulary Practice

- A. 1.** quest; **2.** collision; **3.** bind; **4.** charged; **5.** attributes
B. 1. disagreement; **2.** win; **3.** is similar to yours; **4.** usually; **5.** create a copy of
C. 1. embarked; **2.** abandoned; **3.** aided

TEACHING NOTES

Before You Read

A. Discussion: Have students look at the photo, read the caption, and discuss their ideas with a partner.

- Make sure students know what *elements* are (chemical substances with only one type of atom), and what the *periodic table* is (an organizational structure for elements based on weight / number of protons).

B. Scanning: Have students scan the passage for the three scientists (1–3) and match them to their accomplishments (a–c). Check answers as a class.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: If students have difficulty with this question about cause and effect, review words that provide clues to a cause/effect relationship. They include connecting words (e.g., *because, due to, since*), nouns (e.g., *cause, effect, factor, result*), and verbs (e.g., *cause, lead to, contribute to, result in*). Ask students which words in paragraph E indicate cause or effect (*led him to suspect*).
- Question 3: Students can also look at the infographic on page 214 that shows the year of recognition for each element.
- Question 6: To help with this cohesion question, remind students to focus on the words that indicate connections between ideas. The sentence begins with *In other words*, which indicates that what follows will be a paraphrase of the sentence before.
- Question 7: The infographic shows that four elements have lasted milliseconds, and two elements have lasted seconds. A second is longer than a few milliseconds.

B. Scanning: Have students scan Reading B for the names in the box (a–d) and match the correct name with each sentence (1–8). Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students look at the discoveries and discuss what they know about each one with a partner.
- Have students complete the chart with pros and cons about each discovery.
- Have students answer the question and discuss their ideas with a partner. Share ideas with the class.

Reading Skill

Have students read the paragraph **Understanding Long Sentences**. Breaking a long sentence down is helpful because it separates the details into chunks that are easier to read and comprehend. Suggest students mark separate clauses when possible by hunting for subject-verb combinations. Other information may be added to sentences in reductions or appositives (e.g., *His American counterpart, Glenn Seaborg*). It can be helpful to identify all verbs to break down a long sentence even further. To help students see components of the sentence, copy the example on the board by using different colors for each new chunk, or writing each new chunk on a different line.

A. Analyzing: Have students break each sentence down using the steps in the Understanding Long Sentences paragraph, and then answer the questions. Share answers with the class.

Vocabulary Practice

A. Completion: This passage is about the quest to find new elements. Direct students' attention to the photo and caption next to activity A. Have students read the information and then complete the passage by circling the correct words. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

- Question 4: In Reading B, *charge* was used as a noun. In this passage, *charged* is a participial adjective.

B. Words in Context: Have students circle the correct options to complete the definitions (1–5) and then compare answers in pairs.

C. Collocations: Have students complete the sentences with the correct form of the words in the box and share answers with a partner. If time allows, have students write a new sentence for each word.

Video Summary: This video gives facts and details about black holes and explains how we are able to study these mysterious objects.

Key Vocabulary: *compress, dense, entity, matter*

Answer Key

Before You Watch

A. 1. b; **2.** a; **3.** d; **4.** c

B. Possible answer(s): You can't see a black hole. There's a black hole in our galaxy. Dying stars create black holes. Some black holes are really big.

While You Watch

A. 1. about 10–20 times the mass of the sun; millions; **2.** millions or billions times bigger than the sun; **3.** supermassive; at the center of the Milky Way; **4.** 1971

B. 1. quasar; **2.** accretion disk; **3.** event horizon
4. singularity

Critical Thinking

Possible answer(s): It was such an achievement because it meant that scientists could check if all their theories about black holes were correct. It was the first ever image of a black hole, which is significant because it is a huge step forward in technology. Scientists are interested in studying black holes because of a desire to push the boundaries of science. Black holes were predicted through Einstein's Theory of Relativity and, ever since then, scientists have been fascinated by them.

TEACHING NOTES

Before You Watch

A. Definitions: Have students read the information, and then match each word (1–4) to its definition (a–d). Then have students compare their answers with a partner.

B. Discussion: Have students discuss what they already know about black holes. They will learn more when they watch the video.

While You Watch

A. Gist: Play the video. Then have students answer the questions and check answers with a partner.

B. Labeling: Have students match the words before watching the video again. Then play the video again and have students check answers with a partner.

Critical Thinking

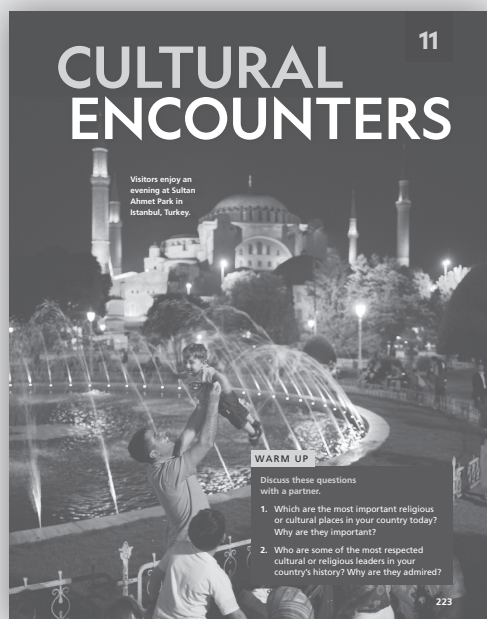
Have students consider why the image of the black hole was such an achievement and why there is such an interest in studying black holes. Have them discuss their ideas with a partner.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

CULTURAL ENCOUNTERS



UNIT INTRODUCTION

This unit focuses on the intersection of Islamic and Christian culture. In “The World of Süleyman the Magnificent,” students read about the successful reign of Süleyman the Magnificent. In “When the Moors Ruled Spain,” students read about the influence of the Moors in Spain, and their cultural legacy. In “Crossroads of the World,” students will watch a video about historical sites in Istanbul. Students will also read about the Muslim leader Saladin, and the famous city of Toledo in Spain.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *Süleyman the Magnificent, Constantinople, Topkapi Palace, Roxelana, Rock of Gibraltar, Moors, Toledo, Ferdinand and Isabella, Córdoba*

WARM UP

Answer Key

Possible answer(s):

1. The mosques are the most important cultural places in my country today because people still use them to worship.
2. Muhammad is one of the most respected religious leaders in my country's history. He was a kind, gentle, and generous man who helped the poor and the destitute. Because of him, we are now an Islamic nation.

TEACHING NOTES

Istanbul is a city located at the intersection of two continents: Europe and Asia. The city serves as the

central historic, cultural, and economic point in Turkey today.

- Read the Unit Title aloud as students look at the photo. Have students describe how the building in the background adds to the culture of the place.
- Read the caption aloud and make sure students know where Istanbul is. Discuss the geography of Istanbul and how it bridges together two continents: Europe and Asia. Have students discuss what they know about Turkey and its culture.
- Have students discuss the questions with a partner and follow up with a class discussion.

LESSON OVERVIEW

Target Vocabulary: *absolute, biased, confide, console, consult, hierarchy, infer, nostalgia, reign, successor*

Reading Passage Summary: Süleyman the Magnificent ruled as the sultan of the Ottoman Empire during the 16th century. During his reign, the Islamic world created some of the greatest achievements architecturally, and the Ottoman Empire extended through much of Europe, parts of Asia, and northern Africa.

Answer Key

Before You Read

A. Possible answer(s): **1.** parts of Europe, south east of Italy, Turkey, Saudi Arabia, North Africa to Iraq; **2.** Possible answer(s): He led the empire from 1494–1566. He expanded its territory throughout Europe, Asia, and Africa and created a powerful navy.

B. **1.** c; **2.** a; **3.** d; **4.** e; **5.** f; **6.** b

Reading Comprehension

A. **1.** b; **2.** c (Para F); **3.** b (Para H); **4.** c; **5.** d; **6.** a; **7.** d (Para W)

B. **1.** the Aegean Sea; **2.** horsemanship and archery; **3.** father Selim's death; **4.** God on Earth; **5.** silver coins; **6.** sultan's foot; **7.** Christian defenses; **8.** siege; **9.** avenge; **10.** heart; **11.** myth

Critical Thinking

Possible answer(s): **Süleyman was a wise leader:** He had been carefully prepared for his role as a future world leader, he ordered a tomb, mosque, and school built in honor of his father, and he created a new code of laws. **He was humane:** He freed 1,500 Egyptian and Iranian captives, he paid back merchants for goods his father had taken from them, and he gave legal protection to minorities. **He was known for his piety:** He consulted theologians on crucial

decisions. He was just, allowing no corruption or injustice to go unpunished. **He was generous:** He allowed knights to leave Rhodes freely within 12 days and citizens could depart at any time within three years.

Reading Skill

A. Para A: g; **Paras B–I:** a; **Paras J–N:** f; **Paras O–S:** e; **Paras T–Z:** c; **Paras AA–BB:** b

B. Possible answer(s): **Para A:** present day; Szigetvár; Sultan Süleyman was buried here; **Paras B–I:** birth to 1520; the Aegean Sea, Constantinople; Süleyman brought Ottoman Empire to the peak of its power; **Paras J–N:** popular approval; but it didn't last long; **Paras O–S:** during his reign; Topkapi Place; he looked regal but we don't know what he was thinking; **Paras T–Z:** during his reign; Rhodes, Malta, Vienna, Szigetvár; 73 years old, campaign diaries written in third person; **Paras AA–BB:** 1566 to the 19th century; Russian expansion, European dominance of southern Asia, Mediterranean possessions lost, the Ottoman Empire was the "Sick Man of Europe," the people would never see his like again

Vocabulary Practice

A. **1.** reign; **2.** hierarchy; **3.** successor; **4.** infer; **5.** consulted
B. **1.** nostalgia; **2.** confide; **3.** console; **4.** biased; **5.** absolute
C. **1.** biased; **2.** bias; **3.** biased; **4.** bias

Before You Read

A. Discussion: Have students look at the map on page 226 and ask: *Where is Constantinople? What countries do you see on the map? What do the reddish areas indicate?* You may want to have students also look at a modern-day map to answer the first question in part A. Have students answer the questions with a partner.

B. Scanning: Have students scan Reading A and match the people in the box (a–f) to their descriptions (1–6). Have pairs check answers.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 3: Paragraph H says that Süleyman rode for three days to reach Constantinople, which means that he was not living there at the time of his father's death.
- Question 4: To answer this question, review the difference between figurative and literal language. Elicit what a lamb and a lion probably represent. Then students need to understand which attribute is the truer one. Two of the options suggest that the "lamb"—with attributes of peace and gentleness—was the dominant personality, whereas option "b" and option "c" suggest the "lion" was dominant.
- Question 6: Because Süleyman's diary was written in the third person with no emotion, there are not many clues as to his true personality.

B. Summarizing: Have students look back at Reading A to complete the summary. Remind students to use no more than three words from the passage in each space. Have them check answers with a partner.

- Question 2: Students may be unsure about this answer as the paragraph talks about which subjects he studied and the skills he learned. Direct students by pointing out the synonym in the passage for *proficient* is *skilled*.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students read the claims in the chart, and then find evidence in Reading A to support each one. Remind students to note down at least one piece of evidence to support each of the claims. Check answers as a class and lead a discussion about which claims students think are accurate.

Reading Skill

Have students read the paragraph **Creating a Mental Map of a Text**. A text is divided up into sections to make it easier for the reader to focus on specific chunks of information. Identifying how a text is organized will help you better understand the main ideas.

A. Creating a Mental Map: Have students read the headings and match them to the correct sections of the chart. Check answers as a class.

B. Creating a Mental Map: Have students add details to each section in activity A.

Vocabulary Practice

A. Completion: This passage is about Saladin, leader of the Muslim forces against the Crusaders, and the first sultan of Egypt and Syria. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct form of the words in the box. Remind students that five words are extra. Check answers as a class, then choose a volunteer to read the completed passage aloud to the class.

B. Definitions: Have students write the correct word next to its definition. Remind students to choose the unused words from the box in activity A. Check answers as a class.

C. Word Usage: Explain that *biased* is an adjective and *bias* is a noun. Tell students to look for context clues in the sentences to choose the correct part of speech. Have students circle the correct words to complete the sentences and then check answers in pairs. If time allows, have students write new sentences for both *biased* and *bias*.

LESSON OVERVIEW

Target Vocabulary: *amend, appendage, empirical, initiate, integrity, invoke, liberal, persecute, splendid, violate*

Reading Passage Summary: The Moors, Arabs who arrived via Morocco, had a huge influence on Spanish history and culture throughout history. They brought their food, language, and religion to Spain in the beginning of the 8th century, and they remained in power for several hundred years. Moorish influence is still strongly felt today in the Spanish cities of Toledo and Córdoba.

Answer Key

Before You Read

A. 1. creed; **2.** prophet; **3.** shrine; **4.** clergy; **5.** cathedral

B. origins of the Moors, how the Moors came to Spain, Moorish architecture, Moorish poetry, how the Moorish era ended

Reading Comprehension

A. 1. b (Para G); **2.** c (Para G); **3.** a (Para D); **4.** a; **5.** c; **6.** a; **7.** c

B. 1. Arabia; **2.** 638; **3.** 711; **4.** Toledo; **5.** capital; **6.** Reconquest; **7.** 1236; **8.** southeast coast; **9.** Alhambra; **10.** Spanish Inquisition; **11.** 1492; **12.** 1609

Critical Thinking

Possible answer(s): **Language:** Argentina has a strong Spanish influence; the language is Spanish. **Food:** There are many similarities with the food. **Music:** You can see flamenco dancers and hear guitars. **Architecture:** Much of the historical Spanish architecture has been preserved too. **Customs:** People take siestas during the day.

Reading Skill

A. Toledo: positive: liberal, tolerant; **the rule of Ferdinand and Isabella:** negative: dark, persecute, cruelty; **Andalucia:** positive: warm, gentle; **Córdoba:** positive: blossomed, greatest; **the cathedral:** negative: banal,

disappointment, commonplace; **Arabic language and poetry:** positive: wealth of vocabulary, distinctive, flowing; **changes to the Alhambra:** negative: abused, eroded, neglect, suffered; **tablaos shows:** negative: threatened, commercialization, loud

B. d

Vocabulary Practice

A. 1. splendid; **2.** liberal; **3.** initiated; **4.** empirical; **5.** persecuted; **6.** violated

B. 1. c; **2.** d; **3.** b; **4.** a

C. 1. law; **2.** privacy; **3.** agreement

TEACHING NOTES

Before You Read

A. Definitions: Have students read the words and match them to their definitions. Suggest students find the words in Reading B to guess their meaning from context. Have students check answers in pairs.

B. Skimming and Predicting: Have students quickly skim Reading B and check the topics they think they will read about. Then have them read the passage to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 2: Paragraph D states that Tariq was a Muslim general, and paragraph G says that Gibraltar is named after him (Tariq's mountain).
- Question 3: Paragraph D says that the invaders met the *hastily assembled* forces of Spain's army. This suggests that the Spanish army was not prepared for the invasion.

- Question 7: The caption to the photo on page 236 states that the Alhambra is now one of Spain's major tourist attractions, and paragraph T says the Alhambra is the most visited site in Spain.

B. Sequencing: Have students complete the timeline with words and dates from Reading B. Check answers as a class.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

Have students think about a country or culture that has been influenced by another country or culture. To help them, tell students to think about countries that have been invaded, and areas of countries that border others. This discussion could include the influence of Spain in Latin America; Portugal in Brazil; France in Africa, Haiti, and Canada; China in Southeast Asia; and England in the United States, Australia, India, and so forth. Language is one way the indigenous cultures were shaped. Have students consider the areas listed and discuss their ideas with a partner.

Reading Skill

Have students read the paragraph **Inferring an Author's Attitude**. Analyzing how an author feels about a topic can help the reader understand the author's attitude. This helps the reader better understand the meaning of the text. To identify the author's attitude, students need to search for words or phrases with positive or negative meanings.

A. Inferring Attitude: Have students read each topic in Reading B and note if the author feels positive (+) or negative (-) about it, noting words or phrases that helped them decide. Have students share answers with the class.

B. Inferring Attitude: Have students choose the best adjective to describe the author's overall feeling toward the Moors, and discuss their reasons with a partner. Encourage students to refer to the completed table in activity A which clearly shows the author's positive attitude towards the Moors.

Vocabulary Practice

A. Completion: This paragraph is about the city of Toledo in Spain. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct form of the words in the box. Check answers as a class then choose a volunteer to read the completed paragraph aloud to the class.

- Questions 5 and 6: Students will have to use the past participle of *persecute* and *violate* as the sentences use the passive voice.

B. Definitions: Have students match each word (1–4) with its definition (a–d) then compare answers in pairs. For added challenge, have students write sentences using these four vocabulary words correctly.

C. Collocations: Have students complete the sentences (1–3) with the words in the box and share answers with a partner. If time allows, have students write new sentences using the three collocations.

Video Summary: This video gives facts and details about historical sites in Istanbul, Turkey.

Key Vocabulary: *bustling, contrasting, divide, dominating, fusion*

Answer Key

Before You Watch

A. 1. a; **2.** d; **3.** e; **4.** b; **5.** c

B. 1. fusion; **2.** bustling; **3.** divides;
4. contrasting; **5.** dominating

While You Watch

A. See Before You Watch B.

B. 1. Europe and Asia; **2.** boat ride along the strait; **3.** 1348; **4.** 67; **5.** church; **6.** mosque; **7.** museum; **8.** the Bosphorus Strait; **9.** checkpoint; **10.** weddings; **11.** 1550 and 1557; **12.** Süleyman the Magnificent

Critical Thinking

Possible answer(s): In my city, you can see the oldest church in the main square. It was built in the 1800s and then extended in the early 20th century. People have been bringing goods to sell to the main building on the square for centuries, and today there are open air markets and stalls every weekend. The train station was built in the early 1900s and is still as important today because many people take public transportation into the capital city, which is about 200 miles away.

TEACHING NOTES

Before You Watch

A. Definitions: Have students match each word in bold (1–5) with its definition (a–e). Remind students they can use a dictionary to help. Then have students compare answers with a partner.

B. Previewing: Have students read the excerpts from the video and then complete them using the words in bold from activity A. Students will check their answers in the video.

While You Watch

A. Gist: Play the video. Have students check their answers to Before You Watch activity B.

B. Details: Have students try to complete the notes before watching the video again. Then play the video again so students can check their answers.

Critical Thinking

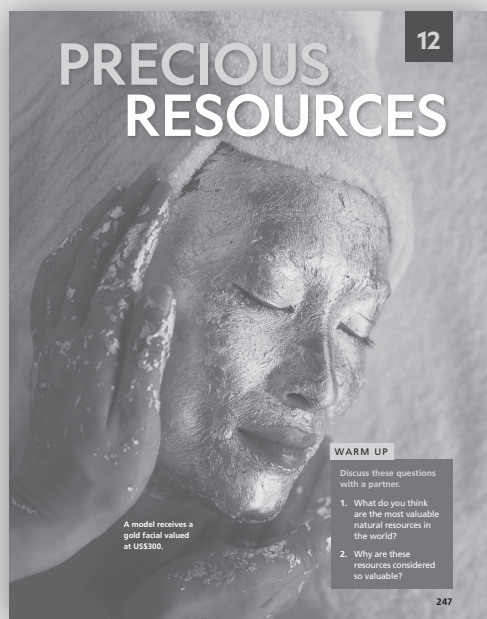
Have students think about a city or town they know well and design a tour to showcase its historical sites. Have each student describe their tour to a partner.

Vocabulary Review

Have students work alone to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.

PRECIOUS RESOURCES



UNIT INTRODUCTION

This unit focuses on nonrenewable resources that are mined for wealth. In “Gold Fever,” students read about our desire for gold and how it is mined. In “The Rush for White Gold,” students read about lithium and the issues involved in mining it in the Salar de Uyuni in Bolivia. In “The Lure of Lithium,” students will watch a video about the properties and characteristics of lithium. Students will also read about Mongolia’s mining boom, and the salt flats in Bolivia.

Visit the *Reading Explorer* website to download supplementary worksheets for this unit.

Key Words for Internet Research: *gold mining, Newmont Mining Corporation, Batu Hijau, Indian wedding gold, lithium applications, Salar de Uyuni*

WARM UP

Answer Key

Possible answer(s):

1. precious metals such as gold, silver, and platinum; diamonds and other jewels
2. I think the resources are considered so valuable because there is such a small supply of them on Earth, and they are so difficult to find.

the gold facial is supposed to remove fine lines and wrinkles, and the metal is supposed to be anti-aging as well.

- Read the Unit Title aloud as students look at the photo. Have students describe what they think the woman has on her face. Ask students why they think gold is such a precious resource.
- Read the caption aloud and have pairs discuss why they think some people would want to have a gold facial.
- Have students discuss the questions with a partner and follow up with a class discussion.

TEACHING NOTES

Gold facials date back to the ancient Egyptians—Cleopatra is said to have had her face covered in gold. Traditionally the reserve of wealthy people,

LESSON OVERVIEW

Target Vocabulary: *auspicious, convene, deplete, explicit, file, grade, hardship, merger, reprise, unrestrained*

Reading Passage Summary: Nur Piah drives a truck at a gold mine in Indonesia, where mining is a big business. Our desire for gold continues to grow, and companies continue to mine for it all around the world. Humans have always had an attraction to the yellow metal and some countries have a particular desire for gold jewelry—specifically China and India.

Answer Key

Before You Read

A. Possible answer(s): medical procedures, electronics, dentistry

B. 1. b; 2. a; 3. c; 4. e; 5. d

Reading Comprehension

A. 1. b; 2. d; 3. c; 4. b (Para M); 5. b; 6. c (Para U); 7. b

B. 1. hundred million tons; 2. practical uses; 3. gold standard / value of gold; 4. China and India; 5. 20 tons; 6. ten million weddings; 7. jewelry; 8. 1980s; 9. financial crisis

Critical Thinking

► Possible answer(s): **Pros:** The mine could make a lot of money for the community, it could create jobs, and it could mean new infrastructure would be built. **Cons:** The mine would be bad for the environment, it could bring too much unwanted traffic and pollution, and it would make people greedy.

► Students' own answers

Reading Skill

A. 1. the tales; 2. when she saw the mine; 3. the world's richest deposits; 4. gold's appeal; 5. social or environmental damage; 6. three gold necklaces

B. 1. legends; 2. Caterpillar / vehicle; 3. the yellow metal

Vocabulary Practice

A. 1. grade; 2. auspicious; 3. depleted; 4. unrestrained; 5. filed; 6. hardship

B. 1. merger; 2. explicit; 3. reprising; 4. convene

C. 1. membership; 2. scholarship; 3. partnership

Before You Read



A. Discussion: Have students look at the photo, read the caption, and then answer the question with a partner.

B. Skimming: Have students quickly skim Reading A and match each section (1–5) with its topic (a–e). Then have students read the passage to check their answers.

Reading Comprehension



A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 1: Students have to determine the purpose of the paragraph. Often, the first sentence indicates the purpose. In this paragraph, the first sentence is a transition. The second sentence states the main idea, signaling the purpose.
- Question 2: Because the sentence begins with *For example*, it must follow a sentence that gives a general statement that this example will support—by stating how the company has responded to its critics.
- Question 3: A *relic*—an object surviving from an earlier time—implies the gold standard was out of date.
- Question 4: Paragraph M states that India is just behind China, meaning that China is the top consumer of gold jewelry and India is second.

- Question 5: 24,000 tons is 40 times more than the amount in the central bank, so 24,000 divided by 40 equals 600.

B. Summarizing: Have students look back at Reading A and the infographic on page 251 to complete the sentences (1–9) and then check answers with a partner. Remind students to use no more than three words for each answer.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students read the scenario then work with a partner to list the pros and cons.
- In small groups, have students debate the issue. Have a class discussion to determine which side has the most convincing argument.

Reading Skill

Have students read the paragraph **Identifying Coherence Devices**. Authors use coherence devices to link ideas together and make their writing more interesting.

A. Understanding Coherence Devices: Have students scan Reading A to find answers to the questions (1–6). Check answers as a class.

B. Identifying Synonyms: Have students scan Reading A to find the synonyms for the words (1–3). Check answers as a class.

Vocabulary Practice

A. Completion: This paragraph is about Mongolia's mining boom. Direct students' attention to the photo and caption next to activity A. Have students read the information and then choose the correct form of the words in the box. Check answers as a class, then choose a volunteer to read the completed passage aloud to the class.

B. Completion: Have students circle the correct words to complete the information. Check answers as a class. For added challenge, suggest students write a paragraph containing all target vocabulary.

C. Word Link: Have students add *ship* to the words in the box and complete the sentences (1–3), then check answers in pairs. If time allows, have students write a new sentence for each of these words.

LESSON OVERVIEW

Target Vocabulary: *assure, commitment, exploit, infinite, proceed (to), revelation, rival, salvation, skeptical, version*

Reading Passage Summary: Lithium is a heat-resistant metal that can store a significant amount of energy. For this reason, it is used to make batteries that can last for a very long time—and so it is in high demand. Salar de Uyuni is a remote salt flat in Bolivia that sits atop this highly prized natural resource, and Bolivia’s vice president is hoping to capitalize on it.

Answer Key

Before You Read

- A.** Possible answer(s): Lithium is used to make batteries that can store a large amount of energy. Bolivia probably wants to extract it to make money.
- B.** Possible answer(s): Bolivia’s vice president probably feels positive about lithium mining because it will make his country richer. Uyuni’s mayor probably feels negative about it because he might worry the government will take all the money from his people and that the mining will destroy the environment. The Bolivian chemical engineer probably feels positive because he understands the issues and the challenges and the work might be exciting to him. The Bolivian geologist probably feels negative because of the environmental impact on the area.

Reading Comprehension

- A.** 1. c; 2. b; 3. d (Para K); 4. c; 5. d; 6. c; 7. a
B. 1. South America; 2. Chile; 3. brine; 4. the west
C. 1. R; 2. O; 3. Q; 4. M; 5. P; 6. S

Critical Thinking

- **Dealing with waste: Government’s view:** It has a unique processing method that will reduce waste. **Expert’s view:** It’s hard to know the truth because the magnesium content in Bolivian lithium is very high. The

regulations and laws in Argentina and Chile are much stricter than in Bolivia. **Lack of water: Government’s view:** 90 percent will come from salt water rather than underground. **Expert’s view:** They will need vast quantities of water; more than any other mine in Bolivia.

- Possible answer(s): I think the expert’s views are more convincing because they are realistic and based on factual evidence.
- Possible answer(s): No, I don’t think so. I worry too much about the environmental damage this will cause to such a remote and beautiful place on Earth.

Reading Skill

- A. Gold:** a, d, g, j; **Lithium:** c, e, f, i; **Both:** b, h
- B.** Possible answer(s): **1.** I think the extraction of gold causes more environmental damage. However, the full extent of lithium mining probably hasn’t been realized yet. **2.** I think the demand for lithium will rise more in the future as technology improves and batteries become more powerful. **3.** I would invest in lithium because it seems to be the way of the future.

Vocabulary Practice

- A.** 1. rival; 2. infinite; 3. salvation; 4. proceed; 5. exploited; 6. commitment
B. 1. surprising and unknown; 2. certain; 3. varies from other forms of the same thing; 4. have doubts about
C. 1. c; 2. d; 3. b; 4. a

TEACHING NOTES

Before You Read



A. Discussion: Have students look at the photo, read the caption, and then answer the questions. Have students discuss with a partner.

B. Predicting: Have students consider how the people mentioned might feel about lithium mining, and then discuss their ideas with a partner. Have students read the passage to check their ideas.

Reading Comprehension

A. Multiple Choice: Have students read the entire passage silently and then answer the questions. Alternatively, play the audio and have students read along. Check answers as a class, asking students to give evidence for their answers using paragraph references from the passage.

- Question 5: The paragraph states that for every percentage of vehicles sold, the demand for lithium increases by 70,000 metric tons a year. If the percentage increases from 3 percent to 5 percent, that is an increase of 2 percent: $70,000 \times 2 = 140,000$ metric tons.

B. Understanding Infographics: Have students look at the infographic on page 261 and answer the questions (1–4). Check answers as a class.

C. Matching Paragraphs: Have students read the sentences (1–6) and write the paragraph letter that contains the information. Have students check answers in pairs.

Additional comprehension questions are available for download on the *Reading Explorer* website.

Critical Thinking

- Have students find the information in Reading B and complete the chart with the government's view and an expert's view.
- Have students answer the question and share their opinion with a partner.
- Have students consider the factors and answer the question, then discuss their ideas with a partner.

Reading Skill

Have students read the paragraph **Synthesizing Ideas Across Readings**. As you summarize, compare, contrast, and evaluate ideas from different sources, you gain a new perspective about a topic and are able to understand the content in a deeper way.

A. Comparing Information: Have students read the information (a–j) and refer to Reading A and Reading B to complete the Venn diagram. Check answers with the class.

B. Synthesizing Information: Have students answer the questions and discuss their ideas in a group. Ask groups to present a summary of their answers to the class.

Vocabulary Practice

A. Completion: This passage is about salt extraction at Salar de Uyuni in Bolivia. Direct students' attention to the photo and caption next to activity A. Have students read the information first and then circle the correct words in red to complete the passage. Check answers as a class, and then choose a volunteer to read the completed passage aloud to the class.

B. Words in Context: Have students circle the correct words to complete each sentence (1–4) and then compare answers in pairs.

C. Word Link: Have students match the words (1–4) to their definitions (a–d) and check answers with a partner. If time allows, have students write new sentences using each of the words.

Video Summary: This video gives facts and details about the importance of lithium and what it is used for today.

Key Vocabulary: *alloy, bedrock, catapult, refine, versatile*

Answer Key

Before You Watch

A. 1. b; **2.** c; **3.** a; **4.** e; **5.** d

B. Possible answer(s): Lithium is a heat-resistant metal. It's used in batteries and in the car industry.

While You Watch

A. 3. The most popular use of lithium is in batteries. **4.** Lithium melts at a very high temperature. **5.** Lithium is capable of storing large amounts of energy.

B. 1. 1817; **2.** stone; **3.** metal; **4.** smartphones; **5.** laptops; **6.** resistant; **7.** reactive; **8.** energy; **9.** sea water; **10.** brines

Critical Thinking

- ▶ Possible answer(s): oil, coal, uranium
- ▶ Possible answer(s): I think it depends on the rate it's being mined, whether new stores are found, or whether we gradually start using less of the resource. I think oil would have the greatest impact on the economy if it ran out, because it is used to make plastic and gas, which are used in so many things we buy today.

TEACHING NOTES

Before You Watch

A. Definitions: Have students read the excerpts from the video and match each word (1–5) with its definition (a–e). Then have students compare answers with a partner.

B. Discussion: Have students discuss with a partner what they already known about lithium from Reading B.

While You Watch

A. Gist: Play the video. Have students check the information that is true about lithium and compare answers with a partner.

B. Completion: Have students try to complete the notes before watching the video again. Then play the video again so students can check their answers.

Critical Thinking

- ▶ Have pairs discuss other limited nonrenewable resources that are important to the world economy.
- ▶ Have pairs discuss the questions and then lead a class discussion about their ideas.

Vocabulary Review

Have students work individually to check their understanding of the unit's target vocabulary. If time allows, have students write an example sentence with each word. Ask for volunteers to read their completed sentences aloud to the class.

Additional vocabulary practice questions are available for download on the *Reading Explorer* website.