



Grade 3

Unit 5 | Teacher Guide

Flash, Bang, Boom! Exploring Light and Sound

Grade 3

Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

Teacher Guide

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Introduction

FLASH, BANG, BOOM! EXPLORING LIGHT AND SOUND

This introduction includes the necessary background information to teach the Flash, Bang, Boom! Exploring Light and Sound unit. This unit contains 17 daily lessons, plus two Pausing Point days that may be used for differentiated instruction. Each lesson will require a total of 120 minutes. Lesson 14 contains the Unit Assessment.

As noted, two days are intended to be used as Pausing Point days. These Pausing Points are embedded into the instruction at appropriate points, with the first one after Lesson 7 and the second after Lesson 17. You may choose to continue to the next lesson and schedule the first Pausing Point day for another day in the unit sequence. Pausing Points can be used to focus on content understanding, writing, spelling, grammar, morphology skills, or fluency.

SKILLS

Reading

The nonfiction Reader for Unit 5, *Adventures in Light and Sound*, consists of selections describing the science behind light and sound. Students will read about light sources, shadows, mirrors, reflection, refraction, lenses, and color. They will also study the characteristics of sound, as well as the human voice. Later chapters include information about light and photography as well as biographies of two famous inventors who worked with light and sound: Alexander Graham Bell and Thomas Edison. It is important that you discuss the characteristics of the biography genre and stress that biographies are nonfiction since they are factual accounts of people's lives. Students will be given opportunities throughout the unit to demonstrate read-aloud fluency.

Spelling

During this unit's spelling exercises, students will review words with spelling patterns of /ee/ spelled 'y,' 'e,' 'i,' 'ea,' 'ee,' 'ie,' 'ey' and 'e_e'. For Lessons 6–10, students will review words with spelling patterns of /ae/ spelled 'ay,' 'ai,' and 'ea'. Finally, in Lessons 11–15, students will review words with spelling patterns of /ae/ spelled 'a_e,' and 'a.' Students will have two Challenge Words and one Content word added to each spelling list.

You will also continue to teach dictionary skills. As this unit progresses, students should become proficient in the application of guide words.

Grammar

In grammar, students will review a part of speech introduced at the end of Grade 2: adverbs ending with *-ly* that tell how an action takes place. They will go further in their study of adverbs by examining those that indicate when and where. Students will be introduced to conjunctions as a new part of speech. They will learn the meanings and usages of the conjunctions *and* and *but*.

Morphology

During the morphology portion of the lessons, students will review the suffixes *-er*, *-or*, *-ist*, *-ian*, *-y*, and *-al*. In addition, students will learn the suffixes *-ous* and *-ly*. They will review how suffixes change the meaning of root words. They will also review how suffixes added to a word can change the part of speech of that word.

KNOWLEDGE: WHY THE LIGHT AND SOUND UNIT IS IMPORTANT

This unit will build upon what students have already learned about the five senses and the human body, focusing on the senses of seeing and hearing. Through reading and listening to read-alouds, students will learn about the properties of light and sound, how light and sound travel in waves, and how light and sound can be manipulated by various instruments, such as magnifying glasses, microscopes, and telescopes. The content students learn in this grade will serve as the basis in later grades for more in-depth study of the human body and the properties of light and sound.

Students will be introduced to this content through a narrative story about two old friends, Samuel and Jack, who are losing their senses of sight and hearing, and their adventures with Samuel's grandchildren, Amy and Ethan.

Note: Light has both a wave and a particle nature. Under most circumstances, light acts like a series of waves. However, there are certain, less common situations where light acts like a stream of particles.

At the Grade 3 level, we concentrate on the wave nature of light, briefly mentioning that “scientists are still studying and learning many new things about light, including that in special situations, light can act like a stream instead of a wave.” Students will learn more about the dual wave and particle nature of light in future grades.

This unit also provides opportunities for students to build content knowledge and draw connections to social studies and science subject areas but does not explicitly teach the Texas Essential Knowledge and Skills standards for Social Studies and Science. At times throughout the unit, you may wish to build on class discussions to support students in making cross-curricular connections to the strands of Science, Technology, and Society from the social studies discipline and Force, Motion, and Energy and Scientific Investigation and Reasoning from the science discipline.

Prior Knowledge

Students who have received instruction in the program will have pertinent background knowledge for this unit. For students who have not received prior instruction in the program, introductory knowledge is addressed at the beginning of each unit.

The Five Senses (Kindergarten)

- Identify and demonstrate understanding of the five senses: sight, hearing, smell, taste, and touch.
- Identify each of the body parts associated with the five senses.
- Provide simple explanations about how the eyes, ears, nose, tongue, and skin work and their functions.
- Describe how the five senses help humans learn about their world.
- Describe some ways the five senses help protect people from harm.
- Describe the experiences and challenges of someone who is blind or deaf.

The Human Body (Grade 1)

- Explain that the human body is a network of systems.
- Identify each of the five body systems: skeletal, muscular, digestive, circulatory, and nervous.

Astronomy: Space Exploration (Grade 1)

- Recognize the sun in the sky.
- Explain that the sun is a source of energy, light, and heat.
- Identify the Earth's rotation or spin as the cause of day and night.
- Explain sunrise and sunset.
- Explain that the Earth orbits the sun.
- Explain that stars are large, although they appear small in the night sky.
- Explain that astronomers study the moon and stars using telescopes.

Cycles of Nature: Clouds to Raindrops (Grade 2)

- Identify that the tilt of Earth's axis in relation to the sun causes the seasons.
- Explain that most cells are too small to be seen without a microscope.
- Identify the three states of matter in which water exists: solid, liquid, and gas.

WRITING

Students have many opportunities to write in a variety of ways and for different purposes. The formal writing piece for the *Light and Sound* unit is a multi-day research and informative writing project that focuses on writing a newspaper article about the invention of either the telephone or the incandescent light bulb. Students will learn to conduct research, take and organize notes, and use the writing process to plan, draft, revise, edit and publish the final newspaper article. The project can be done with or without the use of technology, but having students use computers to research, write, and publish their projects is highly recommended.

Everyday writing opportunities come in many forms, including short and extended responses requiring evidence from the text. Students will also use graphic organizers to gather and categorize information from reading or from the Read-Aloud, or to plan for writing. Many lessons provide opportunities for students to collaborate, share ideas, and give feedback on their writing.

PERFORMANCE TASKS AND ASSESSMENTS

The Primary Focus objectives in each lesson are carefully structured and sequenced throughout the unit to help build student understanding. Additionally, formative assessments are provided to help keep track of their progress toward objectives and standards. These can be found in the Student Activity Book and are referenced in every lesson.

While some units in Grade 3 have extended Performance Task assessments, *Light and Sound* has a Unit Assessment covering the content of the unit, reading objectives taught throughout the unit, as well as grammar and morphology assessment.

FLUENCY SUPPLEMENT

A separate component, the Fluency Supplement, is available on the program's digital components site. This component was created to accompany materials for Grade 3. It consists of selections from a variety of genres, including poetry, folklore, and fables. These selections provide additional opportunities for students to practice reading with fluency and expression (prosody). For more information on implementation, please consult the supplement.

INSTRUCTIONAL COMPONENTS

Teacher Resources

There are 18 Image Cards in your kit that include pictures to augment instruction of the Light and Sound Unit.

At the back of this Teacher Guide, you will find a section titled, "Teacher Resources." In this section you will find the following:

- Glossary for the *Light and Sound* unit
- Activity Book Answer Key

Digital Resources

In the Advance Preparation section of each lesson, you will be directed to prepare to project images associated with the Read-Aloud portion of the lesson. These can be found on the program's digital components site.

ACADEMIC AND CORE VOCABULARY

Lesson 1

- source
- energy
- wavelength
- vacuum
- speed
- wave
- white light
- electricity

Lesson 2

- illuminates
- energy
- light waves
- particles
- rays
- shadow

Lesson 3

- transparent
- skylight
- opaque
- absorb
- project

Lesson 4

- mirror
- reflect
- plane
- distort
- kaleidoscope
- angle
- transmitted

- concave

- convex

Lesson 5

- refract
- dense
- magnify
- security
- instruments
- lens
- refraction
- translucent

Lesson 7

- prism
- spectrum
- indigo
- ultraviolet
- infrared
- optometrist
- x-ray

Lesson 8

- cacophony
- medium
- sound
- sound waves
- vibration

Lesson 9

- vocal chords
- medium

Lesson 10

- pitch
- volume
- intense
- damage
- audiologist
- composing
- frequency
- intensity

Lesson 11

- trachea
- larynx
- automatically
- diaphragm
- variations
- voice box

Lesson 12

- hearing trumpet
- visible speech
- symbol
- inspiration
- telegraph
- Morse code

Lesson 13

- scarlet fever
- patent
- phonograph
- incandescent
- kinetoscope

1

What Is Light?, Part 1

PRIMARY FOCUS OF LESSON

Core Connections

- Students will describe the concept of light. **TEKS 3.7.G**

Reading

Students will find key ideas and details in the text introducing the concept

- of light. **TEKS 3.2.A.vii; TEKS 3.6.G; TEKS 3.9.D.ii**

Writing

Students will take notes and write in response to the text about light.

- TEKS 3.6.H; TEKS 3.7.E**

Language

Students will review the spelling sound /ee /.

- TEKS 3.2.A.vi; TEKS 3.2.B.i; TEKS 3.2.B.iv; TEKS 3.3.C**

FORMATIVE ASSESSMENT

Activity Page 1.1

Before and After Reading Find the key idea

- and details from the reading. **TEKS 3.7.G**

- TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.9.D.ii** Recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding; **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating; **TEKS 3.2.B** Demonstrate and apply spelling knowledge by: (i) spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables; (iv) spelling multisyllabic words with multiple sound-spelling patterns; **TEKS 3.2.A.vi** Demonstrate and apply phonetic knowledge by: decoding words using knowledge of suffixes, including how they can change base words such as dropping e, changing y to i, and doubling final consonants; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

LESSON AT A GLANCE

	Grouping	Time	Materials
Core Connection (5 min.)			
Before Reading: Think-Draw-Share	Whole Group	5 min.	<input type="checkbox"/> Activity Page 1.1 <input type="checkbox"/> <i>Adventures in Light and Sound</i>
Reading (45 min.)			
Introducing the Reader	Whole Group	5 min.	<input type="checkbox"/> <i>Adventures in Light and Sound</i> <input type="checkbox"/> Activity Page 1.1
Previewing the Vocabulary	Whole Group	5 min.	
Reading: “What is Light?”	Whole Group	30 min.	
Responding to Reading	Independent	5 min.	
Writing (30 min.)			
Introduction to Lab Notes	Partner	25 min.	<input type="checkbox"/> <i>Adventures in Light and Sound</i> <input type="checkbox"/> Activity Page 1.2 <input type="checkbox"/> Library of Congress website: Bell’s notebook images <input type="checkbox"/> chart paper
Wrap-Up	Partner	5 min.	
Language (40 min.)			
Spelling	Whole Group	20 min.	<input type="checkbox"/> Individual Code Charts <input type="checkbox"/> Activity Pages 1.3, 1.4 <input type="checkbox"/> Spelling Chart (Digital Projections)
Morphology	Independent	20 min.	
Take-Home Material			
Take Home Letter, Spelling /ee/ sound			<input type="checkbox"/> Activity Page 1.5

ADVANCE PREPARATION

Writing

- Search online for the Library of Congress website, “Notebook by Alexander Graham Bell, from April 18, 1876 to September 30, 1876.” Have the web page open and ready for the whole-class introduction to Lab Notes.
- Chart paper and markers. Prepare the chart paper to replicate the graphic organizer on Activity Page 1.2.

Spelling

- Create the following chart or prepare Digital Projection DP.U5.L1.1:

'y' > /ee/	'e' > /ee/	'i' > /ee/	'ea' > /ee/	'ee' > /ee/	'ie' > /ee/	'ey' > /ee/	'e_e' > /ee/

- Make sure each student has a copy of the Individual Code Chart that is found at the back of the Unit 1 Teacher Guide. These charts will be used throughout Unit 5.

Universal Access

- In this introductory lesson, students will learn about light energy through reading and listening. Prepare students to engage with the content by:
 - setting up the image cards around the room and asking questions about what students think each represents
 - asking prior knowledge questions
 - finding additional books about light and energy for independent reading

Start Lesson

Lesson 1: What Is Light?, Part 1


Core Connections



 **Primary Focus:** Students will describe the concept of light. **TEKS 3.7.G**

BEFORE READING: THINK-DRAW-SHARE (5 MIN.)

- Explain to students that during this unit they will be exploring two sources of energy like real scientists by reading, writing, conducting experiments, and

 **TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning.

sharing observations. Explain that they'll be working to answer the questions "What Is Light?" and "What Is Sound?"

- Think-Draw-Share: Using Activity Page 1.1, students will draw a picture to answer the question "What Is Light?" After two or three minutes, have a few students share their picture with a partner and briefly explain why they drew it. Bring the whole group back together and have a few students share their pictures.

Activity Page 1.1



Lesson 1: What Is Light?, Part 1

Reading

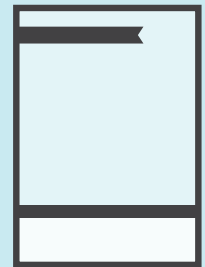


Primary Focus: Students will find key ideas and details in the text introducing the concept of light. **TEKS 3.2.A.vii; TEKS 3.6.G; TEKS 3.9.D.ii**

INTRODUCING THE READER (5 MIN.)

- Make sure that you and each student have a copy of the Reader, *Adventures in Light and Sound*.
- Have students turn to the Table of Contents.
- Have student volunteers read several chapter titles.
- Give students a few moments to flip through the Reader to view the images.
- Ask, "What images caught your eye and why?" Take a few volunteer responses.
- Ask, "What type of informational text features can you find?" Take a few volunteer responses (e.g., bold print, photos and captions, diagrams, table of contents, illustrations, and glossary).

Student Reader:
*Adventures in
Light and Sound*



PREVIEWING THE VOCABULARY (5 MIN.)

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to the definitions at appropriate times. The words also appear in the glossary in the back of the student reader.

source, a starting place, where something comes from

energy, a supply of power

TEKS 3.2.A.vii Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.9.D.ii** Recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding.

wavelength, how long a wave is, the distance from the top of one wave to the top of the next wave

vacuum, emptiness

speed, how fast or slow something moves

wave, an amount of energy that moves in a rippling pattern like a wave in water

white light, light that is made up of waves with different wavelengths and includes all the colors we can see

electricity, energy carried over wires

Vocabulary Chart for “What Is Light?”		
Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words
Vocabulary	wavelength wave white light electricity	source vacuum speed energy
Multiple Meaning	wave	vacuum
Sayings and Phrases		

READING: “WHAT IS LIGHT?” (30 MIN.)

- Read the title of the chapter together as a class: “What Is Light?”
- Ask, “Where in the Reader could we find the definition of *source* quickly?”
 - » the glossary
- Ask, “How do you find the word in the glossary?” Call on one student to identify where the word is and read the definition.

1 What Is Light?

Did you know that the sun is the greatest **source** of light for our planet, Earth? But what is light? Why is it so important?

Hot gases of the sun give off both light and heat **energy**. Light carries **energy**, with the long **wavelengths** carrying the least and the short **wavelengths** carrying the most. When you think of something with lots of **energy**, what comes to mind?

Do you think of something fast like a race car? Do you think of something with great force like a very strong wind knocking down a tree?

Believe it or not, light can be many times more energetic than a car or the wind.



*The sun is the greatest **source** of light for Earth.*

Pages 2–3

- Have students read **page 2** to themselves to find out more about energy.
- When students have finished reading, ask them, “What do you think of when you think of something with a lot of energy?”
 - » Answers may vary.
- I’m going to reread this sentence from **page 2**: “Believe it or not, light can be many times more energetic than a car or the wind.” Ask students to raise their hands if they found this fact surprising.
- Direct students’ attention to the image and caption on **page 3**.

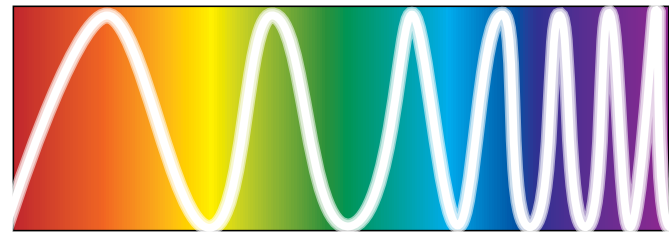
Light travels at 186,000 miles every second in a **vacuum**. At that **speed**, light can go around Earth more than seven times every second! No human-made machine can go that fast—not even a jet plane or rocket!

One way that light travels, including light from the sun, is in the form of **waves**. Scientists can measure how long light **waves** are. **Waves** can be different sizes—some are long and some are short. Some light **waves** are visible and some are invisible. Whether you can see light or not depends on the length of the **wave**. The longest **wavelength** of visible light is seen as red and the shortest **wavelength** is violet. Short **wavelengths** carry the most **energy**.



Long **Wavelengths**

Short **Wavelengths**



*One way light from the sun travels is in **waves**. **Waves** can be different sizes. Short **wavelengths**, like those at the far right, carry the most **energy**.*

Pages 4–5

- Tell students to read **page 4** to themselves.
- Ask students to describe light's speed and how it compares to the speed of other things.
 - » Light travels at 186,000 miles every second in a vacuum, and at that speed, it can go around Earth more than seven times every second. Not even a jet plane or a rocket can go that fast.
- Discuss the concept of measuring light in waves and wavelengths, referring to the image and caption on **page 5**.
- Ask, "Can we see all kinds of light?"
 - » No, some light waves are visible and some are invisible.
- Ask, "What determines whether light can be seen?"
 - » wavelengths



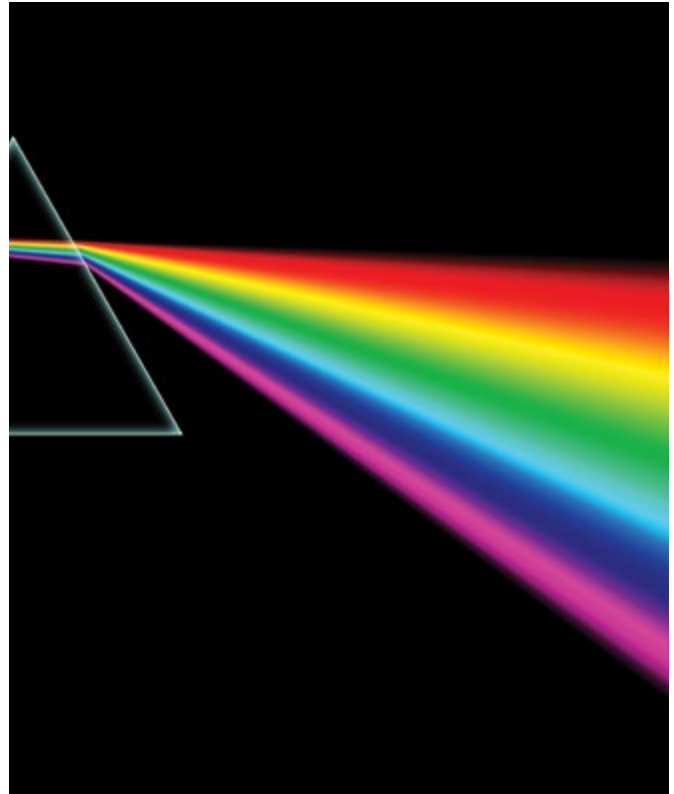
Check for Understanding

Think-Pair-Share: “What does light have to do with wavelengths?”

Teacher should circulate while students share briefly. Answers will vary but should include light can be measured in wavelengths, wavelengths can be different sizes, some wavelengths are visible and some are not, depending on the size. Students can use both the text and the illustrations to explain their answers.

The sun gives off what is called **white light**. Perhaps you think of the light from the sun as having no color at all. Maybe you think the light from the sun is more yellow in color. It may surprise you to know that the sun's light, **white light**, is made up of all the colors of the rainbow. **White light** includes light of different **wavelengths**, including all the colors we can see.

Of all the **wavelengths** in the sun's light, there is just a little more of the yellow **wavelengths** than the other colors. This is why the sun looks yellow when we see it against the blue sky. Still, the light from the sun includes all of the other colors and **wavelengths**. You will learn more about **white light**, visible light, and colors in a later chapter in this Reader.



White light is a well-balanced mix of different wavelengths.

Pages 6–7

- Have students read **page 6** to themselves to find the answer to the question: “What is white light?” When students have finished reading, restate the question and call on a student to answer.
 - » White light is the type of light that comes from the sun. It includes wavelengths of every visible color.
- Point out to students that even though the kind of light coming from the sun is white light, the sun itself looks yellow. Ask students to find the sentence that explains why that’s true.
 - » There is a little more of the yellow wavelengths than the other wavelengths in the sun’s light so the light looks yellow against a blue sky.
- Direct students’ attention to the image and caption on **page 7**.

Although the sun is the greatest **source** of visible light, there are also other **sources** of light. What else in the sky provides light? The other stars in the night sky provide light, though it is not as bright as the light from the sun during the day. The moon is not a star and does not give off its own light.

Can you think of other **sources** of light? Is there light in your classroom right now? Perhaps it is from the sun shining through the windows. Chances are good, though, that some of the light in the room may be coming from light bulbs. Like the sun, most light bulbs give off **white light**. **Electric** lights are such a part of our everyday life, we don't even think about them—unless the **electricity** goes off! This doesn't happen often, but sometimes it does during a bad storm. When the electricity goes off and we do not have light from light bulbs, people sometimes use other **sources** of light, like flashlights or candles.



*Can you think of **sources** of light other than the sun?*

8

9

Pages 8–9

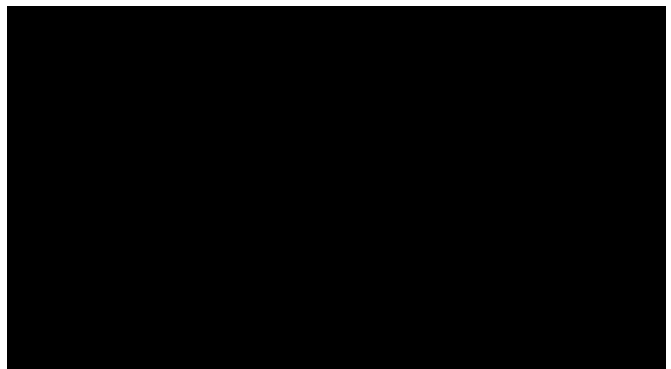
- Direct students' attention to the image on **page 9**. Have one student read the caption to the class.
- Ask students to read **page 8** to themselves to find the answer to the question: "What other sources of light can you think of, besides the sun?"
- When students have finished reading, restate the question and ask students to answer.
 - » Answers may vary but should include light bulbs, flashlights, candles, stars, or fireflies.
- Ask students, "What else in the sky, besides the sun, provides light and what in the sky does not provide light?"
 - » Stars in the night sky provide light that is not as bright as the sun. The moon does not give off its own light.

Light is important for many reasons. Light and heat **energy** from the sun warms Earth. Without the light and heat **energy** from the sun, Earth would be freezing cold. You also learned back in kindergarten that the sun's light is needed for plants to grow. Also, without light, there would be no colors. Can you think of another reason that light is important?

Try to imagine a world in which there is no light—no sun, no stars, no candles, and no light bulbs. What would be different? If you just said that it would be dark, you are only partly right. What else would change? Without light, you would not be able to see anything! A world without light is almost impossible to imagine.



Here is a scene with lots of light.



Here is the same scene without any light.

Pages 10–11

Ask students to read **page 10** to themselves to find the answer to the question: “What would Earth be like without the light and heat energy from the sun?”

RESPONDING TO READING (5 MIN.)

- Have students complete the After Reading Response on Activity Page 1.1.

Lesson 1: What Is Light?, Part 1

Writing



Primary Focus: Students will take notes and write in response to the text about light.

TEKS 3.6.H; TEKS 3.7.E

INTRODUCTION TO LAB NOTES (25 MIN.)

TEKS 3.7.E

- Explain to students that scientists not only read about their area of study, they also experiment and observe, keeping a record all their information, ideas, and questions.
- Show views of the different pages of Alexander Graham Bell's notebook on the Library of Congress website.
- During this unit, we'll be reading and experimenting and keeping notes on what we learn. Have students find Activity Page 1.2. Discuss the graphic organizer and its features.
- Divide students into pairs. Explain that the students will skim **pages 2–11** to find the information to fill in the spaces on the graphic organizer. Remind them that since they are taking notes, they will not need to write complete sentences.
- Model finding the answer to "What is it?" on Activity Page 1.2. Read aloud the first and second paragraph on **Page 2**. After taking answers from a few volunteers, have students write "energy" in the space.
- Have pairs continue to complete the organizer on their own. Circulate to offer support and answer questions.

WRAP-UP (5 MIN.)

- Have student pairs share their information and write their answers in the graphic organizer previously prepared on the chart paper.

TEKS 3.6.H Synthesize information to create new understanding; **TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating.

Support

If students have difficulty writing the response, have them reread **pages 2–11** and find key words and phrases.



**ENGLISH
LANGUAGE
LEARNERS**

Reading Viewing Closely

Beginning

Ask students simple yes/no questions (i.e., "Is light important for plants?").

Intermediate

Provide students a specific sentence frame (i.e., "Light is important because without it _____ would/ would not _____.")

Advanced/Advanced High

Encourage students to use content-specific words in complete sentences (i.e., "Light is important for plants because plants use the energy from the sun to produce food.")

ELPS 4.E

Activity Page 1.2



Support

If students are having difficulty finding the information, have them find the bolded key words and then read the entire sentence aloud. Then, have them paraphrase the sentence.

Challenge

Have students write a paragraph summarizing the information on Activity Page 1.2.

ENGLISH LANGUAGE LEARNERS



Reading
Viewing Closely

Beginning

Read each paragraph aloud while students follow along. Ask yes/no questions about key words (e.g., "Is the word *wavelengths* important in this paragraph?").

Intermediate

Model for students how to find key words in the text and record them in the graphic organizer.

Advanced/Advanced High

Encourage students to discuss why they chose a specific key word to put in their graphic organizer.

ELPS 4.D; ELPS 4.I

Lesson 1: What Is Light?, Part 1

Language



Primary Focus: Students will review the spelling sound /ee/.



TEKS 3.2.A.vi; TEKS 3.2.B.i; TEKS 3.2.B.iv; TEKS 3.3.C

SPELLING (20 MIN.)

- Tell students that they will review all the spellings of /ee/.
- As you introduce each of the spelling words, write it on the board, pronouncing each word as you write it.
- Go back through the list of words, having students read the words and tell you which letters to circle for the sound of /ee/.

1. succeeded	12. degree
2. money	13. athlete
3. enemy	14. chief
4. centipede	15. grease
5. experience	16. scenic
6. believe	17. chariot
7. secret	18. stadium
8. increase	Challenge Word: <i>almost</i>
9. chimney	Challenge Word: <i>really</i>
10. tedious	Content Word: <i>electricity</i>
11. fancy	

- Point to the Challenge Words on the board. Explain to students that the Challenge Words, *almost* and *really*, are also part of their spelling list and are used very often. *Almost* does not follow the spelling patterns for this week but *really* does, as the 'ea' and the 'y' in *really* are pronounced /ee/. Use the



TEKS 3.2.A.vi Demonstrate and apply phonetic knowledge by decoding words using knowledge of suffixes, including how they can change base words such as dropping e, changing y to i, and doubling final consonants. **TEKS 3.2.B** Demonstrate and apply spelling knowledge by: (i) spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables; (iv) spelling multisyllabic words with multiple sound-spelling patterns; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

Challenge Words in sentences as examples for students: “Bill ate *almost* all of his lunch.” “He *really* was not very hungry.”

- Tell students that the Content Word, *electricity*, does follow the usual spelling patterns as the first ‘e’ and the ‘y’ are pronounced /ee/. *Electricity* is a domain-related word defined as “energy carried over wires,” which is found in Chapter 1 of *Adventures in Light and Sound*.
- Use the previously prepared chart or display Projection DP.U5.L1.1.

➤ Projection DP.U5.L1.1.

‘y’ > /ee/	‘e’ > /ee/	‘i’ > /ee/	‘ea’ > /ee/	‘ee’ > /ee/	‘ie’ > /ee/	‘ey’ > /ee/	‘e_e’ > /ee/

- Remind students that this lesson is a review of the /ee/ spelling alternatives from Unit 4. Ask students to refer to the spelling alternatives for /ee/ on the **third page of their Individual Code Charts**. Point out that there are eight spellings for /ee/. Note that with so many different spellings for /ee/, this is often a difficult sound to spell correctly.
- Ask students to tell you which words to list under the ‘y’ < /ee/ header. Briefly explain the meaning of each word.
- Continue through the columns until all words have been listed under the appropriate /ee/ header. Note that *tedious*, *really*, and *electricity* go under two headers. Briefly explain the meaning of each word.
- Remind students that they have spelling words that use all eight of the different spelling alternatives for /ee/.

‘y’ > /ee/	‘e’ > /ee/	‘i’ > /ee/	‘ea’ > /ee/	‘ee’ > /ee/	‘ie’ > /ee/	‘ey’ > /ee/	‘e_e’ > /ee/
enemy	secret	experience	increase	succeeded	believe	money	centipede
fancy	tedious	tedious	grease	degree	chief	chimney	athlete
really	scenic	chariot	really				
electricity	electricity	stadium					

- Practice the words as follows during the remaining time. Call on a student to read any word on the table. Then, have the student orally use the word in a meaningful sentence. After the student says the sentence, have him/her ask the class: “Does that sentence make sense?” If the class says, “Yes,” then the student puts



Foundational Skills

Beginning

Read each word and have students repeat it.

Intermediate

Have students act out the word meanings.

Advanced/Advanced High

Have students create sentences for the words.

ELPS 1.C; ELPS 1.E

a check mark in front of the word and calls on another student to come to the front and take a turn. If the class says, “No,” have the student try again or call on another student to come to the front and use the word in a meaningful sentence. This continues until all of the words are used or time has run out.

- Tell students that this table will remain on display until the assessment so that they may refer to it during the week.
- Tell students they will take home this week’s spelling words to share with a family member.



MORPHOLOGY (20 MIN.)

TEKS 3.2.A.vi; TEKS 3.3.C

Review Suffixes *–er*, *–or*, *–ist*, and *–ian*

- Tell students that this week, they will review some of the suffixes learned so far in third grade, specifically *–er*, *–or*, *–ist*, and *–ian*.
- Write the word *teach* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name the part of speech.
 - » to show someone how to do something; verb
- Ask students what verbs are.
 - » action words
- Add the suffix *–er* to *teach* and have students read the new word.
- Ask students what *teacher* means and what part of speech it is.
 - » a person who shows someone how to do something; noun
- Ask students what nouns are.
 - » people, places, or things
- Follow the same procedures for the following words: *paint*, *play*.
- Write the word *counsel* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name the part of speech.
 - » to give advice to people about their problems; verb
- Add the suffix *–or* to *counsel* and have students read the new word.
- Ask students what *counselor* means and what part of speech it is.
 - » a person who gives advice to people about their problems; noun
- Follow the same procedures for the following words: *inspect*, *govern*.



TEKS 3.2.A.vi Demonstrate and apply phonetic knowledge by decoding words using knowledge of suffixes, including how they can change base words such as dropping e, changing y to i, and doubling final consonants; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

- Write the word *art* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name the part of speech.
 - » something that has been skillfully created for others to enjoy or to express ideas; noun
- Add the suffix *-ist* to *art* and have students read the new word.
- Ask students what *artist* means and what part of speech it is.
 - » a person who makes something that is skillfully created for others to enjoy or who expresses ideas; noun
- Follow the same procedures for the following words: *cartoon*, *guitar*.
- Write the word *music* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name the part of speech.
 - » sounds made by voices or instruments and arranged in a way that is pleasing to hear; noun
- Add the suffix *-ian* to *music* and have students read the new word.
- Ask students what *musician* means and what part of speech it is.
 - » a person who makes sounds using voice or instruments and arranges them in a way that is pleasing to hear; noun
- Follow the same procedures for the following words: *magic*, *mathematics*.
- Tell students that when adding each of these suffixes, *-er*, *-or*, *-ist*, and *-ian*, the word becomes a noun that describes a person.
- Ask students to turn to Activity Pages 1.3 and 1.4.
- Divide students into partners.
- Tell students that they will work with their partner, using the list of words with suffixes on Activity Page 1.3 to answer the questions on Activity Page 1.4.
- Circulate around the room, offering assistance as needed while students work to complete the worksheets. If time permits, you may wish to review the correct answers.

End Lesson

Lesson 1: What Is Light?, Part 1

Take-Home Material

- Have students take home Activity Page 1.5 to complete.

Activity Pages
1.3 and 1.4



Activity Page 1.5



2

What Is Light?, Part 2

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will describe and compare characters in a narrative text about light.

✚ **TEKS 3.8.B; TEKS 3.6.G; TEKS 3.10.A**

Reading

Students will answer questions and provide evidence from an informational

✚ text about light. **TEKS 3.2.A.vii; TEKS 3.7.G**

Writing

Students will compare and contrast two texts about light.

✚ **TEKS 3.6.E; TEKS 3.6.F; TEKS 3.6.H**

Students will summarize the central idea and supporting details presented in

✚ the video. **TEKS 3.1.A; TEKS 3.12.B**

Language

✚ Students will create adverbs that show “how” and end in -ly. **TEKS 3.11.D.v**

FORMATIVE ASSESSMENT

Activity Page 2.1

What Is Light? Answer questions after reading the
✚ text about light. **TEKS 3.7.G**

Activity Page 2.3

✚ **Comparing and Contrasting Organizer** Compare
and contrast two texts about light. **TEKS 3.6.H**

Video summary

✚ **How Light Travels:** Students identify the central
idea in a video. **TEKS 3.12.B**

✚ **TEKS 3.8.B** Explain the relationships among the major and minor characters; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.10.A** Explain the author’s purpose and message within a text; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning; **TEKS 3.6.E** Make connections to personal experiences, ideas in other texts, and society; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft; **TEKS 3.11.D.v** Edit drafts using standard English conventions, including: adverbs that convey time and adverbs that convey manner.

LESSON AT A GLANCE

	Grouping	Time	Materials
Speaking and Listening (40 min.)			
Introducing the Read-Aloud	Whole Group	5 min.	<input type="checkbox"/> Digital Flip Book: U5.L2.1–U5.L2.8 <input type="checkbox"/> Image Card C.U5.L2.1 (Rays of Sunlight) <input type="checkbox"/> Chart paper w/Lab Notes Activity Page 1.2 <input type="checkbox"/> chart paper
Previewing Vocabulary	Whole Group	5 min.	
Presenting the Read-Aloud: “What is Light?”	Whole Group	20 min.	
Discussing the Read-Aloud	Whole Group	5 min.	
Word Work: <i>Energy</i>	Whole Group	5 min.	
Reading (25 min.)			
Partner Reading: “What is Light?”	Partner	25 min.	<input type="checkbox"/> <i>Adventures in Light and Sound</i> <input type="checkbox"/> Activity Page 2.1
Writing (35 min.)			
Compare and Contrast Texts	Whole Group	30 min.	<input type="checkbox"/> <i>Adventures in Light and Sound</i> <input type="checkbox"/> Activity Pages 2.2, 2.3 <input type="checkbox"/> Contrasting Organizer <input type="checkbox"/> Video: How Light Travels <input type="checkbox"/> highlighters (optional) <input type="checkbox"/> paper divided into half sheets <input type="checkbox"/> T-Chart Organizer (Digital Projections)
Wrap-Up: Summarizing a Video	Independent	5 min.	
Language (20 min.)			
Grammar: Adverbs	Independent	20 min.	<input type="checkbox"/> Activity Page 2.4
Take-Home Materials			
Reading, Grammar			<input type="checkbox"/> Activity Pages 2.5, 2.6

ADVANCE PREPARATION

Speaking and Listening

- Identify the following digital images on the program's digital components site to project during the Read-Aloud: U5.L2.1–U5.L2.8.
- Prepare to project Images U5.L2.1–U5.L2.8.

Reading

- Have the Lab Notes chart paper from the previous lesson ready to use to add additional information.

Writing

- Draw the T-Chart Organizer on the board or chart paper, or prepare Digital Projection DP.U5.L2.1.
- Search online for the PBS video “How Light Travels” and have it ready to project.

Grammar

- Prepare and display an “Adverbs” poster for use during the Grammar lesson that says:

Adverbs

Adverbs are words that can describe verbs.

They can tell **how** the action of a verb happens.

- Write the following sentences on the board:
 1. I _____ tapped my friend on the shoulder to ask him a question.
 2. My grandmother _____ offered us cookies when we stopped by to see her.
 3. Our teacher _____ told us that we could not go outside for recess since the weather was bad.
 4. She divided the pie _____ into slices for everyone.

Universal Access:

- Review concepts about light from the previous lesson.
- Use images from the previous lesson to prompt discussions.
- Allow time for questions and discussion about the previous lesson.
- Create work partners strategically, in advance of the activity.

Lesson 2: What Is Light?, Part 2

Speaking and Listening



Primary Focus: Students will describe and compare characters in a narrative text about light. **TEKS 3.8.B; TEKS 3.6.G; TEKS 3.10.A**


INTRODUCING THE READ-ALOUD (5 MIN.)

- Have students review what they learned about light from the previous lesson.
1. What is light?
 - » energy
 2. What are sources of light?
 - » Answers may vary but should include light bulbs, flashlights, candles, stars, or fireflies.
 3. Other than sources we listed yesterday, can you think of any others?
 - » lasers; electricity, such as light bulbs and flashlights; fire, such as candles and lanterns; bioluminescent organisms, such as fireflies, glowworms, some deep-sea animals, and certain plants and bacteria; chemiluminescent or phosphorescent items such as glow-in-the-dark sticks, toys, stickers, etc. (Add any previously unused sources to the Lab Notes chart from previous lesson.)
 4. What sense do we use to perceive light?
 - » sight
- Read the title of the Read-Aloud to students: “What Is Light?” Tell students to listen carefully to hear the answer and to hear how light is described using various adjectives and other words. Tell students to also listen for how the five senses are used by the characters in the Read-Aloud to perceive the world around them.

PREVIEWING VOCABULARY (5 MIN.)

Core Vocabulary

- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to

 **TEKS 3.8.B** Explain the relationships among the major and minor characters; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.10.A** Explain the author’s purpose and message within a text.

use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

illuminates, provides light; brightens; makes something clearer or easier to see or understand

energy, force or physical power; what living things need to exist and be active

light waves, the invisible rays that carry energy in straight paths

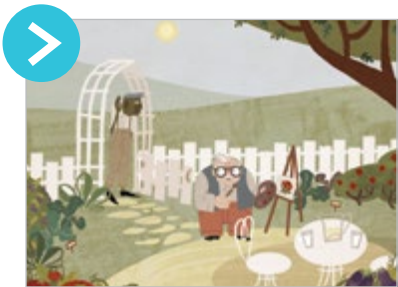
particles, tiny or very small bits of something

rays, lines of light that travel in a straight path from a bright object

shadow, an area of darkness created when light is blocked by something

Vocabulary Chart for “What Is Light?” Read-Aloud		
Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words
Vocabulary	light waves rays shadow	illuminates energy particles
Multiple Meaning		
Sayings and Phrases		

PRESENTING THE READ-ALOUD: “WHAT IS LIGHT?” (20 MIN.)



Show Image U5.L2.1:
Mr. Audire at garden gate; Mr. Van Lumen at his canvas

“Good morning, my friend,” said a smiling Mr. Samuel Van Lumen [loomuhn]. “It is good to see you.”

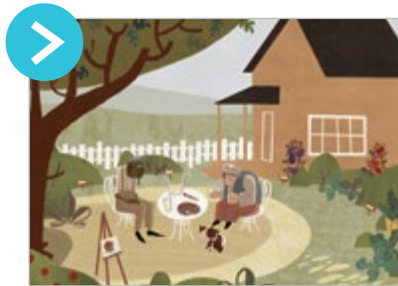
“I see you are already working,” replied Mr. Jack Audire [aw-dee-ray] as he pushed open the creaky garden gate. “What are you painting today?”

“Well, I am painting the roses that have just begun to bloom,” replied Samuel. “I am taking advantage of the early morning sunlight. As you know, my eyes are not what they used to be,” sighed Samuel. “Sadly, I can only paint for an hour each day.”

“You will have to speak up, Samuel. I am a little hard of hearing, you know,” said Jack with a laugh.

“How about we sit for a while under the oak tree?” replied Samuel. “I have just made some lemonade. I am hot standing in the sunlight, and my eyes are tired.”

What type of text is this? How can you tell? (narrative; characters, dialogue, plot). What did we learn about Samuel and Jack? (They are friends. They are older men. Samuel does not see very well. Jack does not hear very well.)



Show Image U5.L2.2:
**Samuel and Jack seated in garden chairs
beneath shade of oak tree**

Samuel and Jack walked slowly
toward the shade of the giant oak
and settled themselves into two

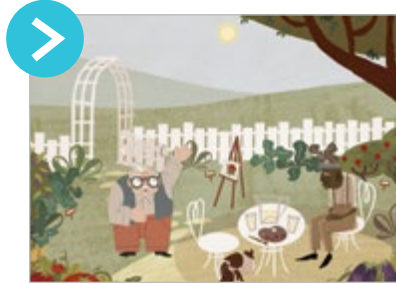
comfortable garden chairs. Samuel picked up a pitcher of ice-cold lemonade and poured it into two sparkling glasses. Both men were silent for a long while, until at last Samuel spoke.

“I have been pondering life,” said Samuel, speaking loudly so that Jack could hear him. “I have such wonderful memories, and you are in many of them.”

“I am glad to hear that,” said Jack. “Now that your eyes and my ears are failing, we should strike a deal: I will be your eyes if you will be my ears!” Jack exclaimed rather loudly.

The two men laughed. At that precise moment Samuel’s dog, Alfie came to join them. Alfie stretched and yawned and then curled up in the shade between the two friends.

Did you hear an adjective that has to do with light? (sparkling) When Jack says he will be Samuel's eyes, is he being literal or figurative? (figurative) What does he mean when he says this?



Show Image U5.L2.3:

Samuel standing, motioning to sun high in the sky

"Tell me," said Jack. "What is the painter's most valued tool?"

"Light!" shouted Samuel. "Let me tell you why light is so extraordinary!"

Samuel lifted himself out of his garden chair and stood beneath the giant oak. As he stood, he gazed out into his beautiful garden that was bursting with color and scent and began to speak.

"Our main source of light and heat is the sun, a hot star of glowing gas." Samuel smiled as he went on. "Light illuminates objects and makes them visible. Light spreads out in all directions. Because of light, our eyes and our brains are able to form pictures of the world we live in. I have spent my life painting those pictures. Light gives us every sunrise and every sunset. Without light, there is only darkness."

Jack stared up into the sky. "I've always wondered how exactly light reaches us here on Earth. The sun is more than 92,000,000 miles away!"

Samuel nodded. "It is difficult to comprehend how it takes a mere eight minutes for light from the sun to reach us here on Earth."

"Light travels in the form of tiny waves called light waves," explained Samuel. "These light waves travel in straight paths called rays. Rays of light waves travel at the fastest speed possible in a vacuum, a place that has no tiny particles or bits of matter. Because most of outer space has very few particles, it is a vacuum, and light travels there at the remarkable speed of approximately 186,000 miles a second!"

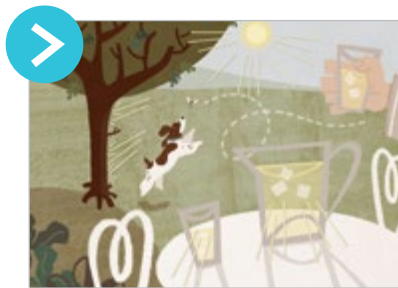
Support

Define and give examples of *illuminate* and *illumination*.

Jack sat shaking his head and then took a sip of the refreshingly cool lemonade. “That is a lot to think about!” he admitted.

“It sure is,” agreed Samuel, smiling. “Scientists are still studying and learning many new things about light, including that in special situations, light can act like a stream instead of a wave.” Jack shook his head. “Figuring out how light works must be complicated, but it is indeed fascinating.”

- Show Image Card C.U5.L2.1. Tell students you can see the rays of light in this image because they are shining on bits of dust and moisture in the air. Ask if students have seen rays of the sun like these. When is the best time to see them?
 - » at sunrise or sunset, or when it is partly cloudy



Show Image U5.L2.4:
Alfie chasing a bee; light waves passing through pitcher of lemonade

Samuel nodded. “Light from the sun reaches Earth because it can pass so quickly through outer space.

There is almost nothing to block its path. Once light reaches Earth’s atmosphere, it slows down a little bit.”

Why is there almost nothing to block the path of the light? (Space is a vacuum.)

“The atmosphere is like a blanket of air full of gases and moisture that covers the Earth. This blanket of air slows the light down.”

Point to the lemonade and the oak tree as you read the sentences aloud. Point to the shadow in the image.

“Then,” Samuel continued, “the speed of light slows down even more because objects start getting in the way of the light rays.” Samuel pointed to the lemonade. “For example, rays of light waves move more slowly when traveling through liquids, such as this lemonade.” Then Samuel pointed to the oak tree. “Light waves cannot pass through

Image Card
C.U5.L2.1

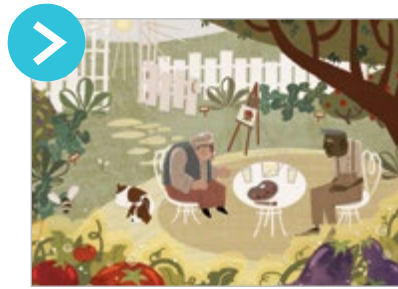
Rays of Sunlight



other objects, such as this beautiful oak tree. Because rays of light waves travel in a straight line, they cannot bend around the tree, either; instead, they leave a shadow, or shade, on the other side of it.”

“Well, I, like Alfie, am enjoying sitting in the cool shade where there is clearly less light and heat,” pronounced Jack as he sipped his lemonade.

At that precise moment, as if he heard his name, Alfie leapt out from under Samuel’s chair and jumped high into the air in pursuit of a buzzing bumblebee. Both men stopped talking to watch the dog’s frantic attempt to capture the bee, but to no avail. The bee seemed to float away on the warm summer breeze, no doubt in search of a sweetly scented flower to pollinate.



Show Image U5.L2.5:
Jack, Samuel and Alfie framed by garden

“Another important thing to remember is that light is fuel for our planet,” announced Samuel. “Light is energy! Energy from the sun supports all forms

of life on this planet. Without light and heat from the sun, the farmer would not have food to harvest. In fact, we could not exist on Earth!”

What do you see in Samuel’s garden that needs light to survive?
(grass, trees, flowers, people, animals, etc.)

“Hmm, speaking of food!” exclaimed Jack.

“Yes, indeed,” said Samuel. “I think I have exhausted both of us, and it is almost time for lunch. What do you say we go into the kitchen and get something to eat?”

“I say that’s the best thing I’ve heard all day!” laughed Jack. “And I smell something delicious coming from the house!”



Show Image U5.L2.6:
Samuel and Jack inside having lunch

The two men made their way into the coolness of the kitchen and prepared themselves a lunch of homemade zucchini bread and fresh fruits and

vegetables gathered from Samuel's garden. They sat at a table next to the kitchen window and talked about old times as they ate their meal.

They recalled how they had first become friends in elementary school. They had been in the same third-grade class together, and they had both been keen baseball players. They had gone to high school together, and then on to the same college where Samuel had studied art, and Jack had studied music. They had even been soldiers together.

Eventually, Samuel and Jack had both married and had children. Their wives became good friends, and their children grew up playing with each other. Sadly, both of their wives had died. Their children were now adults with children of their own.

- On the board or on chart paper, draw a simple T-chart to compare and contrast Samuel and Jack.
- Say, "We've just learned a lot more about Samuel and Jack. Let's go back and make a list of things they have in common and things that are different."
- Fill in the chart as students provide information. Reread portions of the text if necessary. The completed T-chart is below:

Samuel	Jack
3rd grade	3rd grade
baseball	baseball
high school	high school
art	music
married	married
children	children
wife had died	wife had died
grandfather	grandfather
trouble seeing	trouble hearing

- Briefly review the similarities and differences between Samuel and Jack.



Check for Understanding

Ask students to raise their hands if they think Samuel and Jack are more alike. Ask them to raise their hands if they think they are not very alike. Ask volunteers to state why they feel that way.



Show Image U5.L2.7:

Samuel and Jack on porch at night

Note: Remind students to listen for adjectives that have to do with light.

Before they knew it, several hours had passed, and the bright sun had set.

Samuel and Jack were now sitting on the porch in the shimmering twilight. Sounds of various night creatures were beginning to echo in the still of the evening.

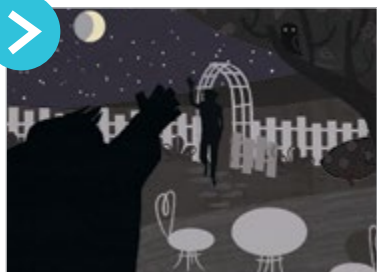
“It won’t be long before the stars are twinkling in the night sky and the moon is shining brightly,” said Jack. “It is almost time for me to go.”

Samuel gazed silently at the emerging night sky. They sat together enjoying the cooler evening air. Eventually, Samuel spoke.

What adjectives did you hear that have to do with light? (bright, shimmering, twinkling, night)

Challenge

Create a list of adjectives and adverbs that have to do with light. Write two or three sentences using words from the list.



Show Image U5.L2.8:

Jack and Samuel saying goodbye

"Isn't it amazing that stars make their own light, but the moon does not? Sunlight bounces off the moon to make it look like it's shining brightly in

the night sky," mused Samuel. "Of course, I could sit here all night and talk about why light is so important, not only for myself as a painter, but for our very existence," he said contemplatively.

"That's a fact," replied Jack, smiling at his friend.

Samuel smiled, too.

"Jack, how about we go fishing tomorrow morning?" asked Samuel.

"Sounds good to me," said Jack as he stood up to go. "As you know, I am the better fisherman. It will be a miracle, Samuel Van Lumen, if you catch a single fish!"

"We'll see about that!" exclaimed Samuel as he watched his best friend walk slowly down the garden path and through the creaky garden gate.

DISCUSSING THE READ-ALOUD (5 MIN.)

1. **Evaluative.** *Lumen* means "light" in Latin. What word that you heard in "What Is Light?" contains the root *lumen*?
 - » illuminates
2. **Evaluative.** How can understanding the Latin word *lumen* help you define the English word *illuminate*?
 - » Understanding that the root has to do with light helps us understand the meaning of the word. If a flashlight or another light source illuminates an object, its light shines on it.

Support

Define *contemplatively*. Ask students for synonyms

» thoughtful, reflective, thinking



ENGLISH
LANGUAGE
LEARNERS

Exchanging Information and Ideas

Beginning

Reframe questions with simple yes/no answers. For example: Do the characters use their five senses to experience the world around them?

Intermediate

Provide students with a sentence frame. For example: Sam is very interested in ____.

Advanced/Advanced High

Encourage students to use details in complete sentences. For example: Sam's last name is Lumen, which is Latin for *light*.

ELPS 1.E; ELPS 3.G


3. **Evaluative.** Why do you think the author chose Van Lumen as Samuel's last name?
- » His last name contains *lumen*, which means light. Samuel is very interested in and knowledgeable about light because he is a painter. He notices light when he paints, and tries to show the qualities of light in his paintings.
4. **Evaluative.** How do the characters in this narrative use their five senses and sensory organs to experience the world around them?
- » They see the roses, garden, sun, Alfie, etc., with their eyes; they taste the lemonade and their lunch with their taste buds; they smell the bread with their noses; they feel the sun and cool shade, glasses, etc., with their skin; they hear each other talking, Alfie barking, the buzzing bee, etc., with their ears.
5. **Evaluative.** What was the author's purpose in writing this narrative?
- » to inform and entertain **TEKS 3.10.A**

WORD WORK: ENERGY (5 MIN.)

1. In the Read-Aloud you heard, "Light is *energy*!"
2. Say the word *energy* with me.
3. Energy is the force or physical power that living things need to exist and be active.
4. "After Marcia ate a big breakfast, she had the energy she needed to rake all of the leaves in the yard."
5. When have you used energy to do something? What gave you the energy? What were you doing that needed energy? Be sure to use the word *energy* when you tell about it.
 - Ask two or three students. If necessary, guide and/or rephrase the students' responses to make complete sentences: "I used energy to _____" or "_____ gave me the energy I needed to _____."
6. What's the word we've been talking about? What part of speech is the word *energy*?
 - » The word *energy* is a noun.
 - Use a Discussion activity for follow-up. Have students discuss the sources from which they receive energy and ways that they use that energy. Have them discuss times when they feel they have a lot of energy and when they have only a little energy. As students share, make sure that they use the word *energy* in a complete sentence.

Support

Pull together a small group of students to read aloud. Assist them in completing Activity Page 2.1. Create anecdotal records of students' reading, making note of any problems with decoding, fluency, or comprehension for follow-up.

 **TEKS 3.10.A** Explain the author's purpose and message within a text.

Lesson 2: What Is Light?, Part 2

Reading



Primary Focus: Students will answer questions and provide evidence from an informational text about light. **TEKS 3.2.A.vii; TEKS 3.7.G**

PARTNER READING: “WHAT IS LIGHT?” (25 MIN.)

- Make sure that you and each student have a copy of the Reader, *Adventures in Light and Sound*.
- Pair students to read and discuss the chapter. You may wish to use any or all of the following pairings: strong readers with readers who need more support, readers of similar skill levels, or English learners with native speakers. Student pairings should change throughout the year. As students read, circulate among the class, monitoring students' focus and progress.
- You may also wish to pull together a small group of students who need more support.
- Explain to students that for this lesson, they will both read aloud to their partners. They will take turns reading each paragraph on the page aloud. Students can ask their partner for help with sounding out or defining words as necessary. They may also use the glossary to help with definitions.
- Have students complete Activity Page 2.1 independently once they've completed partner reading. Collect when completed.

Lesson 2: What Is Light?, Part 2

Writing



Primary Focus: Students will compare and contrast two texts about light.

TEKS 3.6.E; TEKS 3.6.F; TEKS 3.6.H

Students will summarize the central idea and supporting details presented in the video. **TEKS 3.1.A; TEKS 3.12.B**

TEKS 3.2.A.vii Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning; **TEKS 3.6.E** Make connections to personal experiences, ideas in other texts, and society; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.

Challenge

Have students write a paragraph explaining why the moon shines at night and sometimes during the day.



**ENGLISH
LANGUAGE
LEARNERS**

Reading
Reading/Viewing Closely

Beginning

Provide 1:1 support for students during Activity Page 2.1.

Intermediate

Allow students to work with a partner to complete Activity Page 2.1.

Advanced/Advanced High

Have students share completed Activity Page 2.1 with a partner to check their answers.

ELPS 2.G; ELPS 4.F

Activity Page 2.1



Support

Use Activity Page 2.3A. Have students use highlighters to find key words and sentences on Activity Page 2.3A. Assist students in completing Activity Page 2.3A in a small group, if necessary.



COMPARE AND CONTRAST TEXTS (30 MIN.)

TEKS 3.6.E; TEKS 3.6.F

Activity Page 2.2



- Explain that the students have heard and read two different texts about light. Now they will compare and contrast the two texts and summarize their information.
- Have students find Activity Page 2.2. Explain that it has excerpts, or short pieces of a longer text, from today's Read Aloud, "What Is Light?" They can use the page to help remind them of the key points in the Read Aloud.
- Introduce the T-Chart Organizer on Activity Page 2.3. Explain that it's similar to the T-chart they used earlier but with one important difference. Ask if they can find the difference. (It has a second page with lines for writing.)
- Explain that they will be using Activity Page 2.2 and the text from Chapter 1 to compare and contrast the two texts.
- Work together as a whole group to find the similarities and differences. Focus on the characteristics of narrative vs. informational text, but include similarities in content as well. Go back and forth between the two texts to find evidence. Fill in information on the chart you prepared earlier and have the students put that information on Activity Page 2.3.
- Direct students' attention to the second page of Activity Page 2.3. Tell students that they will write a few sentences that summarize the main differences between the two texts. Collect when completed.

Challenge

Have students write a summary on the back of Activity Page 2.3 on how the two texts are *most* similar.

Video Summary



WRAP-UP: SUMMARIZING A VIDEO (5 MIN.)

- Show video *How Light Travels* (2 min.).
- Pass out one half-sheet of paper to each student.
- Ask the students what the central idea of this video is. Tell them to be sure to write in complete sentences. They may draw a picture to help illustrate the central idea.
- Collect the summaries.

Lesson 2: What Is Light?, Part 2

Language



Primary Focus: Students will create adverbs that show "how" and end in *-ly*.



TEKS 3.11.D.v



TEKS 3.6.E Make connections to personal experiences, ideas in other texts, and society; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.11.D.v** Edit drafts using standard English conventions, including: adverbs that convey time and adverbs that convey manner.

GRAMMAR: ADVERBS (20 MIN.)

Adverbs that Tell “How” and End with *-ly*

- Tell students that this week they will review another part of speech, adverbs, that was introduced in second grade.
- Direct students to the Adverbs poster you prepared in advance. Read the poster with students. Display the poster in your room with the other parts of speech posters that you have already displayed.

Adverbs

Adverbs are words that can describe verbs.

They can tell **how** the action of a verb happens.

- Ask students if they can recall what other part of speech they have studied that is also a “describing word.”
 - » Students should respond that adjectives are words that describe nouns.
- Reiterate that adverbs are words that can describe verbs. Tell students that the word *adverb* has the word *verb* in it, which may help students remember which part of speech adverbs describe.
- Tell students that many adverbs end with *-ly*. Adverbs are often created by adding *-ly* to an adjective.
- Tell students that the suffix *-ly* means “in a way,” with the blank being the adjective that *-ly* is added to. Adverbs with *-ly* describe how the action of a verb happens.
- Write the word *quiet* on the board. Tell students that this is an adjective. Ask students to provide several oral examples of phrases with the adjective quiet describing different nouns (e.g., the quiet boy, a quiet afternoon, etc.).
- Add *-ly* to quiet to make the adverb *quietly*. Quietly means “in a quiet way” and describes how an action takes place. Ask students to provide several oral examples of phrases with the adverb quietly describing different verbs (e.g., talk quietly, hum quietly, etc.).
- Read the first sentence you prepared in advance to students. Tell students that an adverb needs to be added to the blank so that it describes how the action takes place.
 - “I _____ tapped my friend on the shoulder to ask him a question.”
- Write the word *soft* on the board, telling students that it is an adjective (e.g., soft pillow, soft towel, etc.). Tell students that the meaning of the word *soft* makes sense in the above sentence, but *soft* must be changed from an adjective to an adverb so that it describes the verb *tapped*.



ENGLISH
LANGUAGE
LEARNERS

Writing Writing

Beginning

Provide 1:1 support for students during Activity Pages 2.3 or 2.3A.

Intermediate

Allow students to work with a partner to complete Activity Pages 2.3 or 2.3A.

Advanced/Advanced High

Have students exchange Activity Page 2.3 and check for complete sentences.

ELPS 4.1; ELPS 5.E

Support

If students are having difficulty finding the central idea, replay the video and then discuss with students. Use a graphic organizer, such as a web, to help sort the details and find the central idea.

Challenge

Create a list of questions about how light travels that were not answered by watching the video.



Grammar Modifying to Add Details

Beginning

Tell students that an adjective is a word that describes a noun, and an adverb is a word that describes a verb. Practice identifying verbs and then creating adverbs to describe them.

Intermediate

Model changing adjectives to adverbs: "The adjective is *sudden*. If I add an *-ly*, the word becomes *suddenly*."

Advanced/Advanced High

Provide a list of adverbs and have students make adjectives by taking away the suffix. Have them explain what the adjective means.

ELPS 2.C

Activity Page 2.4



- Ask students if they have any idea how to change the adjective *soft* to an adverb.
 - » Students should respond "by adding *-ly*."
- Write the word *softly* in the blank. Reread the complete sentence to students. Ask students to identify the verb and draw a wiggly line under the word *tapped*.
- Ask students to identify which word describes how I tapped (*softly*). Draw a triangle around *softly*. Draw an arrow from the adverb to the verb.
- Follow the same procedures for the remaining sentences that you prepared in advance. It is important to note for students that the adverb may not be in the same place in every sentence. Point this out when discussing the other sentences.
- Ask students to turn to Activity Page 2.4. Complete this as a teacher-guided activity. Consider using the following procedures:
 - Select a student to read aloud the first sentence.
 - Ask students to identify the verb in the sentence and underline it with a wiggly line.
 - Ask students to read the adjective that will be changed to an adverb for the sentence. (The adjective is listed under each blank.) Then, ask them to say this word as an adverb and to write the word in the blank.
 - Ask students to explain how the adverb describes the verb, just as they did with the sentences on the board. Tell them to draw a triangle around the adverb and an arrow from the adverb to the verb.
 - Then, ask students to answer the question after the sentence.
 - Continue until students have completed the activity page.

Lesson 2: What Is Light?, Part 2

Take-Home Materials

- Have students take home Activity Page 2.5 to read to a family member and Activity Page 2.6 to complete.

Activity Pages
2.5 and 2.6



3

How Are Shadows Made?

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will work collaboratively in small groups to complete and discuss an experiment about shadows. **TEKS 3.1.D**

Writing

Students will take notes and record observations about cause and effect from an experiment about light and different surfaces and write a reflection.

TEKS 3.6.C; TEKS 3.13.E

Reading

Students will demonstrate understanding of cause and effect after reading an informational text about how light makes shadows.

TEKS 3.2.A.vii; TEKS 3.7.F; TEKS 3.9.D.iii

Language

Students will identify adjectives and adverbs correctly. **TEKS 3.11.D.iv; TEKS 3.11.D.v**

FORMATIVE ASSESSMENT

Activity Page 3.2

Light Experiment Reflection Write a reflection based on a shadow experiment.

TEKS 3.6.C; TEKS 3.13.E

Activity Page 3.4

Use Adjectives and Adverbs Use adjectives

and adverbs correctly. **TEKS 3.11.D.iv; TEKS 3.11.D.v**

TEKS 3.1.D Work collaboratively with others by following agreed-upon rules, norms, and protocols; **TEKS 3.6.C** Make and correct or confirm predictions using text features, characteristics of genre, and structures; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.9.D.iii** Recognize characteristics and structures of informational text, including organizational patterns such as cause and effect and problem and solution; **TEKS 3.11.D** Edit drafts using standard English conventions, including: (iv) adjectives, including their comparative and superlative forms, (v) adverbs that convey time and adverbs that convey manner.

LESSON AT A GLANCE

	Grouping	Time	Materials
Speaking and Listening (35 min.)			
Review “What Is Light?”	Small Group	5 min.	<input type="checkbox"/> “What Am I?” cards <input type="checkbox"/> Activity Pages 3.1, 3.2 <input type="checkbox"/> flashlights <input type="checkbox"/> clear plastic wrap
Light and Surface Experiment	Small Group	30 min.	<input type="checkbox"/> wax paper <input type="checkbox"/> cardboard or cardstock <input type="checkbox"/> aluminum foil
Writing (10 min.)			
Experiment Reflection	Independent	10 min.	<input type="checkbox"/> Activity Page 3.2
Reading (45 min.)			
Introducing the Chapter	Whole Group	10 min.	<input type="checkbox"/> <i>Adventures in Light and Sound</i> <input type="checkbox"/> Activity Page 3.3
Independent Reading: “How Are Shadows Made?”	Independent	25 min.	
Wrap-Up	Small Group	10 min.	
Language (30 min.)			
Grammar: Adjectives and Adverbs	Whole Group	15 min.	<input type="checkbox"/> Activity Pages 3.4, 3.5
Spelling: Blank Busters	Independent	15 min.	
Take-Home Material			
“How Are Shadows Made?”			<input type="checkbox"/> Activity Pages 3.6, 3.7

ADVANCE PREPARATION

Writing

- Prepare “What Am I?” cards on next page. Prepare four to five sets of cards, cut out, and put one set each in an envelope. Students will be working in small groups of four to five.
- Prepare materials for experiment with light. Students will work in groups of four to five. Cut out one large square each of clear plastic wrap, wax paper, cardboard or cardstock, and aluminum foil for each of the groups. Have one flashlight for each group. Penlights work best because they have a small, focused light beam.

Grammar

- Write the following sentences on the board for the grammar lesson:
 - I took a quick shower.
 - We ran quickly to the car when the storm started.
 - The eager puppy jumped up and down.
 - I waited eagerly for my dad to get home.
 - I picked the correct choice on the test.
 - My teacher said I answered correctly.
 - I heard a loud noise!
 - “Hello!” my friend shouted loudly.

Universal Access

- Review Light Lab Notes from previous lessons.
- Ask students if they have any questions or need clarification.
- Review domain vocabulary that will be used in the lesson. Use glossaries if necessary.
- Use image cards and images from the Read-Aloud to reinforce concepts and ideas.

What Am I?

**Create one set of cards for each group of 4 to 5 students.
Cut out cards and place in an envelope.**

I am an extraordinary kind of energy, and I travel as tiny waves. I am very fast, but you cannot see me moving. What Am I? (light)

I am a source of light. Light energy starts with me. Light waves move out from me and illuminate the area around me. You can see me but should never, ever look right at me. What am I? (sun)

I don't have my own light, but I shine brightly in the sky. You see me mostly at night, but sometimes I peek out during the daytime. What am I? (the moon)

I am formed in places where all of the light doesn't reach. Sometimes I am very dark, and sometimes only a little bit darker than what is around me. Sometimes I take a shape similar to something nearby. What am I? (shadow)

I begin at a light source and travel through the air. Sometimes you can see me and sometimes you can't. I show the way light travels in a straight line. What am I? (a ray)

I am the way light travels. Sometimes I am long and sometimes I am short. Sometimes I'm visible and sometimes I'm not. What am I? (a wave)

I come from the sun and I carry all the colors of the rainbow. What am I? (white light)

I am one of the characters in the story, and I am especially knowledgeable about light. I love to paint, and I always notice the qualities of light and shadows. I am slowly losing my vision, or sense of sight. Who am I? (Samuel)

Support

The peer-oriented and collaborative nature of the experiment provides natural support for students who may need assistance. If necessary, the teacher can put these students in their own group and work with them directly.

ENGLISH LANGUAGE LEARNERS



Speaking and Listening Exchanging Information and Ideas

Beginning

Work 1:1 with students to support them in completing the Activity Page 3.2.

Intermediate

Have students Pair-Share when completing Activity Page 3.2.

Advanced/Advanced High

Make sure students understand the directions to the experiment and encourage them to share their ideas with the group using complete sentences.

ELPS 1.G; ELPS 2.D

Activity Page 3.1



Activity Page 3.2



Start Lesson

Lesson 3: How Are Shadows Made?

Speaking and Listening

35M

Primary Focus: Students will work collaboratively in small groups to complete and discuss an experiment about shadows. **TEKS 3.1.D**

REVIEW “WHAT IS LIGHT?” (5 MIN.)

- “What am I?” Riddle Game
- Divide class into groups of four or five. These groups will also be together for the following activity, so you may consider student needs when putting together groups.
- Pass out one envelope with one set of “What Am I?” cards to each group.
- Tell students to take turns choosing one riddle card and reading it aloud to the rest of the group. Tell them to continue until they’ve gone through all the cards.

LIGHT AND SURFACE EXPERIMENT (30 MIN.)

TEKS 3.1.D

- Have students remain in their groups from the “What Am I?” Riddle Game.
- Explain that they’ll be working as research scientists, making predictions, conducting experiments, and recording their observations.
- Have them turn to Activity Page 3.1. Read directions aloud to the students.
- Choose one person from each group to come and get the materials the group will need.
- Once the group has the materials, the members will work together to conduct the experiment.
- Tell students to record their predictions and observations in the Lab Notes on Activity Page 3.2.
- Circulate around to each group to ensure students are on task and offering assistance if needed.

TEKS 3.1.D Work collaboratively with others by following agreed-upon rules, norms, and protocols.

Lesson 3: How Are Shadows Made?

Writing



Primary Focus: Students will take notes and record observations about cause and effect from an experiment about light and different surfaces and write a reflection. **TEKS 3.6.C; TEKS 3.13.E**

EXPERIMENT REFLECTION (10 MIN.)

- When the experiment is completed, students will work on the second page of Activity Page 3.2, "Light Experiment Reflection," independently.

Lesson 3: How Are Shadows Made?

Reading



Primary Focus: Students will demonstrate understanding of cause and effect after reading an informational text about how light makes shadows.

TEKS 3.2.A.vii; TEKS 3.7.F; TEKS 3.9.D.iii

INTRODUCING THE CHAPTER (10 MIN.)

- Review with students what they learned in the previous chapter by referring to Activity Page 1.2 Lab Notes.
- Using the graphic organizer, remind students that light is a form of energy.
- Sources of light include the sun, the stars, light bulbs, candles, and flashlights. (Students may also have included fireflies, fires, and other sources that they learned about during Listening and Learning Read-Alouds.)
- One way that light travels is in waves.
- Light travels 186,000 miles per second in a vacuum.
- Remind students that in an earlier Listening and Learning lesson in this unit, they heard Jack and Samuel talk about shadows.

TEKS 3.6.C Make and correct or confirm predictions using text features, characteristics of genre, and structures; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.9.D.iii** Recognize characteristics and structures of informational text, including organizational patterns such as cause and effect and problem and solution.

Activity Page 3.2



**ENGLISH
LANGUAGE
LEARNERS**

Writing
Exchanging Information
and Ideas

Beginning

Provide a picture of a car. Point to various parts and ask students if the light will go through, bounce off, or stop.

Intermediate

Provide a picture of a car and ask students to label the parts (window, metal, plastic, etc.). Have students list next to the car part whether the light will bounce, go through, or stop.

Advanced/Advanced High

Encourage students to use domain vocabulary and write in complete sentences.

ELPS 1.E; ELPS 2.C;

ELPS 5.B

Activity Page 1.2



- Ask students to spend a few moments recalling what Jack and Samuel said about shadows.
 - » A shadow is the area of darkness that is produced by an object or person that is blocking the light. Light cannot bend around the object or person because it travels in straight lines.
- Tell students that the title of today’s chapter is “How Are Shadows Made?”
- Ask students to turn to the Table of Contents, locate Chapter 2, and then turn to the first page of the chapter.

Previewing the Vocabulary

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the student reader.

transparent, clear, see-through so that light gets through

skylight, a window in a ceiling or roof that lets in the light

opaque, not clear, blocking all light so that none gets through

Vocabulary Chart for “How are Shadows Made”		
Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words
Vocabulary		transparent skylight opaque absorb
Multiple Meaning		
Sayings and Phrases		

INDEPENDENT READING (25 MIN.)

Note: Students will only read **pages 12–21** of “How Are Shadows Made?” during this lesson and the next one. **Pages 22–27** will be not be used in this lesson.

- Read the title of the chapter, “How Are Shadows Made?”, together as a class.

Chapter 2 How Are Shadows Made?

Do you remember any interesting facts about how light travels? In the last chapter, you learned that it travels in waves that can be measured as wavelengths. You also learned that it travels at a very high rate of speed. Here's another interesting fact—light waves travel from a source in straight lines that spread out in all directions, like rays.

Take a look at the image on the opposite page. In this image, there are several light sources. Each source or dot of light has several rays of light shooting out. Put your finger on the source you can see. Now, using your finger, trace the lines of light coming out from that source. Each ray of light is a straight line.



Light travels in straight lines like rays from its source.

12

13

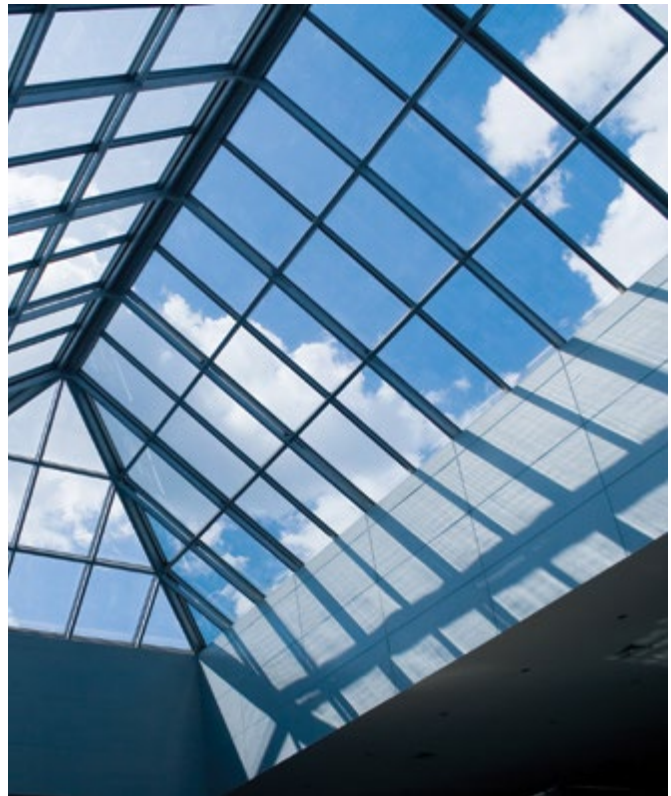
Pages 12–13

- Ask students to look at the image on **page 13**.
- Read the caption, “Light travels in straight lines like rays from its source.”
- Remind students that in previous lessons, they learned that light can travel in waves.
- Ask students to read **page 12** to themselves to find the answer to the question: “What new information is there about how light waves travel?”
- When students have finished reading, restate the question and have students answer.
 - » Light waves travel in a straight lines.

Have you ever wondered what happens when a line or path of light bumps into something in its way? Different things may happen depending on what exactly is in the light's path.

If a path of light hits something that is **transparent**, most of the light will pass right through. Air, water, and glass are all **transparent**. When light hits these **transparent** objects, it passes through to the other side. It is almost as if the object isn't there.

Most buildings have glass windows so that natural sunlight can travel from the outdoors inside. Have you ever been in a building that has a glass roof or **skylight**? Sometimes you can even see blue sky and clouds through the **skylight**!



*How do you know that the glass in this **skylight** is **transparent**?*

Pages 14–15

- Ask students to look at the image on **page 15** and read the caption together.
- Ask students to read **page 14** to themselves to find the answer to the question in the caption.
- When students have finished reading, reread the question in the caption and have students answer.
 - » We know the glass in the skylight is transparent because light travels through it. We can see the sky and the clouds. (When students answer, have them read the text that supports their answer.)
- Have students turn to Activity Page 3.3
- Together, fill in all the information in the row for *transparent*.

Activity Page 3.3



Light cannot travel through all materials. If a path of light hits something that is **opaque**, the light is **absorbed** and blocked by the object. It cannot continue in a straight line through the object. Wood, cardboard, and even a person's body are all **opaque** objects. Light cannot pass through to the other side. Instead, a **shadow** is created because the light is **absorbed**.

Look around your classroom. Do you see **transparent** objects through which light is passing? Can you also find **opaque** objects? You will probably find that your classroom has many more **opaque** objects than **transparent** objects. Do you see any **shadows**?

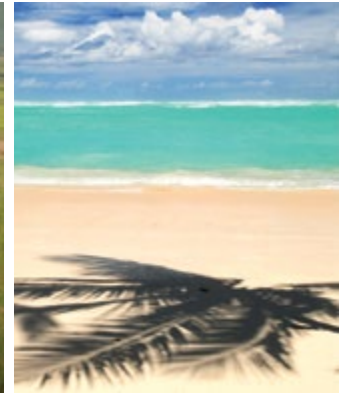


*Are people's bodies **transparent** or **opaque**? How do you know?*

Pages 16–17

- Ask students to look at the image on **page 17** and read the caption together.
- Ask students to read **page 16** to themselves to find the answer to question in the caption.
- When students have finished reading, reread the question in the caption and have students answer.
 - » People's bodies are opaque. Light cannot pass through them so shadows are formed. (Have them read the text that supports their answer.)
- Together, fill in all the information in the row for *opaque* on Activity Page 3.3.

The **shadow** created by blocked light takes on the shape of the object. Can you guess the object or objects that are making the **shadows** in these images?



*What objects created these **shadows**? Are these objects **opaque** or **transparent**?*

18

19

ENGLISH LANGUAGE LEARNERS



Reading
Exchanging Information
and Ideas

Beginning

Ask students *yes* and *no* questions, e.g., “Does the word *opaque* mean that you can see through it?”

Intermediate

Have students work with a partner before answering questions.

Advanced/Advanced High

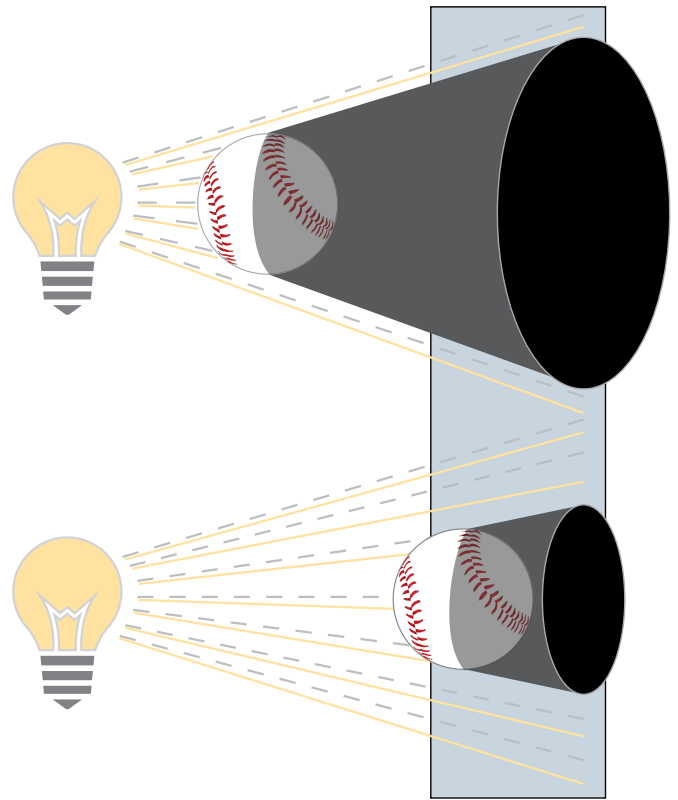
Encourage students to use complete sentences when answering questions.

ELPS 4.F

Pages 18–19

- Have students read **pages 18–19** to themselves to answer the questions posed on those pages.
- When students have finished reading, read the questions aloud and have students answer.
 - » airplane—opaque; palm tree—opaque; person holding ladder—opaque; bicycle—opaque

The size of a **shadow** depends on several different things. The closer an object is to a light source, the larger the **shadow** will be. If you move the same object farther away from the light source, the **shadow** will become smaller. So the size of the **shadow** changes, even though the size of the object does not. What makes the **shadow** larger or smaller is the distance of the object from the source of light.



*Shadows can be different sizes. What causes the size of a **shadow** to change?*

20

21

Page 20–21

- Have students read **pages 20–21** to themselves to find the answer to the question: “Why are the shadows different sizes in each image on **page 21**?”
- When students have finished reading, restate the question and have students answer.
 - » The distance of the object from the light source affects shadow size.

Note: Students can stop reading after **Page 21**.

Challenge

Allow students to practice measuring the approximate size of a shadow as it moves different distances from the light source.



Check for Understanding

Have the students answer in unison either *transparent* or *opaque* when you ask them to describe the following objects: desk, fish tank, human body, plastic wrap, magnifying glass, light bulb, book, window, poster.

WRAP-UP (10 MIN.)

- Put students back together in the groups they were in at the beginning of the lesson. Using the flashlights, students will choose three to four objects in the room to confirm that the distance of the object from the light source affects the size of the shadow. Have groups share their observations with the whole group. Remind students to speak in complete sentences using unit vocabulary words.

Lesson 3: How Are Shadows Made?

Language



Primary Focus: Students will identify adjectives and adverbs correctly.



TEKS 3.11.D.iv; TEKS 3.11.D.v

GRAMMAR: ADJECTIVES AND ADVERBS (15 MIN.)

- Remind students that adjectives describe nouns and adverbs describe verbs. Adding *-ly* to adjectives changes them to adverbs, which are words that describe how the verb is completed.
- Display the first two sentences you prepared in advance.
- Ask students to read the first sentence (I took a quick shower.), identifying the word *quick* as an adjective that describes the word *shower*, which is a noun. Mark the noun and adjective with the established symbols.
- Ask students to read the second sentence (We ran quickly to the car when the storm started.), this time identifying the word *quickly* as an adverb that describes the verb *ran*. Mark the verb and adverb with the established symbols.



TEKS 3.11.D Edit drafts using standard English conventions, including: (iv) adjectives, including their comparative and superlative forms, (v) adverbs that convey time and adverbs that convey manner.

- Point out to students that it would be grammatically incorrect to say “we ran quick” because the word that is being described is a verb. Ask them to provide the correct form of the word for this sentence.

» quickly, adverb

- Likewise, be sure that they understand that it would be grammatically incorrect to say “I took a quickly shower” because the word being described is a noun. Ask them to provide the correct form of the word for this sentence.

» quick, adjective

- Use the same procedure for the remaining sentences that you prepared in advance. It’s important to note for students that the adverb may not be in the same place in every sentence. Point this out when discussing the other sentences. Here is an answer key for the remaining sentences:

» eager, adjective

correct, adjective

correctly, adverb

loud, adjective

loudly, adverb

- Ask students to turn to Activity Page 3.4 and tell them to complete it independently.

SPELLING: BLANK BUSTERS (15 MIN.)

Blank Busters

- Tell students that they will practice writing their spelling words for the week.
- Tell students to turn to Activity Page 3.5. Note for students that some sentences have two blanks and one sentence has three.
- Point out to students that the spelling words are listed in the box on the worksheet and on the board. Students may also have to add an appropriate suffix to have the sentence make sense: *-s*, *-ed*, *-ly*, or *-ing*.
- Ask students to read the statement in **number 1** silently and fill in the blank. When students have completed **number 1**, call on one student to **read number 1** aloud with the spelling word in the blank.
- Ask students if anyone had a different answer. Discuss the correct answer to be sure students understand why it is correct.
- Discuss the proper spelling of the word in the blank, referencing the table of this week’s spelling words. Have students compare their spelling with the spelling in the table.



ENGLISH
LANGUAGE
LEARNERS

Language Modifying to Add Details

Beginning

Read the sentence aloud using the adjective and the adverb. Ask which word makes the most sense in that sentence. Define words if necessary.

Intermediate

Have students read each set of adjectives and adverbs and tell what they mean before the sentences.

Advanced/Advanced High

Have students explain why the word they chose makes the most sense in the sentence.

ELPS 3.B

Activity Page 3.4



Activity Page 3.5



- Have students move to **number 2** and fill in the blanks on their own.
- Follow the previous steps to discuss the correct answers for the remaining items on the worksheet.

~~~~~End Lesson~~~~~

### Lesson 3: How Are Shadows Made?

# Take-Home Material

Activity Pages  
3.6 and 3.7



- Have students take home Activity Page 3.6 to read to a family member and Activity Page 3.7 to complete.



## 4

# Reflection and Mirrors

## PRIMARY FOCUS OF LESSON

### Speaking and Listening

- Students will discuss ideas and apply information gained from listening to text about mirrors and reflections. **TEKS 3.1.A; TEKS 3.7.G; TEKS 3.10.E**

### Writing

- Students will compare and contrast ideas based on a hands-on investigation with convex and concave reflections. **TEKS 3.7.E; TEKS 3.13.E**

### Reading

- Students will find the central idea and details in text about mirrors and reflections and find connections between different paragraphs. **TEKS 3.2.A.vii; TEKS 3.9.D.i**

### Language

- Students will identify adverbs that tell *when* and *where*. **TEKS 3.11.D.v**

## FORMATIVE ASSESSMENT

### Activity Page 4.1

**Lab Notes: Compare and Contrast** Compare and contrast convex and concave mirrors.

- TEKS 3.7.E; TEKS 3.13.E**

### Activity Page 4.2

**Lab Notes: Central Idea and Details** Find connections between paragraphs from the text.

- TEKS 3.9.D.i**

### Activity Page 4.3

**Adverbs That Tell *How*, *When*, *Where*** Identify

- adverbs that tell how, when and where. **TEKS 3.11.D.v**

- TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning; **TEKS 3.10.E** Identify the use of literary devices, including first- or third-person point of view; **TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.9.D.i** Recognize characteristics and structures of informational text, including: the central idea with supporting evidence; **TEKS 3.11.D.v** Edit drafts using standard English conventions, including: adverbs that convey time and adverbs that convey manner.

## LESSON AT A GLANCE

|                                                           | Grouping     | Time    | Materials                                                                                                                                                                                                      |
|-----------------------------------------------------------|--------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Speaking and Listening (35 min.)                          |              |         |                                                                                                                                                                                                                |
| Introducing the Read-Aloud                                | Whole Group  | 10 min. | <input type="checkbox"/> Digital Flip Book: U5.L4.1–U5.L4.11<br><input type="checkbox"/> Image Card C.U5.L4.1 (Firefly)<br><input type="checkbox"/> Internet: images of convex and concave mirrors (optional)  |
| Presenting the Read-Aloud: “Reflections and Mirrors”      | Whole Group  | 15 min. |                                                                                                                                                                                                                |
| Discussing the Read-Aloud                                 | Whole Group  | 5 min.  |                                                                                                                                                                                                                |
| Word Work: <i>Convex</i> and <i>Concave</i>               | Partner      | 5 min.  |                                                                                                                                                                                                                |
| Writing (20 min.)                                         |              |         |                                                                                                                                                                                                                |
| Compare and Contrast                                      | Small Groups | 20 min. | <input type="checkbox"/> Activity Page 4.1<br><input type="checkbox"/> small flat mirrors<br><input type="checkbox"/> large shiny serving spoons<br><input type="checkbox"/> other types of mirrors (optional) |
| Reading (40 min.)                                         |              |         |                                                                                                                                                                                                                |
| Introducing the Chapter                                   | Whole Group  | 10 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Activity Page 4.2<br><input type="checkbox"/> Video: Assignment Discovery: Kaleidoscope (optional)                   |
| Whole Group Reading: “Reflections and Mirrors”            | Whole Group  | 30 min. |                                                                                                                                                                                                                |
| Language (25 min.)                                        |              |         |                                                                                                                                                                                                                |
| Grammar: Adverbs                                          | Whole Group  | 15 min. | <input type="checkbox"/> Activity Pages 4.3, 4.4<br><input type="checkbox"/> Adverbs (Digital Projections)                                                                                                     |
| Spelling                                                  | Independent  | 10 min. |                                                                                                                                                                                                                |
| Take-Home Materials                                       |              |         |                                                                                                                                                                                                                |
| Adverbs That Tell <i>How</i> , <i>When</i> , <i>Where</i> |              |         | <input type="checkbox"/> Activity Pages 4.5, 4.6                                                                                                                                                               |



## ADVANCE PREPARATION

### Speaking and Listening

- Have one of the serving spoons and one of the flat mirrors ready to show.
- Prepare to project Internet images of convex and concave mirrors and other objects (optional).
- Prepare to project Images U5.L4.1–U5.L4.11

### Writing

- Prepare materials for groups of three to four students. Each group should have at least one flat mirror and at least one large, shiny serving spoon. Smaller spoons will work as long as they are very shiny. Other types of mirrors are optional.

### Reading

- Search online for the video “Assignment Discovery: Kaleidoscope” and have it ready to project.

### Grammar

- Add the following bullet to the Adverbs poster for display during the Grammar lesson:
  - They can tell *when* the action of a verb happens. (*yesterday, today, tomorrow, always, sometimes, never, early, first, next, last, again, soon, later*)
  - They can tell *where* the action of a verb happens. (*here, there, everywhere, anywhere, inside, outside, somewhere*)
- Write the following sentences on the board and cover them or write them on sentence strips to be displayed during the grammar lesson or prepare digital Projection DP.U5.L4.1.

#### Adverbs That Tell *when*:

\_\_\_\_\_ I will play football with my friends at the park.

\_\_\_\_\_ I played football with my friends at the park.

I \_\_\_\_\_ play football with my friends at the park.

He did his hardest homework assignment \_\_\_\_\_, then he did the easier one.

He made a mistake in his homework, so he did it \_\_\_\_\_.

### Adverbs That Tell *where*:

Mike cut the grass \_\_\_\_\_.

Dad \_\_\_\_\_ in a building with ten floors.

Flowers are growing \_\_\_\_\_.

I left my book \_\_\_\_\_.

Sam put the mail \_\_\_\_\_.

### Universal Access

- Ask students to share their experiences with either fishing, lakes, rivers or other bodies of water.
- Ask students what they remember about the way the water looked. Was it a sunny day? Cloudy?
- Display images of convex and concave mirrors, or spoons from previous activity.
- Provide additional pictures of sunlight on different bodies of water.

Start Lesson

### Lesson 4: Reflection and Mirrors

# Speaking and Listening



**Primary Focus:** Students will discuss ideas and apply information gained from

listening to text about mirrors and reflections. **TEKS 3.1.A; TEKS 3.7.G; TEKS 3.10.E**

### INTRODUCING THE READ-ALOUD (10 MIN.) **TEKS 3.10.E**

- Read the following excerpt from the previous Read-Aloud:

“Jack, how about we go fishing tomorrow morning?” asked Samuel.

“Sounds good to me,” said Jack as he stood up to go. “As you know, I am a better fisherman. It will be a miracle, Samuel Van Lumen, if you catch a single fish.”
- Who can tell me the difference between narration and dialogue?” Guide students to explain which parts of the excerpt are narration and which are dialogue.

**TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.7.G** Discuss specific ideas in the text that are important to the meaning; **TEKS 3.10.E** Identify the use of literary devices, including first- or third-person point of view.

- Who can tell me from what point of view this story is being told?"
- Tell students that this story is in the third person point of view, and remind them that they heard this point of view in the narrative "The Wind in the Willows." Remind students that when a story is told in third person, the main pronouns used in the narration are *he, his, him, she, her, and hers*. Remind students that when a story is told in the first person, the main pronouns used in the narration are *I, my, mine, and me*. You may wish to read the first sentence of the excerpt in first person to illustrate this difference:  

"Jack, how about we go fishing tomorrow morning?" I asked.
- Tell students to listen to find out more about what light does when it hits an object. Tell students to also listen to learn more about the characters and setting of the story.

### Previewing the Vocabulary

#### Core Vocabulary

- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a "domain dictionary" notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**angle**, a slant; the space or shape formed when two lines or two surfaces meet in one place; the corner of something with straight sides

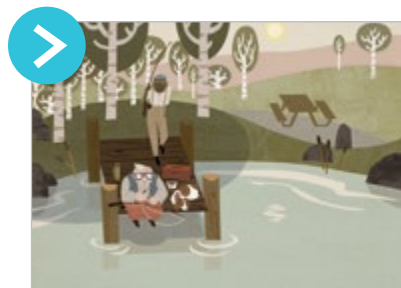
**concave**, curving inward; shaped like the inside of a bowl

**convex**, rounded or curving outward; shaped like the outside of a bowl

**transmitted**, sent, passed along, or spread through a material

| Vocabulary Chart for "Reflections and Mirrors" Read-Aloud |                                 |                                  |
|-----------------------------------------------------------|---------------------------------|----------------------------------|
| Type                                                      | Tier 3<br>Domain-Specific Words | Tier 2<br>General Academic Words |
| Vocabulary                                                | concave<br>convex               | angle<br>transmitted             |
| Multiple Meaning                                          |                                 |                                  |
|                                                           |                                 |                                  |
| Sayings and Phrases                                       |                                 |                                  |

**PRESENTING THE READ-ALoud :  
“REFLECTIONS AND MIRRORS” (15 MIN.)**



**Show Image U5.L4.1:**

**Jack walking toward Samuel and Alfie on the pier**

The next morning both men were up bright and early, each one looking forward to a day of fishing. Fishing had

become one of their most cherished pastimes, and they both enjoyed fishing for striped bass. They had a favorite fishing spot on the banks of the Hudson River, where Samuel arrived first. There, an old, rickety, or wobbly, pier jutted out into the cool, lapping water. Nearby, a row of silver birch trees provided just the right amount of shade. There was also a picnic table. Alfie always accompanied them and frequently scared the fish away by jumping off the pier into the water.

*Explain that the Hudson River is in New York, or show the location on a US map.*

“Hey, you beat me to it!” shouted Jack as he walked toward Samuel. Samuel was already on the pier, intently focused on attaching a large, juicy bloodworm to the hook on the end of his fishing line. Alfie was stretched out, enjoying the sun and the gentle breeze that was blowing across the Hudson River Valley.

“Just got here myself!” yelled back Samuel. “I hear the fish are jumping right onto the line!”

“Well, they’ll miss your line, for sure!” bellowed Jack. Then he laughed loudly to himself.

Samuel smiled at his friend and shook his head.

“If you continue to yell like a wild bear, you’ll scare away every living creature, including the fish,” said Samuel.

“Ahh, the fish can’t hear me!” retorted Jack. *Why do you think Jack is speaking loudly? (Sometimes when people begin to lose their hearing they speak loudly because they can’t hear themselves well.)*



### **Show Image U5.L4.2:**

#### **Samuel and Jack sitting on the end of pier, fishing**

For several minutes the two men were silent. Samuel finished attaching the worm to the hook on the end of his

line. Then he cast his line out into the smooth, glass-like surface of the Hudson River and plunked himself down on the edge of the pier.

*Let's take a look at this picture for a minute. Can you find examples of how light is acting as it is hitting certain objects? (rays are going through the clear water, the trees are causing shade, rocks are blocking the rays, the clear water is reflecting objects).*



### **Show Image U5.L4.3:**

#### **Light hitting different objects**

"Going back to what we were talking about yesterday about light waves," said Samuel, "did you know that when a light wave hits an object, three things

can happen? The light can be transmitted, or passed through the object. The light can also be reflected, or bounced back off that object, or the light can be absorbed, or soaked up into it. This is determined by the type of object that the light wave hits. Sometimes the light does a combination of these things." *Point to the objects in the image and have students discuss which objects are transmitting and reflecting light (eyeglasses, glass) and which are absorbing light (tackle box).*

"Hmm," Jack responded.

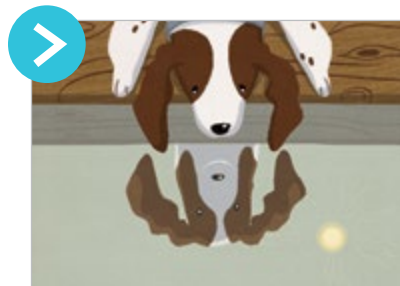
"Take reflection, for example," continued Samuel eagerly. "Most of the light that reaches our eyes is reflected light. You see, apart from objects that produce their own light, such as the sun or a light bulb, all other objects are visible because light waves from a source bounce off them and into our eyes," explained Samuel.

“If you recall, Samuel Van Lumen, I did go to school. For most of the time we were in the same class,” said Jack somewhat grumpily. “I remember learning about bioluminescent creatures such as lightning bugs. If I recall correctly, they produce their own light.” *Who has seen lightning bugs or fireflies in the summer time?* (Show Image Card C.U5.L4.1 if students are not familiar with lightning bugs.) *Lightning bugs are bioluminescent, meaning that they can make their own light through chemicals they have in their bodies. Say bioluminescent. What word part do you hear that is also in the word illuminate and in Samuel Van Lumen’s name? (lumen) The root bio means life. So bioluminescent means a living thing that produces its own light.*

“Yes!” exclaimed Samuel, laughing as he spoke. “It seems that as my eyes begin to fail me, I appreciate even more the things I am able to see.

“The science of light is really quite fascinating.”

“I’m sure it is,” shouted Jack. “However, I hope you’re not going to talk all day. That’s why you never catch any fish, you know!”



**Show Image U5.L4.4:  
Alfie staring at his reflection**

Samuel smiled at Jack and continued to talk anyway. “You see, when light hits a surface, some of the light bounces off the surface. It is the light that bounces

off the surface that we call reflected light. Most objects reflect some light. In fact, you are reflecting some light right now, Jack; otherwise, I wouldn’t be able to see you,” explained Samuel. “Not that my eyes let me see a whole lot these days!” he added.

Jack glanced over at Alfie, who was staring at his reflection in the still water. Jack laughed and said, “Look at the way the smooth water is reflecting a perfect image of Alfie—just like a mirror!”

At that moment, Jack stood up to check on his line. “Hmm, I thought I sensed something nibbling, but there’s nothing there,” he said.

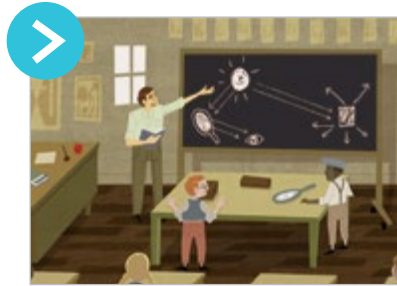
Image Card  
C.U5.L4.1

**Firefly**



“When I was young,” Samuel mused, “I often wondered why we’re able to see our reflection in some things but not in others.”

Jack laughed. “We wondered a lot of things when we were young. I still wonder some of those things!”



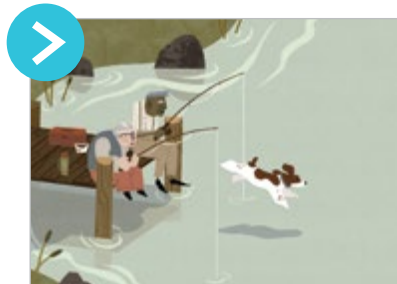
**Show Image U5.L4.5:**  
**Jack and Samuel as kids in**  
**Mr. Benson’s class**

“Do you remember,” asked Samuel, “when our third grade teacher, Mr. Benson, brought a mirror and a piece

of wood into class to explain how light is reflected off a surface? He showed us that when the surface of an object is perfectly smooth and shiny, like that of a mirror, light rays hit all parts of the surface of that object at the same angle. Therefore, light rays reflected by that object bounce back off it at the same angle and produce a clear and accurate reflection.”

Jack nodded, “I remember Mr. Benson well.”

“However,” Samuel continued, “when the surface of an object is not perfectly smooth and shiny, like that of a piece of wood, light rays hit different parts of it at different angles. Therefore, some light rays are absorbed by that object, and some are reflected by that object at different angles, so it does not produce a reflection.”



**Show Image U5.L4.6:**  
**Alfie jumping off the pier; men laughing**

“Mr. Benson was one of my favorite teachers,” said Jack.

“Yep! He was one of my favorite teachers, too,” agreed Samuel.

“I remember him explaining that because they are so smooth, mirrors reflect almost all the light that hits them.”

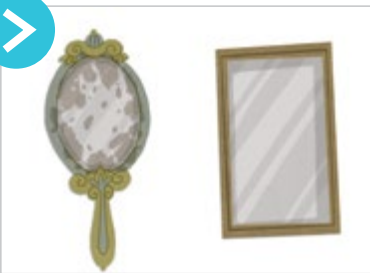
“Have you noticed that crazy dog of yours?” Jack asked. “He’s still staring at his reflection in the smooth, shiny surface of the water.”

“He does that,” explained Samuel.

Both men laughed loudly. The sound of their laughter seemed to act as a trigger for Alfie. He looked at them, wagged his tail, and then jumped headlong into the river. *What do you notice about how light behaves in this image?* (reflecting off water, shadow under pier and under Alfie)

“Don’t go too far out there, Alfie!” yelled Samuel, as if he was talking to a young child.

The two men stood up to check their lines and then returned to their chairs. Samuel continued to keep a watchful eye on Alfie, whose head was just visible above the water. He noticed that the water was now full of ripples, making the reflections in the water wavy and distorted. *What does distorted mean? What clues helped you to understand that word?* (unclear; clues were the words *ripples* and *wavy*)



#### **Show Image U5.L4.7: Old mirror and new mirror**

“I remember that day John O’Connor brought a really old mirror into class,” recalled Jack. “It was his grandmother’s mirror, and we

couldn’t see ourselves that well in it. Mr. Benson compared it to a modern mirror, the back of which was coated with a silvery material. The modern mirror could reflect almost all the light that hit it.”

“Yes,” said Samuel, “and Mr. Benson told us that most mirrors have flat surfaces and are called plane mirrors.” *Show one of the small flat mirrors and explain that it is called a plane mirror.*





### **Show Image U5.L4.8: Samuel's face in spoons**

"Mr. Benson also taught us about two other types of mirrors that have curved surfaces instead of flat surfaces: concave and convex," recalled Samuel.

"Oh, I remember," said Jack. "We had to draw two portraits of ourselves: one portrait was a concave image, and the other was a convex image. I remember that I borrowed my mother's silver spoons and brought them to school."

"That's right!" exclaimed Samuel excitedly. "That experiment was a lot of fun!"

Jack went on, "Now let me see—concave and convex mirrors reflect light in such a way that they alter, or change, the view we see in them. *Show the two sides of a large serving spoon as you read the following sentences. Then point to the left (concave) spoon in the image.*

A concave mirror curves inward, and produces a smaller upside-down image of an object, but only if it is a certain distance away from the viewer."

"Yes," added Samuel, "but if an object is very close to a concave mirror, its reflection will be upright and magnified! Do you remember how Mr. Benson showed us how you could put a pencil point right up into the "cave" of the spoon and see it upright and magnified?"

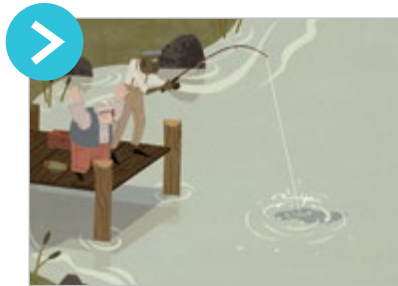
*Demonstrate for students how you can hold a pencil point inside the concave side of the spoon. Say, "Later you will have a chance to try this activity on your own and you will be able to see the reflection up close."*

Jack nodded and continued. "Convex mirrors curve outward, and always produce a smaller, upright image, as when you look into the convex side of the spoon." Point the right spoon in the image. Explain that a convex mirror bulges outward and makes it easier to see the surrounding area. *Ask for examples of convex mirrors students have seen. (on cars and buses, in stores.)*

Samuel laughed out loud. “Did you actually learn something in school, Jack Audire? I seem to recall that you were always talking, especially when Mr. Benson was talking!”

“Oh, I learned a thing or two,” protested Jack, “and I’ll have you know—”

Suddenly Jack leapt out of his chair. “Jumping jelly beans! I think I’ve caught a fish!” he yelled.



**Show Image U5.L4.9:**  
**Jack struggling with fishing line**

Almost at once Jack began to wrestle with his fishing pole.

“It’s a big one, Samuel!” screeched Jack as he struggled to hold onto his

fishing pole and not fall headfirst into the river.

“If you stand still, you’ll stand a better chance of reeling it in,” advised Samuel.

“Stand still? Stand still?” shrieked Jack as he battled with the creature on the end of the line. “This fish is the size of a whale! How am I supposed to stand still?”

*Does Jack really think the fish on the end of the line is as big as a whale?*

*Why does he use this expression? (He’s excited and he’s exaggerating.)*

*Let’s talk more about Samuel and Jack and their friendship. What do you notice about them? (They like to do things together. They like to talk about old times. They like to joke with each other.)*

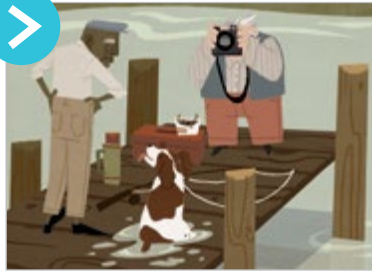
For several minutes Jack appeared to do a dance on the end of the pier with a fishing pole. Finally, Samuel had the good sense to take a closer look at the creature that Jack was attempting to catch.

“Hold on a minute, Jack! Stop wrestling with that line. You’ve hooked Alfie by the collar! The poor dog is trying to free himself, and you keep trying to reel him in!” laughed Samuel.

“That darn dog should be banned from coming fishing with us! He’s more trouble than he’s worth!” roared Jack.

### Challenge

Have students create a list of similes that also describe something that is very large.



**Show Image U5.L4.10:**  
**Samuel taking pictures of Jack and his catch**

“Hold on, hold on. Let me get my camera!” shouted Samuel. I want to get a photograph of the day Jack Audire

hooked himself a live springer spaniel!”

Moments later, having been unhooked by Jack, an extremely wet Alfie stood happily wagging his tail beside Jack, while Samuel busied himself taking photographs of the two of them.

“Get away from me, you darn dog,” muttered Jack as Alfie shook himself dry.

Samuel laughed aloud as he continued to capture photographic images of his two best friends.

“If you don’t put that camera away right now, you’ll be as wet as that silly dog!” announced Jack.

“Okay,” laughed Samuel. “Time for lunch, I think.”



**Show Image U5.L4.11:**  
**Samuel and Jack having a picnic**

The two friends shared some chicken and coleslaw while Alfie lay in the sun to finish drying off.

“I’m glad I had my camera with me,”

Samuel said between mouthfuls as he arranged the parts of his camera on the picnic blanket. “Did you know that some cameras contain plane mirrors that make it possible to see the image you are about to photograph?” *Explain that those types of cameras are older, not like the digital cameras that most people use today.*

“Yeah, well, you certainly didn’t need to record that image of me hooking Alfie,” grumbled Jack, offering a piece of chicken to Alfie.

Samuel laughed as he began to pack up the picnic basket. “Well, you’ve obviously forgiven him. Did I tell you that we are taking Amy to the fair tomorrow?”

“We?” exclaimed Jack.

“Yep! That was the deal,” explained Samuel. “I told her that if she made me some chocolate cake, I’d take her to the fair.”

“Me, too?” shouted Jack, a little less grumpily.

“You’re going to eat some cake, aren’t you?” Samuel yelled back.

“Well, okay then, but you’re not going to make me go on those bumper cars again, are you?” asked Jack.

“No,” said Samuel with a smile. “This time I thought we would try the House of Mirrors.”

### DISCUSSING THE READ-ALOUD (5 MIN.)

1. **Literal.** You heard Samuel explain to Jack that when rays of light waves hit an object, they can be transmitted, reflected, or absorbed. What do these terms mean?
  - » When light hits an object and passes through it, it is transmitted; when light hits an object and bounces back off it, it is reflected and creates a reflection; when light hits an object and is soaked up into it, it is absorbed and a shadow is created behind the object.
2. **Inferential.** What causes light to reflect off water, glass, and other smooth and shiny objects?
  - » Rays of light waves hit all parts of smooth, shiny objects at the same angle and are then reflected off them at the same angle, creating a clear reflection.

### Challenge

Research how cameras work, both old and newer digital cameras. Compare and contrast the two types of cameras.



ENGLISH  
LANGUAGE  
LEARNERS

Speaking and Listening  
Exchanging Information  
and Ideas

### Beginning

Point to an object and ask simple yes and no questions, e.g., “Is this whiteboard reflective?”

### Intermediate

Have students point to an object in their section and say either “reflective” or “not reflective.”

### Advanced/Advanced High

Encourage students to share during the whole-class discussion.

**ELPS 1.D; ELPS 2.H;**

**ELPS 3.I**

3. **Evaluative.** Based on the information in the story so far, why do you think Samuel wants to visit the House of Mirrors?

- » Samuel is interested in the extraordinary science of light and the important part it plays in his art. He has already explained what causes light to reflect off smooth, shiny surfaces. By visiting the House of Mirrors, he will be able to demonstrate to Jack and the children the different ways that mirrors of various designs reflect light.

• **Find-Pair-Share:** Divide the students into pairs. Send each pair to a different part of the classroom. Have each pair list as many objects they can find in their assigned area that are reflective.

- » Answers may vary, but should include objects that are smooth and shiny. Have pairs share some items on their list with whole group.



### Check for Understanding

Have each pair share one object on their list with the class. The other students will either agree (thumbs up) or disagree (thumbs down) as to whether the object is reflective.

## WORD WORK: CONVEX AND CONCAVE (5 MIN.)

### ***Convex and Concave***

1. In the Read-Aloud, you heard Samuel say to Jack, “Mr. Benson also taught us about two other types of mirrors that have curved surfaces instead of flat surfaces: *concave* and *convex*.”
  2. Say the words *concave* and *convex* with me.
  3. If you are looking at something *concave*, it is bent or curved inward. If you are looking at something *convex*, it is rounded and curved outward.
  4. Every morning, I pour my cereal into a concave bowl. If I turn my bowl upside-down, the outside that is now facing me is convex.
  5. Can you see some things in the classroom that are concave and convex? What other things have you seen that are concave or convex? Be sure to use the words *concave* and *convex* when you speak about them.
- Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “I saw a concave \_\_\_\_\_” or “\_\_\_\_\_ is convex \_\_\_\_\_.”

6. What are the words we've been talking about? What part of speech are the words *concave* and *convex*?

» *concave* and *convex*; adjective

- Use a Making Choices activity for follow-up. Tell students that the words *concave* and *convex* are antonyms because they have opposite meanings. Directions: I am going to name several things. If what I name is *concave*, say, "That is *concave*." If what I name is *convex*, say, "That is *convex*."

7. a dent in a car

» That is *concave*.

8. a dome, looking at it from the outside

» That is *convex*.

9. a dome, looking at it from the inside

» That is *concave*.

10. the Roman Colosseum, looking down into it

» That is *concave*.

11. a bowl, looking into it

» That is *concave*.

12. a bowl, looking at it turned upside-down

» That is *convex*.

13. the rounded top of a light bulb

» That is *convex*.

## Lesson 4: Reflection and Mirrors

# Writing



**Primary Focus:** Students will compare and contrast ideas based on a hands-on investigation with convex and concave reflections. **TEKS 3.7.E; TEKS 3.13.E**

### COMPARE AND CONTRAST (20 MIN.)

- Divide students into groups of three or four. Give each a large serving spoon, and drawing tools. Have students turn to Activity Page 4.1.

**TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;  
**TEKS 3.13.E** Demonstrate understanding of information gathered.

## Support

Project Internet images of convex and concave mirrors and other objects to help students visualize and differentiate the two shapes.

## Activity Page 4.1



## Support

Provide sentence starters for each of the questions.

“The two reflections are similar because \_\_\_\_\_”  
or “the two reflections are different because \_\_\_\_\_.”

### ENGLISH LANGUAGE LEARNERS



Writing  
Exchanging Information  
and Ideas

### Beginning

Provide sentence frames for each of the questions, e.g., “The two reflections are similar because \_\_\_\_\_.”

### Intermediate

Have students create a T-chart of similarities and differences between the two types of mirrors.

### Advanced/Advanced High

Encourage students to share during whole-class discussion.

**ELPS 2.H; ELPS 3.I;**

**ELPS 5.C**

## Activity Page 3.3



- Tell students that they are going to repeat the experiment that Samuel and Jack did together in Mr. Benson’s third-grade class. First, have students observe their reflections in the convex side of the spoon and draw what they see in the first oval on Activity Page 4.1.
- Next, have students observe their reflections in the concave side of the spoon and draw what they see in the second oval. Discuss with students the differences between the upside-down concave image and the upright convex image.
- If possible, provide a variety of mirrors with which students can experiment. You may wish to have students experiment with holding other kinds of concave mirrors at various distances to see if the reflection changes from upside-down to upright. Discuss with students how a shaving mirror or a cosmetic mirror produces an upright image. Observe that this is similar to the pencil point reflection, and unlike the upside-down reflection of a face seen in the concave side of most spoons.
- When the investigation is complete, have students complete the questions “What is similar about the two reflections?” and “What is different about the two reflections?” Remind students to write in complete sentences, with correct capitalization and punctuation.
- Collect Activity Page 4.1.

## Lesson 4: Reflection and Mirrors

# Reading



**Primary Focus:** Students will find the central idea and details in text about mirrors and reflections and find connections between different paragraphs.



**TEKS 3.2.A.vii; TEKS 3.9.D.i**

### INTRODUCING THE CHAPTER (10 MIN.)

- Make sure you and your students have a copy of the Student Reader.
- Have students turn to Activity Page 3.3 from previous lesson.
- Review the information about *transparent* and *opaque*.
- Tell students that they will be gathering more information in their Lab Notes on how light works.



**TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by: identifying and reading high-frequency words from a research-based list; **TEKS 3.9.D.i** Recognize characteristics and structures of informational text, including: the central idea with supporting evidence.

- Tell students that the title of today’s chapter is “Mirrors and Reflections.” Have them locate the chapter in the table of contents and turn to the first page of the chapter.
- Have students turn to Activity Page 4.2. Explain that we’ll be finding the central idea and details in the text as we read.

### Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the student reader.

**mirror**, a shiny surface that reflects light

**reflect**, to throw back light, heat, or sound from a surface

**plane**, a more or less flat surface

**kaleidoscope**, a tube with plane mirrors and pieces of colored glass that you hold up to the light and rotate to make colorful patterns

**distort**, to twist out of normal shape

### Activity Page 4.2



| Vocabulary Chart for “ Mirrors and Reflections “ |                                 |                                  |
|--------------------------------------------------|---------------------------------|----------------------------------|
| Type                                             | Tier 3<br>Domain-Specific Words | Tier 2<br>General Academic Words |
| Vocabulary                                       | plane<br>kaleidoscope           | mirror<br>reflect<br>distort     |
| Multiple Meaning                                 | plane                           | reflect                          |
|                                                  |                                 |                                  |
| Sayings and Phrases                              |                                 |                                  |



## Chapter 3 Mirrors and Reflections

Have you been to the dentist recently? Do you remember if they used a tool with a **mirror** to look at your teeth? Think for a minute about how useful that **mirror** is. Why does the dentist use it? This simple tool allows them to see the back of your teeth. They can also see teeth way in the back of your mouth. Without it, they couldn't do their job nearly as well! Ask to see this tool the next time you're at the dentist.

So what is a **mirror**? A **mirror** has a smooth, shiny **surface** that **reflects** light. Light that is **reflected** bounces off of something in its path. You have already learned that light travels in a straight line, unless it runs into something in its way. If light hits a transparent object, it passes right through the object. If it hits an opaque object, the light is absorbed and blocked so a shadow is made. If light hits a smooth, shiny surface like a **mirror**, it is **reflected**.



*Light **reflected** from the surface of this **mirror** allows the dentist to see the back of this person's teeth.*

28

29

### WHOLE GROUP READING: "MIRRORS AND REFLECTIONS" (30 MIN.)

#### Pages 28–29

- Read the title of the chapter, "Mirrors and Reflections", together as a class.
- Point students' attention to the image on **page 29** and read the caption, "Light reflected from the surface of this mirror allows the dentist to see the back of this person's teeth."
- Remind students that in previous lessons, they learned that light travels in straight lines and is stopped by opaque objects, creating shadows.
- Ask students to read **page 28** to themselves to find the answer to the question: "What happens when light hits a smooth, shiny surface?"
- When most students have finished reading, restate the question and have students answer.
  - » Light is reflected when it hits a mirror, which is a smooth, shiny surface.

When a **mirror** is made, glass is coated with hot, **silvery** metals and then cooled. This coating makes the **mirror** shiny so it **reflects** back all the light that hits it.

Did you know that there are different types of **mirrors**? You probably use a **plane mirror** every morning when you get ready for school. A **plane mirror** has a more or less flat **surface**. The **reflection** of something in a **plane mirror** is almost the same size as the real object.



*This little girl is looking at her **reflection** in a **plane mirror**.*

## Pages 30–31

- Draw students' attention to the image on **page 31**. Say to students, "I wonder what a mirror is made of. Let's read **page 30** to find out more."
- Ask students to read **page 30** to themselves to fill in the blank in the following sentence: "A mirror is made of \_\_\_\_."
- When students have finished reading, reread the sentence and ask students to fill in the blank.
  - » glass coated with hot, silvery metals
- Have students look back at the image on **page 31** and have them give examples of the mirrors they may have in their homes.
  - » Answers may vary but could include a bathroom mirror, a mirror hanging on a wall, a mirror on the back of a door, etc.

- Tell students that most mirrors found in homes are called plane mirrors. Ask, “What are plane mirrors?”
  - » Ask one student to read the sentence(s) that answer(s) the question. A plane mirror has a more or less flat surface. The reflection of something in a plane mirror is almost the same size as the real object.
- Have students turn to Activity Page 4.2. Discuss the central idea of the text (mirrors) and additional details. Have students record the information from the text and discussion in the first web.
  - » The central idea is mirrors. The details should include: silvery metal, plane mirrors are flat, same size reflections.

**Plane mirrors** are used in many tools. Cameras, telescopes, and microscopes sometimes use **plane mirrors**. Some toys even use **plane mirrors**. Have you ever looked through a toy called a **kaleidoscope**? A **kaleidoscope** is a tube with **plane mirrors** inside. There are also tiny bits of colored glass and beads sealed up inside the **kaleidoscope**. You look through a small hole at one end of the **kaleidoscope** and point it toward the light. As you rotate the tube, you will see beautiful, colored patterns.



*Here's what the outside tube of a toy **kaleidoscope** looks like.*



*Here's what you might see if you looked inside a **kaleidoscope**.*

## Pages 32–33

- Have students read **pages 32–33** to themselves to find the answer to the question: “What is a kaleidoscope?”
  - » When most students have finished reading, restate the question and have students answer. A kaleidoscope is a tube with plane mirrors, tiny bits of colored glass, and beads, inside.
- Ask, “How does a kaleidoscope work?”
  - » You look through a small hole at one end of the kaleidoscope, point it toward the light, and rotate the tube. Beautiful patterns appear, as seen in the image on **page 32**.
- Show a brief video on how kaleidoscopes work (optional).

There are two other types of mirrors that are different from **plane mirrors**. **Plane mirrors** have flat surfaces, but **concave** and **convex** mirrors have **curved** surfaces. The smooth, shiny side of a **concave mirror** **curves** inward like a spoon. The smooth, shiny side of a **convex mirror** **curves** outward.

Here's another way that **concave** and **convex mirrors** are different from **plane mirrors**. Remember that in a **plane mirror**, the **reflection** of an object is about the same size as the object. In **concave** and **convex mirrors**, the **reflection** can look larger or smaller than the real object.



*Three types of mirrors*

## Pages 34–35

- Ask students to read just the first paragraph on **page 34** to themselves to answer the question: “How are concave and convex mirrors different from plane mirrors?”
- When students have finished reading, restate the question and have students answer.
  - » Plane mirrors are flat, while concave and convex mirrors are curved.
- Ask, “Which way does a concave mirror curve?”
  - » inward like a spoon

**Note:** You may wish to tell students that *concave* has the word cave in it. A way to remember which kind of mirror curves inward and which curves outward is that concave mirrors curve inward, like walking into a cave.

- Ask, “Which way does a convex mirror curve?”
  - » outward
- Next, have students read the second paragraph on **page 34** to themselves to answer the question: “How is the reflection of objects in concave and convex mirrors different from the reflection of objects in plane mirrors?”
- When students have finished reading the second paragraph, restate the question and have a student answer.
  - » The reflection of objects in plane mirrors is about the same size as the object, while the reflection of objects in concave and convex mirrors appears larger or smaller than the real object.
- Direct students’ attention to the images and caption on **page 35**.
- Have students turn to Activity Page 4.2. Discuss the central idea of the text (mirrors or special mirrors) and additional details. Have students record the information from the text and discussion in the second web.
  - » The central idea is mirrors or special mirrors. The details should be the words concave curves inward, and convex curves outward; objects can be reflected as smaller or larger than their actual size.
- Have students independently complete the sentence “The central idea of both texts is \_\_\_\_\_.”
  - » There are different types of mirrors that reflect images in different ways.
- Collect Activity Page 4.2.

## Challenge

Students can write a brief paragraph about what all three types of mirrors—plane, convex, and concave—have in common.

- » made of glass with silvery metal on the back, shiny, reflect images



**ENGLISH  
LANGUAGE  
LEARNERS**

**Reading**  
Reading/Viewing Closely

## Beginning

Work 1:1 with students to complete Activity Page 4.2.

## Intermediate

Model finding details in the paragraphs and putting key words in the graphic organizer. Ask students, “What are these paragraphs mostly about?”

## Advanced/Advanced High

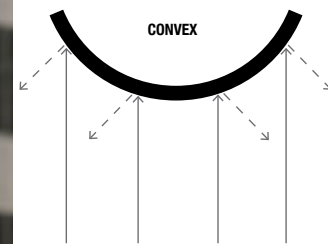
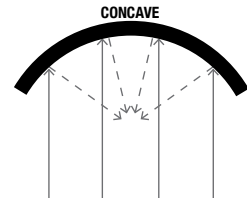
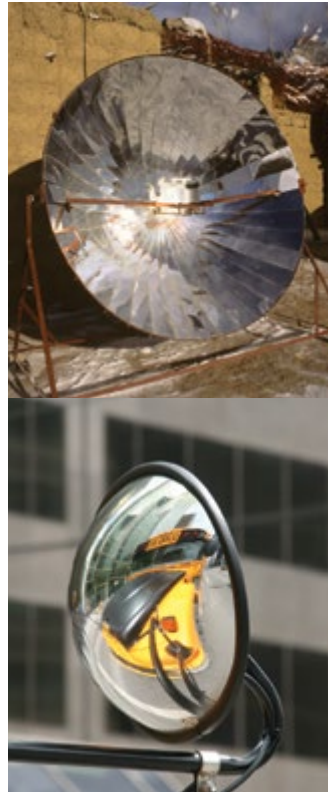
Have students complete the activity and then compare their answers with those of a partner.

**ELPS 4.D; ELPS 4.I**



**Concave** and **convex mirrors** are also useful. **Concave mirrors** can be used to provide heat using the light from the sun. Remember that sunlight is a form of light and heat energy. The large **concave mirror** in the image on the next page **reflects** the sun's energy so that people can warm their hands or bodies outside.

What about **convex mirrors**? The next time you get on a bus, take a look at the mirrors on the sides of the bus. Most buses and large trucks have a small, extra **convex mirror** on the side-view **plane mirror**. The **convex mirror** makes objects look smaller but shows a wider area so you can see more. It helps drivers avoid hitting something they might not see in the regular **plane mirror**.



*Curved mirrors change the look of things because of the ways they bounce light rays back.*

## Pages 36–37

- Draw students' attention to the images on **page 37** and have them read the caption aloud.
- Have students read the first paragraph on **page 36** to themselves to find the answer to the question: "How can concave mirrors be used to provide heat?" You may also wish to have students look carefully at the diagram on **page 37**.
- After students have finished reading and looking carefully at the image and the diagram, restate the question and have them talk about their ideas with a partner before answering out loud. When ready, have several students share their ideas.
  - » Sunlight is a form of light and heat energy. The large concave mirror in the image reflects the sun's energy so that people can warm their hands or bodies outside.
- Draw students' attention to the bottom image on **page 37**. Have them also look carefully at the diagram beside that image.

- Have students read the remainder of **page 36** to themselves to find the answer to the question: “Why would a convex mirror be called a safety mirror?”
- When students have finished reading, restate the question, and call on a student to read the sentences that answer the question.
  - » The convex mirror makes objects look smaller but shows a wider area so you can see more. It helps the driver avoid hitting something he or she might not see in the regular plane mirror.
- What text features do you see on these two pages? Remember what we learned in the Animal Classification Unit?
- How does the text feature help us?



So now you see how useful **mirrors** are in our everyday lives. **Mirrors** can also be a lot of fun. A circus or carnival sometimes has a place called the “Funhouse,” or “House of **Mirrors**.” If you go in, there are lots of **concave** and **convex mirrors**. When you look in these **mirrors**, you might not recognize yourself! Your **reflection** is **distorted**. What makes that happen? Now you know it’s **concave** and **convex mirrors**.



*Concave and convex mirrors can distort the reflection of an object.*

### Pages 38–39

- Ask student to look at the image on **page 39** and read the caption.
- Have students read **page 38** to themselves to answer the question: “What sorts of mirrors would reflect this kind of image?”
- When students have finished reading, restate the question and have students answer.
  - » They are concave and convex mirrors found in a circus or carnival “funhouse” or “house of mirrors.”

## Lesson 4: Reflection and Mirrors

# Language



**Primary Focus:** Students will identify adverbs that tell *when* and *where*.



**TEKS 3.11.D.v**

### GRAMMAR: ADVERBS (15 MIN.)

#### Adverbs That Tell *When* and *Where*

- Draw students' attention to the adverbs poster you displayed in advance. Point out that the adverbs telling *how*, all end in the suffix *-ly*.

##### Adverbs

*Adverbs* are words that can describe verbs.

- They can tell *how* the action of a verb happens.
  - They can tell *when* the action of a verb happens. (*yesterday, today, tomorrow, always, sometimes, never, early, first, next, last, again, soon, later*)
  - They can tell *where* the action of a verb happens. (*here, there, everywhere, anywhere, inside, outside, somewhere*)
- Tell students that today, they will continue to work with adverbs. However, the new adverbs do not end in *-ly* and so may be more difficult for students to identify.
  - Instead of telling *how* the action of a verb takes place, the adverbs today describe *when* or *where* the action of the verb takes place.
  - Read with students the adverbs that tell *when*, listed on the poster.
  - Use several adverbs that tell *when*, from the poster, in oral sentences. Ask students which word in each sentence tells *when*; emphasize that this word is the adverb. If students have difficulty, repeat each sentence and encourage students to look at the words on the adverbs poster. For example:
    - Tom and Bob will play baseball tomorrow. (Which word tells when? *tomorrow*)
    - I never eat chocolate. (*never*)
    - I fell asleep early. (*early*)



**TEKS 3.11.D.v** Edit drafts using standard English conventions, including: adverbs that convey time and adverbs that convey manner.

- Display the “Adverbs That Tell When” sentences you prepared in advance.
- Ask students to look at the list of *when* adverbs on the poster and choose one that would fit in the blank of the first sentence.
- For each adverb suggested by students, ask them to first say the complete sentence using their selected adverb. If the word makes sense within the context of the complete sentence, write it in the blank. (In some instances, more than one adverb may make sense.)
- Ask students which word in the sentence tells *when*. Draw a triangle around the adverb and then draw an arrow from it to the verb it describes.
- Follow these steps with the remaining *when* sentences you prepared in advance. Here is a key:
  - When did I play football with my friends?  
» *yesterday*
  - When do I play football with my friends?  
» *always*
  - When did he do his hardest homework assignment?  
» *first/next*
  - When did he do his homework?  
» *again/later*

### Where?

- Tell students that other adverbs can tell *where*.
- Point out the third bullet on the adverbs poster you displayed in advance. Read the adverbs listed on the poster with students, emphasizing that all of these words tell *where* something is happening.
- Use several adverbs that tell *where*, from the poster, in oral sentences. Ask students which word in each sentence tells *where*; emphasize that this word is the adverb.
- Display the “Adverbs That Tell Where” sentences you prepared in advance.
- Ask students to look at the list of the *where* adverbs on the poster and choose adverbs that would fit in the blank of the first sentence.
- For each adverb suggested by students, ask them to first say the complete sentence using their selected adverb. If the word makes sense within the context of the complete sentence, write it in the blank. (In some instances, more than one adverb may make sense.)
- Ask students which word in the sentence tells *where*. Draw a triangle around the adverb and then draw an arrow from it to the verb it describes.

- Follow these steps with the remaining *where* sentences you prepared in advance. Here is a key:

- Where does Dad work?  
» *inside*
- Where are flowers growing?  
» *everywhere/somewhere/there/here*
- Where did I leave my book?  
» *somewhere/there/here/inside/outside*
- Where did Sam put the mail?  
» *here/there/somewhere/inside*

- Ask students to turn to Activity Page 4.3. Complete this as an independent activity.

## SPELLING (10 MIN.)

### Word Sort

- Tell students they will sort words with /ee/ spelled 'y', 'e', 'i', 'ea', 'ee', 'ie', 'ey', and 'e\_e'.
- Have students turn to Activity Page 4.4.
- Ask students to identify the vowel patterns. ('y' > /ee/, 'e' > /ee/, 'i' > /ee/, 'ea' > /ee/, 'ee' > /ee/, 'ie' > /ee/, 'ey' > /ee/, and 'e\_e' > /ee/)
- Have students independently read the words in the box below the headers and circle the vowels that have the /ee/ sound.
- Then, have students independently write the words that match the various spellings below the appropriate headers.

**Note:** You may wish to circulate around the room, offering assistance where needed.

End Lesson

### Lesson 4: Reflection and Mirrors

# Take-Home Material

- Have students take home Activity Page 4.5 to complete and Activity Page 4.6, "Mirrors and Reflections", to read aloud to someone at home.

## Activity Page 4.3



ENGLISH  
LANGUAGE  
LEARNERS

### Grammar Modifying to Add Details

#### Beginning

Read each sentence aloud and identify the adverb. Ask, "Does this adverb tell how, when, or where?"

#### Intermediate

Have students orally identify the verb and adverb before marking them on the Activity Page. Read each step and have students complete it before moving to the next step.

#### Advanced/Advanced High

Preview/review directions for the activity.

#### ELPS 3.C

## Activity Page 4.4



## Activity Pages 4.5 and 4.6



## 5

# Refraction and Lenses, Part 1

## PRIMARY FOCUS OF LESSON

### Spelling

Students will write words using spelling patterns and rules for words with the /ee/ sound. **TEKS 3.2.B.i**

### Speaking and Listening

Students will use events and details from listening to the story about refraction and lenses and apply what they've learned to show cause and effect.

**TEKS 3.1.A; TEKS 3.6.G**

### Reading

Students will ask and answer questions about the central idea and details in a text about refraction and lenses. **TEKS 3.2.A.vii; TEKS 3.9.D.i**

### Language

Students will use suffixes *-y* and *-ly* correctly. **TEKS 3.3.C**

## FORMATIVE ASSESSMENT

### Activity Page 5.1

**Spelling Assessment** Spell words with the /ee/ sound correctly. **TEKS 3.2.B.i**

### Activity Page 5.3

**Lab Notes** Ask and answer questions about the central idea and details of the text using a graphic organizer. **TEKS 3.9.D.i**

### Activity Page 5.4

**Words With Suffixes *-y* and *-al*** Use suffixes *-y* and *-al* correctly in words and sentences. **TEKS 3.3.C**

**TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables and final stable syllables; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.9.D.i** Recognize characteristics and structures of informational text, including the central idea with supporting evidence; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as *im-* (into), *non-*, *dis-*, *in-* (not, non), *pre-*, *-ness*, *-y*, and *-ful*.

## LESSON AT A GLANCE

|                                                    | Grouping    | Time    | Materials                                                                                                                                       |
|----------------------------------------------------|-------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Language (20 min.)                                 |             |         |                                                                                                                                                 |
| Spelling Assessment                                | Independent | 20 min. | ❑ Activity Page 5.1                                                                                                                             |
| Speaking and Listening (45 min.)                   |             |         |                                                                                                                                                 |
| Whip Around Vocabulary Review                      | Whole Group | 5 min.  | ❑ Digital Flip Book: U5.L5.1–U5.L5.11<br>❑ Image Cards C.U5.L5.1–C.U5.L5.3<br>❑ clear glass of water and a colored straw<br>❑ Activity Page 5.2 |
| Introducing the Read-Aloud                         | Whole Group | 10 min. |                                                                                                                                                 |
| Presenting the Read-Aloud: “Refraction and Lenses” | Whole Group | 20 min. |                                                                                                                                                 |
| Discussing the Read-Aloud                          | Whole Group | 5 min.  |                                                                                                                                                 |
| Wrap-Up: Cause and Effect                          | Whole Group | 5 min.  |                                                                                                                                                 |
| Reading (40 min.)                                  |             |         |                                                                                                                                                 |
| Introducing the Chapter                            | Whole Group | 10 min. | ❑ <i>Adventures in Light and Sound</i><br>❑ Activity Page 5.3                                                                                   |
| Whole Group Reading: “Refraction and Lenses”       | Whole Group | 20 min. |                                                                                                                                                 |
| Lab Notes                                          | Independent | 10 min. |                                                                                                                                                 |
| Language (15 min.)                                 |             |         |                                                                                                                                                 |
| Morphology: Suffixes -y and -al                    | Independent | 15 min. | ❑ Activity Page 5.4                                                                                                                             |
| Take Home Material                                 |             |         |                                                                                                                                                 |
| Spelling: Dictionary Skills                        |             |         | ❑ Activity Page 5.5                                                                                                                             |

## ADVANCE PREPARATION

### Speaking and Listening:

- Identify the following digital images on the program's digital components site to project during the Read-Aloud: U5.L5.1–U5.L5.11.
- Have a clear glass of water and a colored drinking straw prepared to demonstrate refraction.

### Universal Access

- Preview Image Cards that will be used in the lesson and have students make predictions about what they will learn.

Start Lesson

## Lesson 5: Refraction and Lenses, Part 1

# Language



**Primary Focus:** Students will write words using spelling patterns and rules for words with the /ee/ sound. **TEKS 3.2.B.i**

## SPELLING ASSESSMENT (20 MIN.)

- Have students turn to Activity Page 5.1 for the spelling assessment.
- Tell students to write their words under the heading to which they belong. For example, if you call out the word *each*, they would write the word under the header 'ea'>/ee/.
- Tell students that should a spelling word fit under more than one header, they should only write the word under one.
- Using the list below, call out the word using the following format: say the word, use it in a sentence, and say the word once more.
- After you have called out all of the words including the Challenge Words and the Content Word, go back through the list slowly, reading each word just once more.

### Activity Page 5.1



**TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

|               |                                         |
|---------------|-----------------------------------------|
| 1. scenic     | 12. enemy                               |
| 2. money      | 13. degree                              |
| 3. chimney    | 14. believe                             |
| 4. centipede  | 15. athlete                             |
| 5. chief      | 16. grease                              |
| 6. secret     | 17. experience                          |
| 7. stadium    | 18. chariot                             |
| 8. increase   | <b>Challenge Word:</b> <i>almost</i>    |
| 9. tedious    | <b>Challenge Word:</b> <i>really</i>    |
| 10. succeeded | <b>Content Word:</b> <i>electricity</i> |
| 11. fancy     |                                         |

- Ask students to write the following sentences as you dictate them:

1. The students were eager to learn Chinese.
2. The honey bees fly from flower to flower.

**Note:** You may find it helpful to use the Spelling Analysis Chart found at the end of this lesson to analyze students' mistakes. This will help you understand any patterns that are beginning to develop, or that are persistent among individual students.

## Lesson 5: Refraction and Lenses, Part 1

# Speaking and Listening



**Primary Focus:** Students will use events and details from listening to the story about refraction and lenses and apply what they've learned to show cause and effect. **TEKS 3.1.A; TEKS 3.6.G**

### WHIP AROUND VOCABULARY REVIEW (5 MIN.)

- Have students write down a list of all the words they've learned having to do with the *Light and Sound* unit so far. Allow them 1 minute to write their list.

**TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.G** Evaluate details read to determine key ideas.



- Have all the students stand up at their desk.
- “Whip” around the room, calling on one student at a time. Have students share one of their words.
- When a student hears a word that is on their list, they cross it off.
- When all the words on their list are crossed off, the student sits down.
- Continue until there is only one person standing or time runs out.

### INTRODUCING THE READ-ALoud (10 MIN.)

- Prepare to project Images **U5.L5.1–U5.L5.11**.

#### ➤ Images **U5.L5.1–U5.L5.11**

- To review the narrative elements of the story, ask the following questions:
  - Who are the characters so far?
  - What is the setting for the story?
  - From which point of view is this story told?
- To review concepts learned about light so far, ask the following questions:
  - What does it mean for light to be transmitted, absorbed, or reflected?
  - Describe the three types of mirrors.
- Show students the clear drinking glass filled with water. Place a colored straw into the water. Ask students to look closely at the straw from different angles. Have students share what they observe.
  - » Responses may include that the straw looks magnified, bent, or separated at the water line.
- Share with students that certain substances have the ability to bend light and distort the image that we see. Ask students if they’ve seen examples of this.
  - » Responses may include aquariums or swimming pools.
- Set the purpose for listening by telling students to listen for ways that light can bend and also for examples of tools and instruments that bend light in interesting and useful ways.

# Previewing the Vocabulary

## Core Vocabulary

- The following are core vocabularies used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabularies.

**instruments**, mechanical or electronic tools designed and used for specific purposes

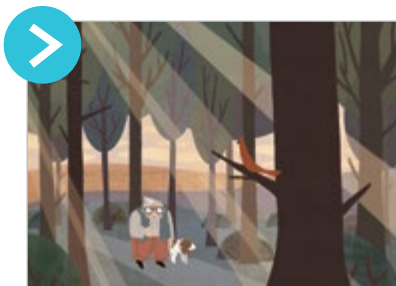
**lens**, a clear piece of curved glass or plastic that is used to make things look clearer, larger, or smaller

**refraction**, the act of light changing direction or bending as it travels through different objects or substances

**translucent**, describes an object that allows some light to pass through, so that you are able to see the form of an object but not a clear image

| Vocabulary Chart for “Refraction and Lenses” |                                 |                                  |
|----------------------------------------------|---------------------------------|----------------------------------|
| Type                                         | Tier 3<br>Domain-Specific Words | Tier 2<br>General Academic Words |
| Vocabulary                                   | lens<br>refraction              | translucent                      |
| Multiple Meaning                             |                                 | instruments                      |
|                                              |                                 |                                  |
| Sayings and Phrases                          |                                 |                                  |

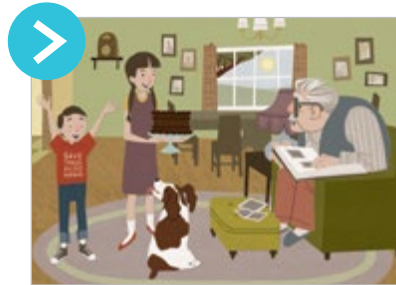
## PRESENTING THE READ-ALOUD: “REFRACTION AND LENSES” (20 MIN.)



### Show Image U5.L5.1: Samuel walking in the woods with Alfie

The next day Samuel was up bright and early. He had begun the day by painting in the garden, but as his eyes grew tired, he decided to put down his

paintbrush and go for a walk in the woods with Alfie. Samuel loved to observe the perfectly straight shafts of light as they burst through the tree canopy into the woodland.



**Show Image U5.L5.2:**  
**Children walking toward their grandfather**

Later, when they had returned from their walk, Samuel passed several hours scrapbooking photographs of

his grandchildren. Before he knew it, it was late in the afternoon.

“Grandad! Grandad! We’re here!” came the sound of two young voices.

Two smiling children walked toward Samuel as he sat in his favorite armchair. One of the children was a girl about eleven years of age. She was tall and skinny and had braided brown hair. Her face was awash with freckles. She was carrying a large chocolate cake. The other child was a boy about eight years old. He, too, had brown hair, and he wore a bright red T-shirt that said “Save Trees. Avoid Homework.” It was obvious that they were brother and sister. They were two of Samuel’s four grandchildren.

“Mom walked us to the garden gate. She says she’ll stop by later for dinner, after we’ve been to the fair. She’s going to bring us a meatloaf that she made,” said the girl, whose name was Amy.

Samuel grimaced.

“Mom says she knows you don’t like meatloaf, but you have to eat it anyway because it’s good for you!” said the boy who was clearly missing his two front teeth.

“Oh, she does, does she?” replied Samuel.

“Yep!” said the boy.

“How come you’re here?” said Samuel laughing. “Did you make that chocolate cake?”

The boy, whose name was Ethan, smiled boldly. “I didn’t make it, but I was the one who said it should be a double chocolate cake, and not just chocolate,” explained Ethan.

“Oh, well, I guess that’s a good enough reason for you to come to the fair with Amy and me,” said Samuel, teasing his grandson.” Let’s go put the cake in the kitchen!” *Who are the two new characters?* (Ethan and Amy, Samuel’s grandchildren) *What do we know about them?* (Amy is 11 and has freckles; Ethan is 8 and missing his two front teeth.)



**Show Image U5.L5.3:  
Samuel and children at  
kitchen table**

In the kitchen Samuel poured two glasses of ice cold water and placed a striped straw in each glass. “Have a

cold drink before we go,” Samuel instructed.

Moments later they heard the sound of a very loud voice.

“Samuel!” yelled Jack. “You need to do something about that dog.

He’s run off with my hat again!”

Samuel and the children burst out laughing.

At that moment Jack appeared in the kitchen looking a little flustered. “Why, if it isn’t my two favorite children!” Jack exclaimed.



**Show Image U5.L5.4:  
Observing straw in glass**

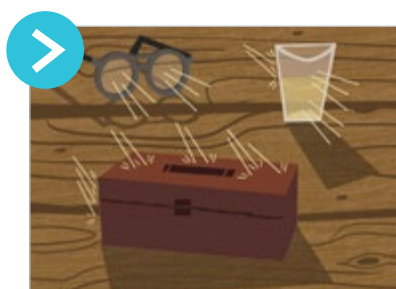
Samuel poured two more glasses of water and joined his guests at the kitchen table. All four sat and chatted and sipped their drinks.

“Grandpa,” said Ethan, “Why does it look like the straw is separated where it meets the water? See, the part of the straw in the water is magnified and looks like it’s bent!”

“That’s a really good question, Ethan,” replied Samuel eagerly. “Well, where should I begin?”

“This could take a while,” warned Jack, smiling the tiniest bit.

- 
- Remind students to listen closely for some key words and new information about how light travels
- 



**Show Image U5.L5.5:**  
**Transparent, translucent, and**  
**opaque objects**

“You may have learned by now that light can be transmitted, or passed through some objects, but not others,”

began Samuel. “Objects that most light can pass through, such as eyeglasses or an empty glass, are called transparent, and objects that light cannot pass through, such as a tackle box or Jack’s hat, are called opaque.”

“My hat’s been called worse!” Jack shouted.

Amy and Ethan giggled.

“What about objects that some light can go through, like frosted glass and tracing paper?” asked Amy. “I think there’s a name for those, too.”

“Yes,” said Samuel, “Those objects are called translucent. They let a little bit of light pass through, and it scatters or spreads out, causing the objects you see through them to look fuzzy.”

*Which substance is translucent, letting some of the light pass through? (the lemonade) Who has seen stained glass windows or window decorations? Some of the light passes through to make beautiful glowing colors.*

“Cool!” exclaimed Ethan. “We’re about to start learning all this stuff in third grade.”

“Yeah, it is cool,” joined in Amy. “And now you’ll be a little ahead, Ethan!”

“You may have also learned,” continued Samuel, “that when light waves travel through different transparent substances, such as through the air and then through a drinking glass, or through a glass and then through the water, they change speed,” explained Samuel.

Amy nodded. “I remember learning that when a light wave suddenly changes speed, it quickly changes its direction and looks like it’s bending. That’s why when you look into a river and see fish, they seem closer to the surface than they actually are.”

“Does that apply to dogs, too?” yelled Jack, remembering catching Alfie.

The children looked at Jack with puzzled expressions.

“Oh, it’s a long story,” said Samuel, laughing.

“To return to your question, Ethan, that’s exactly why a straw standing in a glass of water appears to bend or even break apart as it enters the water. This sudden change of speed and direction of the light wave is called refraction.”

“Refraction?” repeated Ethan.

Samuel nodded and continued. “In fact, the refraction of light is how a concave or convex lens works in many instruments, or tools, that we use.” *What words did you hear that may be new?* (translucent, refraction, lens) *What does the light do when it travels through different transparent substances?* (changes speed) *What is refraction?* (when light changes speed and direction) *Show image card C.U5.L5.1 (Refraction). Ask, “How would you describe what is happening in this image? Can you add descriptive adjectives and adverbs to your description? Can you figure out the definition of lens from the text?* (a curved, transparent piece of glass)

## Image Card C.U5.L5.1

### Refraction

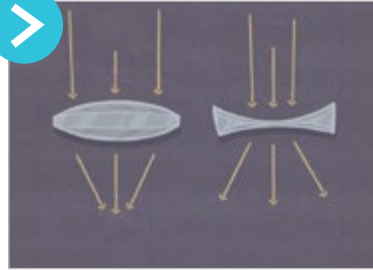


### Support

Reread the sentence “Samuel nodded and continued. In fact, the refraction of light is how a concave or convex lens works in many instruments, or tools, that we use.”

Image Card  
C.U5.L5.2

Instruments That  
Use Lenses



**Show Image U5.L5.6:  
Convex and Concave lenses**

Samuel went on, “A convex lens curves outward so that it is thicker in the middle than at the edges. Rays of light passing through a convex lens

are forced to change direction and move toward each other, making things look bigger if they are close enough to the lens. Convex lenses are used in instruments such as microscopes, magnifying glasses, binoculars, telescopes, and cameras.”

The lenses in my eyeglasses are convex to help me see close images better when I’m painting.”

- Go over the concave and concave lenses on image U5.L5.6 (Convex and Concave Images). Remind students about the similarities to concave and convex mirrors. Tell students that you look *at* and mirror but *through* a lens.
- Show Image Card C.U5.L5.2 (Instruments That Use Lenses) as examples of instruments with convex lenses.

Samuel continued, “On the other hand, a concave lens curves inward like a cave and is thinner in the middle than at the edges. Light rays passing through a concave lens are forced to change direction and move away from each other, making things look smaller. Cameras use lenses to focus the light rays inside the camera to record an image. Lenses are also used in security cameras and peepholes that are in some doors to help the background view look wider and easier to see.”

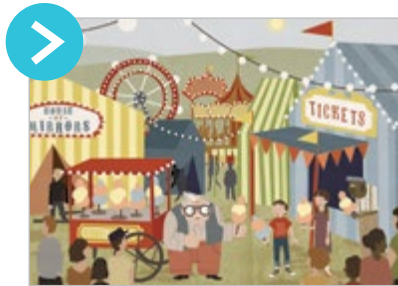
“I don’t want to interrupt your lecturing, Samuel, but I’ve heard it’s going to be busy at the fair tonight, so we should get going,” said Jack as he finished his drink.

“Good point, Jack. We’d better get ourselves out of here.”

“Yay!” yelled Ethan excitedly. “I want us all to go on the chair-o-planes!”

“We’ll have to see about that,” replied Jack. “I need to be able to walk home from the fair in one piece, not a million, zillion pieces!”

The two children laughed at Jack, and then Ethan ran off to rescue Jack’s hat from Alfie.



**Show Image U5.L5.7:**  
**Everyone at fair eating cotton candy**

Fifteen minutes later, having arrived at the fair, they promptly bought a roll of tickets for various rides, as well as four helpings of cotton candy. They

stood together for a short time, eating the sweet cotton candy and observing all the fun of the fair.

Finally, Amy asked, “What should we do first?”

“I have a special request,” said Samuel. “I have been teaching Jack about the science of light. I have promised him a trip to the House of Mirrors.”

“It was more like a threat,” retorted Jack.

The two children laughed at Jack’s grumpy reply.

“The House of Mirrors is so much fun!” exclaimed Amy.

“Let’s go!” cried Ethan, as he grabbed his grandfather’s hand. And with that, the four of them made their way toward the giant red, white, and blue sign that said “Welcome to The House of Mirrors.” *What kinds of mirrors will they find in the House of Mirrors? (different concave and convex mirrors, plane mirrors) What effect will the mirrors have? (They will appear larger or smaller; they might look distorted.)*





### **Show Image U5.L5.8:**

#### **Everyone standing in front of distortion mirrors**

A man dressed like a clown stood at the entrance. He smiled and took their tickets. Upon entering the

partly wooden, partly tented structure, they discovered an array, or selection, of distortion mirrors. As they stood in front of each mirror, they witnessed a variety of optical illusions.

“I have a head shaped like a giant melon,” pronounced Jack.

“This is so cool,” said Ethan eagerly, looking into the mirror that had convex and concave parts. “Look, I’m really tall and skinny.”

“I’m short and really, really wide,” exclaimed Amy, looking at her reflection in the mirror.

“How is this possible?” asked Ethan, as he observed his new shape.

“Well,” began Samuel, “I’m glad you asked that question, Ethan.”

“Oh no, I sense another speech,” said Jack. And with that, Jack walked toward the entrance to the mirrored maze.

“You’re going to miss my talk,” said Samuel as he watched Jack walk away.

“That’s fine with me,” Jack replied.

“Actually it’s a very simple concept,” explained Samuel, ignoring Jack’s comment. “Mirrors are made of reflective material. Each one of these mirrors has a different shape. Depending on the shape of the mirror, it can be used to bring light rays together, or spread them apart. Some of these mirrors have concave and convex parts, some are slightly twisted, and some are even folded.” Samuel continued, “Generally, convex mirrors make images look smaller, whereas concave mirrors can make images look larger. When you put them together, you get some really funny shapes!”

“So, different mirrors do different things,” said Ethan, who had been listening intently to his grandfather.

“Yes! For example,” continued Samuel, “a convex mirror, like the ones on the sides of your school bus, curve outward so that rays of light striking them are forced to change direction and move away from each other, making distant things look smaller and the background wider. This allows the bus driver to see more area around the bus. Objects very close to these mirrors may look wider and distorted.”

“Cool,” exclaimed Ethan.

“It is cool,” Samuel agreed. “In comparison, a concave mirror—like the large makeup mirror your mother has or the shaving mirror your father has—curves inward so that light rays hitting it are forced to change direction and move toward each other, making things look larger,” explained Samuel.

“I get it! I get it!” exclaimed Amy happily. “When light strikes either a concave or a convex mirror, it is reflected in different ways at different angles.”

“Right on the button!” said Samuel. “Light reflects differently in each mirror in such a way that it alters the view. The waves of light provide a clear, but altered, image.”

*Show Image Card C.U5.L5.3 (Distortion Mirror). What kind of mirror is this? (It's both concave and convex.)*

Image Card  
C.U5.L5.3

**Distortion Mirror**



**Show Image U5.L5.9:  
Everyone in the mirrored maze**

“Hey, you guys, I’m kind of lost in here!” called a very loud voice.

It was Jack. “So any time you’re ready, I’d welcome being rescued.”

The children laughed out loud.

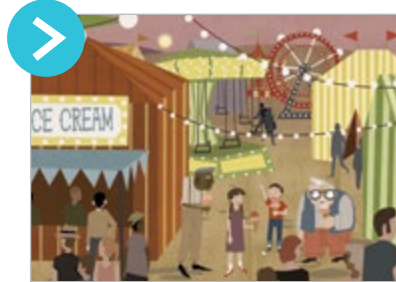
“Well, you did go wandering off!” yelled back Samuel. “Hold on! Hold on! We’re on our way.”

Samuel and his grandchildren made their way toward the entrance to the mirrored maze. The maze was a series of narrow, mirrored corridors.

The trick was to find an opening into a new corridor, and if you followed the path correctly, you would eventually find your way out. However, because the walls were made entirely out of framed mirrors, it was difficult to find the openings, and people had been known to walk round and round for a very long time.

Eventually Samuel, Amy, and Ethan found Jack. They basically followed the sound of his very loud complaints. Once they were all together, they put Ethan in charge of finding the way out. It didn’t take him long to figure out the way to the exit.

*What kind of mirrors do you think are in the maze? (plane mirrors)*



**Show Image U5.L5.10:**  
**Everyone enjoying ice cream**

Once out of the maze, they spent the rest of the evening enjoying the fun of the fair. The children went on a variety of rides. They also ate ice cream.

Finally, it was time to go. Samuel had promised his daughter Anna that the children would be home in time for dinner.

“Time to go, children,” said Samuel softly.

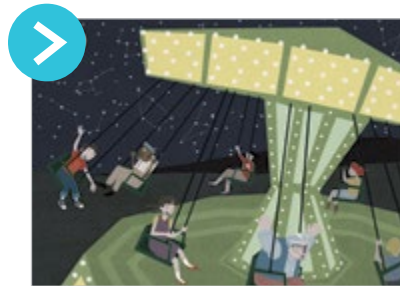
“Oh, grandad!” exclaimed Ethan. “We haven’t been on the chair-o-planes. Please, can we go on them? Please!” pleaded Ethan.

“What do you say, Jack? Are you up for a little ride through the cool evening air?” said Samuel.

“Samuel, if I don’t come back alive, are you prepared to feed my fish?” yelled Jack.

“No problem! I’ll take real good care of them,” replied Samuel calmly.

“Okay then, let’s do it!”



**Show Image U5.L5.11:**  
**Everyone swinging in chair-o-planes**

They reached the chair-o-plane ride just as it had stopped. They found four chairs all in a row and seated themselves. They fastened the chain across the front of the seat and waited for the ride to begin.

Several minutes later they began to move through the air in perfect circles. Slowly they rose higher and higher into the air as fairground music began to play. Samuel and Jack looked at the children’s eager faces and smiled with content. *What are some synonyms for the word content? (happy, peaceful, satisfied)*

**DISCUSSING THE READ-ALoud (5 MIN.)**

1. **Literal.** Where do the characters go in today’s story?
  - » the fair, carnival.
2. **Evaluative.** What was the story mostly about?
  - » Most of the story was about convex and concave lenses.
3. **Evaluative.** What else did the characters talk about?
  - » Refraction, reflections, concave and convex mirrors, light, angles, translucent, opaque.
4. **Literal.** What is a lens?
  - » A lens is a curved piece of glass or plastic that focuses together or spreads apart rays of light.
5. **Evaluative.** What happens to light when it encounters a translucent object?
  - » Some light passes through; some is scattered.
6. **Evaluative.** Can you name some examples of translucent objects?
  - » Answers may vary, but may include stained glass, wax paper, loosely woven cloth, frosted glass, etc.



**ENGLISH  
LANGUAGE  
LEARNERS**

**Speaking and Listening**  
**Listening Actively**

**Beginning**

Ask yes and no questions, e.g., “Did the characters talk about refraction today?”

**Intermediate**

Ask students to retell what they remember when the characters were discussing specific ideas, e.g., “Can you tell me what Sam said about concave lenses?”

**Advanced/Advanced High**

Encourage students to use domain vocabulary and complete sentences when responding.

**ELPS 1.E; ELPS 2.C**

7. **Evaluative.** Look around the classroom and out the windows. What are some concave and convex objects you see? Think a minute, and then share with your partner. Then, we'll share out your ideas to the whole class.

» Answers may vary, but may include some of the following: concave—various containers, inside of spoons and bowls, maybe a satellite dish, etc. Convex—outside of domes, outside of spoons or bowls, school bus mirrors, magnifying glass, etc.

## Activity Page 5.2



Image Card  
C.U5.L5.1

### Refraction



### Support

Provide additional examples of cause and effect. Create a list of key words from the story and categorize them as cause, effect, or neither. Use the appropriate words from the list to complete the activity.

### Challenge

Have students create cause and effect charts for the convex and concave lenses discussed in the story, using illustrations and texts to explain the concepts.

## WRAP-UP: CAUSE AND EFFECT (5 MIN.)

### Cause and Effect

- Have students turn to Activity Page 5.2.
- Ask them if they recall the refraction activity that was demonstrated at the beginning of the lesson and also discussed in the story.
- Tell them that when an event happens, there is always a cause for that event or *why* it happened, and an effect of the event or *what* happened.
- Explain that they will describe the experiment in their Lab Notes by writing what the *cause* was of the light refracting in the glass of water and what the *effect* of that was.
- Display Image Card C.U5.L5.1 and/or the glass of water and straw from the beginning of the lesson.
- Do Activity Page 5.2 together as a class. Reread portions of the story if necessary.

## Lesson 5: Refraction and Lenses, Part 1

# Reading



**Primary Focus:** Students will ask and answer questions about the central idea and details in a text about refraction and lenses. **TEKS 3.2.A.vii; TEKS 3.9.D.i**

## INTRODUCING THE CHAPTER (10 MIN.)

- Make sure you and your students have a copy of the Student Reader.

**TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.9.D.i** Recognize characteristics and structures of informational text, including the central idea with supporting evidence.

- Note that this is a first read of *Refractions and Lenses*. Lesson 6 will be a close reading activity. The purpose of this first reading is to gain an overall understanding of the chapter, as it contains highly technical vocabulary and concepts.
- Remind students that during the story, they heard Samuel and Jack talk about refraction and lenses. What does refraction mean? (When a light wave suddenly changes speed, it changes the direction of the light wave and makes it look like it's bending.)
- Ask students to turn to the Table of Contents, locate the chapter, and then turn to the first page of the chapter.

### Previewing the Vocabulary

#### Academic Vocabulary

- The following are the vocabulary used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary at the back of the student reader.

**refract**, the appearance of light bending when it moves from one medium to another

**dense**, thick, heavy

**magnify**, to make something look larger or sound louder

**security**, protection from danger

| Vocabulary Chart for “ Refraction and Lenses” |                                 |                                  |
|-----------------------------------------------|---------------------------------|----------------------------------|
| Type                                          | Tier 3<br>Domain-Specific Words | Tier 2<br>General Academic Words |
| Vocabulary                                    | refract                         | dense<br>magnify<br>security     |
| Multiple Meaning                              |                                 |                                  |
|                                               |                                 |                                  |
| Sayings and Phrases                           |                                 |                                  |

## Chapter 4 Refraction and Lenses

In the previous chapters, you have been reading about how light travels. You already know that light travels at a very fast speed—faster than any machine made by humans.

You also know that light travels in a straight line, unless it runs into something in its way.

*When light hits a transparent object, it passes right through the object.*



*When light hits an opaque object, the light is absorbed and blocked so a shadow is made.*



*When light hits a smooth, shiny surface like a mirror, it is reflected.*



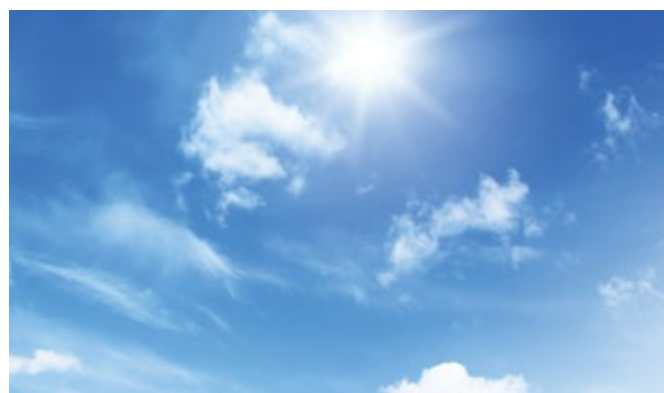
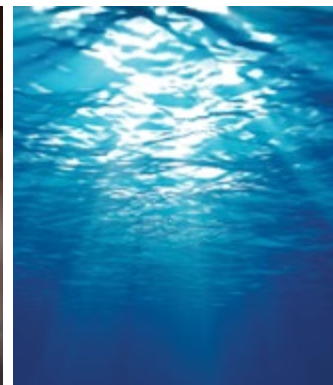
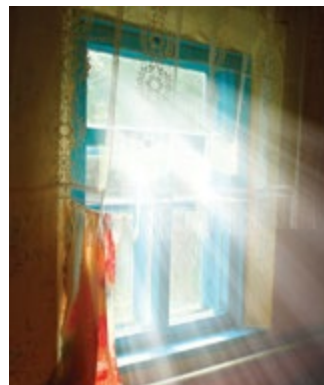
### WHOLE GROUP READING: “REFRACTION AND LENSES” (20 MIN.)

#### Pages 40–41

- Read the title of the chapter together as a class, “Refraction and Lenses.”
- Ask students to read **page 40** to themselves to review what happens to light when it encounters different types of objects along its path.
- Next, draw students’ attention to the images on **page 41** and read the captions together.
- When students have finished reading, ask different students to explain what happens when light hits a transparent, opaque, or shiny object. Encourage students to use the domain vocabulary that they have been learning in their response, e.g., *absorb*, *shadow*, *reflect*, etc.
  - » When light hits a transparent object, it passes right through the object. When light hits an opaque object, the light is absorbed and blocked so a shadow is made. When light hits a shiny object, it is reflected.



One of the things we haven't studied yet is what happens to the speed of light when it passes through something transparent. As fast as light is, when it passes through something transparent, it does slow down. So, when light passes through windows, water, and even air, it slows down. The **denser** or heavier something is, the slower light travels through it. For example, light travels more slowly through glass than it does through water or air. It travels more slowly through water than it does through air.



*Does light travel fastest through glass, water, or air?*

42

43

## Pages 42–43

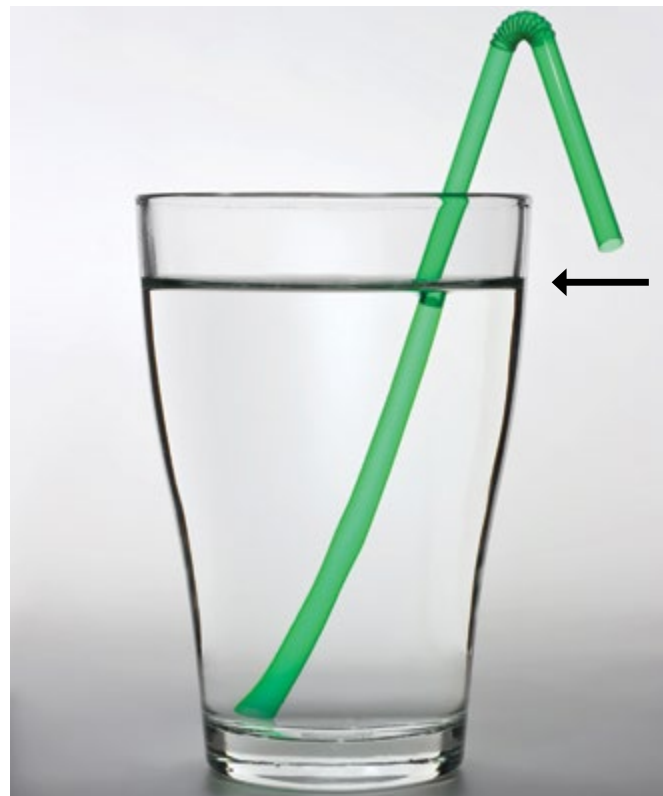
- Have students read **page 42** to themselves to find the answer to the question: “Does light always travel at the same speed?”
- When students have finished reading, restate the question and have students answer.
  - » No, light slows down when it goes through transparent objects that are dense or heavy.
- Ask, “Which is denser or heavier, a piece of glass or water?”
  - » glass
- Ask, “Through which of these two transparent materials, glass or water, will light travel faster?”
  - » water



- Ask, “Why?”
  - » Water is a liquid and is less dense than the glass, which is a solid.
- Ask, “Which is heavier or denser, water or air?”
  - » water
- Ask, “Through which of these two transparent materials, water or air, will light travel faster?”
  - » air
- Ask, “Why?”
  - » Air is a gas and is less dense than water, which is a liquid.

When light moves through one thing that is transparent to something different that is transparent, it changes speed. When light changes speed, the **angle** of the light rays change and appear to bend.

Take a straw and put it in a glass of water. Now, look at the straw where it enters the water. Can you see that it appears to be at a different **angle**? That is called **refraction**. It's caused by the slowing down of light as it moves from air to water. As the light enters the water, it changes **angle** direction because it slows down. It seems like magic, but it's really just how light travels—no trick.



*Why does the **angle** of the straw look different after it enters the water?*

## Pages 44–45

- Direct students' attention to the image on **page 45**. Read the caption together as a class or have a student read it to the class.
- Say to students, "I wonder why the straw looks bent. Let's read **page 44** to find out more."
- Ask students to read **page 44** to themselves to find out more about why the straw looks bent.
- When students have finished reading, restate the question and have students answer.
  - » When light moves from one thing that is transparent to something different, that is also transparent, it changes speed. When light changes speed, the angle of the light rays changes and light appears to bend.

- Ask, “How does the speed of light moving from air to water cause the straw to look bent?”
  - » Light slows down as it moves from air to water. As the light enters the water, it changes angle direction because it slows down.

You may be surprised to learn that there are many ways that we use light **refraction** every day. Do you or any of your classmates wear eyeglasses? The **lenses** in eyeglasses correct different kinds of vision problems by **refracting** light. Transparent glass or plastic **lenses** are made to **refract** light in different ways. Like mirrors, these **lenses** can be convex **lenses** or concave **lenses**.



*Lenses can be used to **refract** light to correct vision problems.*

46

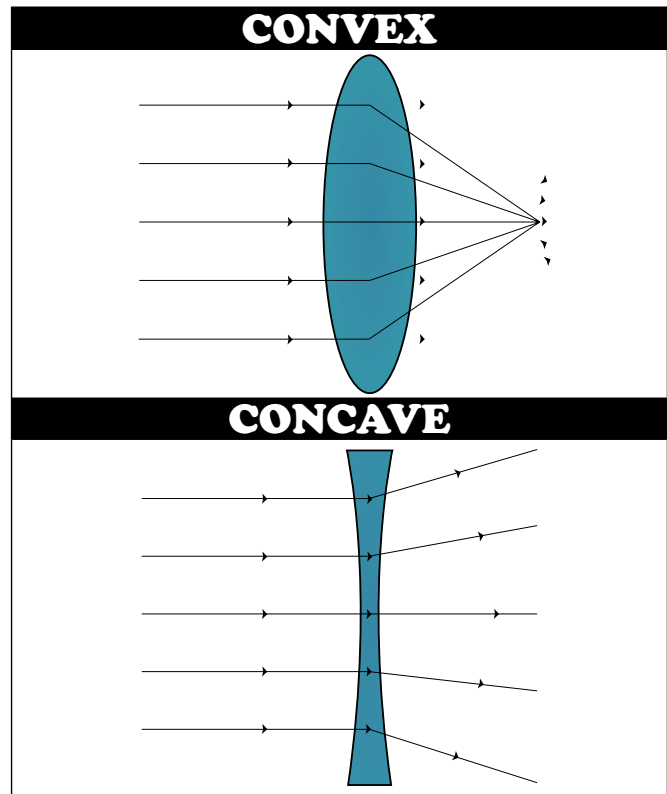
47

## Pages 46–47

- Draw students' attention to the image on **page 47** and read the caption.
- Ask students to read **page 46** to themselves to find out what eyeglasses have that helps to correct vision problems.
- When students have finished reading, restate the question and have students answer.
  - » Eyeglasses have lenses that refract light in different ways.

Remember that something convex curves outward. A convex **lens refracts** and bends light rays closer together. When you look through a convex **lens**, an object will look larger and closer. It looks **magnified** because the light rays are closer together.

A concave lens curves inward. A concave **lens refracts** and spreads light rays apart. If you look through a concave **lens**, an object will look smaller. It looks smaller because the light waves are spread apart.



Convex and concave **lenses** bend light in different directions. Do objects look larger or smaller through a convex **lens**? What about through a concave **lens**?

## Pages 48–49

- Ask students to read **pages 48** to themselves to find the answer to the question: “How do convex lenses change the way things look?”
- When students have finished reading, restate the question and have students answer.
  - » When you look through a convex lens, an object will look larger and closer. It looks magnified because the light rays are closer together.
- Ask, “How does a concave lens change the way things look?”
  - » A concave lens refracts and spreads light rays apart. If you look through a concave lens, an object will look smaller.

A **magnifying glass** is an example of a simple convex **lens**. If you hold and look at something closely through a magnifying glass, it will look larger. People use a **magnifying glass** to more clearly see the details of something small.



*A **magnifying glass** has a convex **lens** that makes small details appear larger if you hold the **magnifying glass** close to the object you are looking at.*

50

51

## Pages 50–51

- Ask students to read **page 50** to themselves to find the answer to the question: “How does a magnifying glass make things look different?”
- When students have finished reading, restate the question and have students answer.
  - » It is a convex lens and makes things look larger to show details better.
- Draw students’ attention to the images on **page 51** and read the caption with them.

Convex **lenses** are also found in scientific instruments. A scientist might look through a microscope with a convex **lens**. The **lens magnifies** very small things that cannot be seen with the naked eye.

Scientists study outer space with telescopes. Telescope **lenses** are also convex. They make the moon, stars, and planets look larger and closer so scientists can learn more about them.



*Scientists look through microscopes with a convex **lens** to see tiny things that are not visible to the naked eye, like these germs.*



*Scientists also use telescopes with convex **lenses** to study outer space.*

### Pages 52–53

- Have students read **pages 52–53** to themselves to find the answer the question: “How do scientists use convex lenses?”
- When students have finished reading, restate the question and have students answer.
  - » They use microscopes and telescopes, both of which make objects appear larger and/or closer.
- Draw students’ attention to the images on **page 53** and read the captions with them.

Concave **lenses** are also useful. Remember that concave **lenses** spread out light rays. Concave **lenses** are used in **security cameras** because they provide a wider view of a place.

Do you have a peephole in your door at home? If so, you may have a concave **lens**. In many homes and apartments, the peepholes of doors have two lenses, one of which is concave. The other lens is convex and magnifies the image made by the concave **lens**. The people looking in from the outside can barely see what's inside. (Remember, concave **lenses** make things look smaller.) However, if you are looking from the inside out, you can see who is standing in front of your door.



*Concave **lenses** that spread out light rays are useful for **security** purposes.*

## Pages 54–55

- Have students read **page 54** to themselves to find the answer to the question: “How are concave lenses used for security?”
- When students have finished reading, restate the question and have students answer.
  - » Security cameras provide a wider view of a place and a peephole in a door allows a person to see who is at the door before opening it.
- Ask, “Why are concave lenses used in peepholes?”
  - » Concave lenses spread out light rays and make items appear smaller so you can see more of the person outside your door.
- Draw students’ attention to the images on **page 55** and read the caption with them.



## Activity Page 5.3



### Support

Bring together a small group of students so you can assist them in completing the activity. Encourage students to complete as much as they can on their own, then work as a group on the more difficult areas such as the central idea and facts.

### Challenge

Students can research the answers to the questions they generated in the last section of Activity Page 5.3.

**ENGLISH  
LANGUAGE  
LEARNERS**



**Reading**  
Reading/Viewing Closely

### Beginning

Provide 1:1 support for students to complete Activity Page 5.3.

### Intermediate

Model for students how to find the key ideas and details in the text.

### Advanced/Advanced High

Provide support for students as needed.

**ELPS 4.E; ELPS 4.I**

## LAB NOTES (10 MIN.)

- Have students turn to Activity Page 5.3.
- Students will complete the activity independently.
- Tell students that they may use their Readers to find the information they need to complete the activity.
- Collect Activity Page 5.3 when complete.

## Lesson 5: Refraction and Lenses, Part 1

# Language



**Primary Focus:** Students will use suffixes *-y* and *-ly* correctly. **TEKS 3.3.C**

## MORPHOLOGY: SUFFIXES *-Y* AND *-A* (15 MIN.)

- Tell students that today, they will review two other suffixes they have learned in third grade, specifically *-y* and *-al*.
- Write the word *leak* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name its part of speech.
  - » A hole that lets something in or allows something to escape; noun.
- Add the suffix *-y* to *leak* and have students read the new word.
- Ask students what leaky means and what part of speech it is.
  - » Full of holes that let something in or allow something to escape; adjective.
- Ask students what adjectives are.
  - » Words that describe nouns.
- Follow the same procedures for the following words: *curl*, *salt*.
- Write the word *tradition* on the board.
- Ask students to read the word. Discuss its meaning and ask students to name its part of speech.
  - » A custom or belief handed down from one generation to the next; noun.
- Add the suffix *-al* to *tradition* and have students read the new word.



**TEKS 3.3.C** Identify the meaning of and use words with affixes such as *im-* (into), *non-*, *dis-*, *in-* (not, non), *pre-*, *-ness*, *-y*, and *-ful*.

- Ask students what traditional means and what part of speech it is.
  - » Related to a custom or belief handed down from one generation to the next; adjective.
- Follow the same procedures for the following words: *nutrition*, *coast*.
- Ask students to turn to Activity Page 5.4 and have them complete it independently.

End Lesson

# Take-Home Material

- Have students take home Activity Page 5.5 to complete at home.

## Activity Page 5.4



ENGLISH  
LANGUAGE  
LEARNERS

Language  
Modifying to Add Details

### Beginning

Provide 1:1 support for students to complete Activity Page 5.4.

### Intermediate

Provide additional examples of verbs and nouns and model adding *-y* and *-al* to create new words.

### Advanced/Advanced High

Have students brainstorm words that have *-y* and *-al* endings and describe how the original word changed.

**ELPS 2.C**

## Activity Page 5.5



| Spelling Assessment Analysis Chart |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Student Name                            |
|------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-----------------------------------------|
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1. scenic                               |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2. money                                |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 3. chimney                              |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4. centipede                            |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 5. chief                                |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 6. secret                               |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 7. stadium                              |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 8. increase                             |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 9. tedious                              |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 10. succeeded                           |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 11. fancy                               |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 12. enemy                               |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 13. degree                              |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 14. believe                             |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 15. athlete                             |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 16. grease                              |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 17. experience                          |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 18. chariot                             |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <b>Challenge Word:</b> <i>almost</i>    |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <b>Challenge Word:</b> <i>really</i>    |
|                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | <b>Content Word:</b> <i>electricity</i> |

## SPELLING ANALYSIS DIRECTIONS

### Unit 5, Lesson 5

- Students are likely to make the following errors
  - For 'y', students may write 'ey' or 'i'
  - For 'e', students may write 'ee', 'ea', or 'ie'
  - For 'ea', students may write 'ee'
  - For 'ee', students may write 'ea'
  - For 'ey', students may write 'y'
  - For 'e\_e', students may write 'ee' or 'ea'
- While any of the above student-error scenarios may occur, you should still be aware that misspellings may be due to many other factors. You may find it helpful to record the actual spelling errors that the student makes in the analysis chart. For example:
  - Is the student consistently making errors on specific vowels? Which ones?
  - Is the student consistently making errors at the end of the words?
  - Is the student consistently making errors on particular beginning consonants?
- Did the student write words for each feature correctly?
- Also, examine the dictated sentences for errors in capitalization and punctuation.

## 6

# Refraction and Lenses, Part 2

## PRIMARY FOCUS OF LESSON

### Reading

- Students will demonstrate comprehension of the text about refraction and lenses during a Close Reading activity. **TEKS 3.6.F; TEKS 3.6.I; TEKS 3.7.C; TEKS 3.9.D.ii**

### Writing

- Students will write for a specific task, reflecting on what they've learned from the reading about refraction and lenses. **TEKS 3.12.D**

### Language

- Students will demonstrate understanding of the domain words *opaque*, *translucent*, and *transparent*. **TEKS 3.7.F**
- Students will write words using spelling patterns and rules for words with the sound /æ/. **TEKS 3.2.B.i**

## FORMATIVE ASSESSMENT

### Activity Page 6.1

- Think-Write-Share** Write a letter reflecting on what has been learned from reading. **TEKS 3.12.D**

- TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.I** Monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.9.D.ii** Recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding; **TEKS 3.12.D** Compose correspondence such as thank you notes or letters; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; controlled syllables; and final stable syllables.

## LESSON AT A GLANCE

|                                                                        | Grouping    | Time    | Materials                                                                                                                                      |
|------------------------------------------------------------------------|-------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading (45 min.)                                                      |             |         |                                                                                                                                                |
| Close Reading Exercise                                                 | Partners    | 45 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> sticky notes (each student will need 8 sticky notes) |
| Writing (40 min.)                                                      |             |         |                                                                                                                                                |
| Think-Write-Share                                                      | Independent | 25 min. | <input type="checkbox"/> Activity Page 6.1                                                                                                     |
| Sharing                                                                | Partner     | 15 min. |                                                                                                                                                |
| Language (35 min.)                                                     |             |         |                                                                                                                                                |
| Word Work: <i>opaque</i> , <i>translucent</i> , and <i>transparent</i> | Whole Group | 5 min.  | <input type="checkbox"/> Individual Code Charts<br><input type="checkbox"/> Spelling Chart (Digital Projections)                               |
| Spelling                                                               | Whole Group | 30 min. |                                                                                                                                                |
| Take-Home Material                                                     |             |         |                                                                                                                                                |
| Take-Home Material                                                     |             |         | <input type="checkbox"/> Activity Page 6.2                                                                                                     |

## ADVANCE PREPARATION

### Reading

- Have enough sticky notes so that students will have eight each.

### Spelling

- On chart paper, prepare the following chart of digital Projection DP.U5.L6.1.

| 'ay' > /æ/ | 'ai' > /æ/ | 'ea' > /æ/ |
|------------|------------|------------|
|            |            |            |
|            |            |            |
|            |            |            |
|            |            |            |
|            |            |            |

### Universal Access

- The Close Reading activity allows students to take a closer look at previously read text.
- Create work partners strategically in advance of the Close Reading lesson.

Start Lesson

## Lesson 6: Refraction and Lenses, Part 2

# Reading



**Primary Focus:** Students will demonstrate comprehension of the text about refraction and lenses during a Close Reading activity.



**TEKS 3.6.F; TEKS 3.6.I; TEKS 3.7.C; TEKS 3.9.D.ii**



### CLOSE READING EXERCISE (45 MIN.)

**TEKS 3.6.I**

- The practice of close reading involves directing students' attention to specific aspects of a text. The guided reading supports in the close reading of "Refraction and Lenses" are intended to provide this focus and are labeled as follows:



**TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.I** Monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.9.D.ii** recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding.

- **VOC** indicates questions or comments that focus on vocabulary to explain meanings or check student understanding and may highlight multiple-meaning words or idioms.
  - **SYN** indicates questions or comments that focus on syntax to explain complex sentences and syntactic structure.
  - **COMP** indicates questions or comments that focus on students' understanding of the text. These questions require text-based responses and are sequenced to build a gradual understanding of key details of the text. Students may provide multiple responses using different pieces of evidence, grounding inferences logically in the text.
  - **LIT** indicates questions or comments that focus on literary devices, which are techniques an author uses to produce a specific effect, such as alliteration, similes, metaphors, etc.
- Not all question types will be included in each close reading lesson. These labels and their explanations are for your reference and are not intended to be shared with students.
  - For this Close Reading lesson, students will be working in pairs to discuss and answer questions.
  - Make sure you and your students have a copy of *Adventures in Light and Sound*.
  - Divide the students into pairs.
  - Pass out several sticky notes to each pair.
  - Following each question, have students consult with their partner before one student responds.
  - Have students turn to Chapter 4, "Refractions and Lenses."



## Chapter 4 Refraction and Lenses

In the previous chapters, you have been reading about how light travels. You already know that light travels at a very fast speed—faster than any machine made by humans.

You also know that light travels in a straight line, unless it runs into something in its way.

*When light hits a transparent object, it passes right through the object.*



*When light hits an opaque object, the light is absorbed and blocked so a shadow is made.*



*When light hits a smooth, shiny surface like a mirror, it is reflected.*



### Support

Remind students of the types of text features they learned about during the Animal Classification unit.

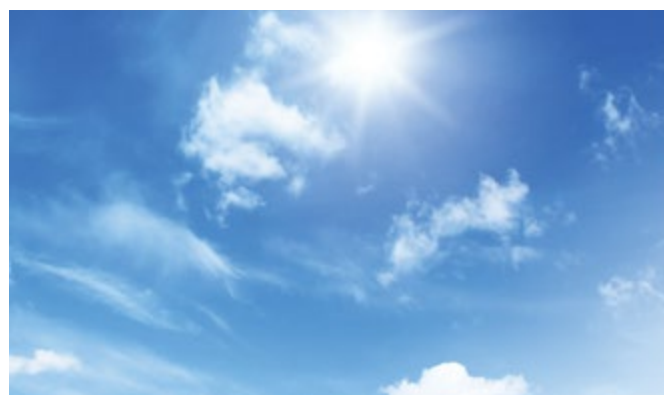
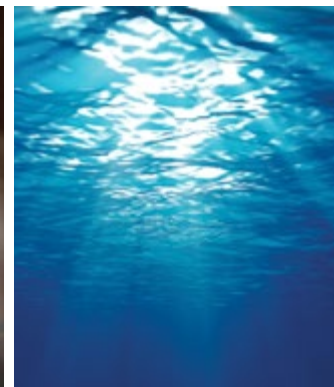
Have them list them.

- Circulate to make sure students are putting the correct information on the sticky note. If they are having difficulty, have them reread the captions and retell them in their own words.

### Pages 40–41

- Have a student read **page 40** aloud.
- Have students look at **page 41**.
  1. **COMP Literal**. What text features did the author use on this page?
- Write the text features on your first sticky note.
  - » photos and captions
- Write one word or two words that summarize each of the captions.
  - » transparent passes through; opaque absorbs and blocks, makes shadow; shiny reflects
- Ask some students to share their answers. Have students add to or make corrections on their sticky notes, if necessary.

One of the things we haven't studied yet is what happens to the speed of light when it passes through something transparent. As fast as light is, when it passes through something transparent, it does slow down. So, when light passes through windows, water, and even air, it slows down. The **denser** or heavier something is, the slower light travels through it. For example, light travels more slowly through glass than it does through water or air. It travels more slowly through water than it does through air.



*Does light travel fastest through glass, water, or air?*

42

43

## Pages 42–43

- Read **page 42** aloud, telling students to listen for key words. Have them write key words on their sticky notes. (*speed of light, transparent, slows, denser*).
- 1. **VOC Literal.** What does it mean if something is transparent?
  - » It is clear; you can see through it.
- 2. **COMP Literal.** What objects does the author name that are transparent?
  - » windows, water, air
- 3. **SYN Evaluative.** Why does the author start the sentence “As fast as light is . . .”?
  - » The author is making a point that light is fast, but it can be slowed down.
- 4. **VOC Literal.** How did the author help you to know what *denser* means?
  - » The author used the words “or heavier” in the sentence.
- 5. **COMP Inferential.** Does light ever speed up when it hits an object?
  - » no



**ENGLISH  
LANGUAGE  
LEARNERS**

**Reading**  
Reading/Viewing Closely

### Beginning

Provide sentence starters for questions. For example, “If something is clear, it is called \_\_\_\_\_.”

### Intermediate

Have students confirm their answers with their partners.

### Advanced/Advanced High

Provide students with support if needed.

**ELPS 4.C**

### Challenge

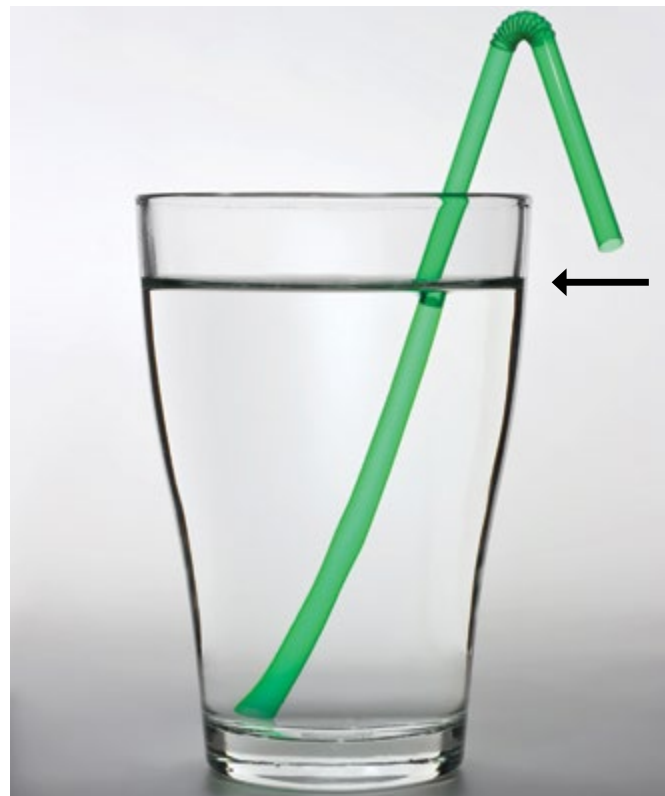
Make a list of transparent substances and rank them in order of their density, from least dense to most dense.

Where can you find evidence to support your answer?

- » “As fast as light is, when it passes through something transparent, it does slow down.”

When light moves through one thing that is transparent to something different that is transparent, it changes speed. When light changes speed, the **angle** of the light rays change and appear to bend.

Take a straw and put it in a glass of water. Now, look at the straw where it enters the water. Can you see that it appears to be at a different **angle**? That is called **refraction**. It's caused by the slowing down of light as it moves from air to water. As the light enters the water, it changes **angle** direction because it slows down. It seems like magic, but it's really just how light travels—no trick.



*Why does the **angle** of the straw look different after it enters the water?*

44

45

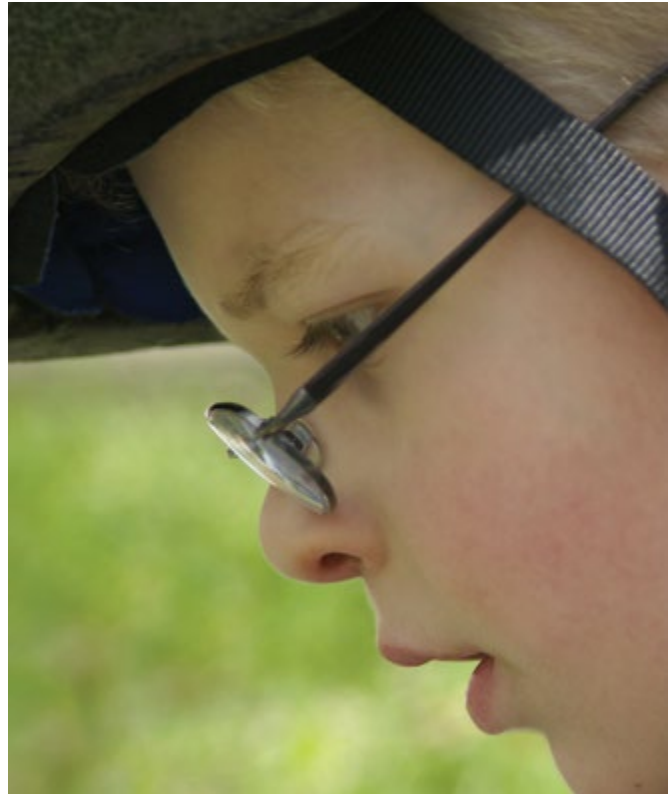
## Pages 44–45

- Have a student read the first paragraph on **page 44** aloud.
  1. **COMP Literal.** When light moves through something that is transparent and then moves through something else that is transparent, it \_\_\_\_?
    - » changes speed
  2. **COMP Literal.** And when light changes speed, it also changes its \_\_\_\_?
    - » angle
- Have students write the word *refraction* on the top of the sticky note.
- Read the second paragraph on **page 44** aloud.
- Have students skim back through the paragraph and find the key words that have to do with refraction. Have students share their words. (*transparent, speed, angle, bend*)
- 3. **COMP Literal.** On your sticky note, write your own definition for refraction using the key words.
- Have some students share their definitions.

## Support

Reread the second paragraph aloud, sentence by sentence, asking if there are any important words in each sentence. Keep a list of the words found in each sentence. Sort through the list to determine which are the most important to put on the sticky notes.

You may be surprised to learn that there are many ways that we use light **refraction** every day. Do you or any of your classmates wear eyeglasses? The **lenses** in eyeglasses correct different kinds of vision problems by **refracting** light. Transparent glass or plastic **lenses** are made to **refract** light in different ways. Like mirrors, these **lenses** can be convex **lenses** or concave **lenses**.



*Lenses can be used to **refract** light to correct vision problems.*

46

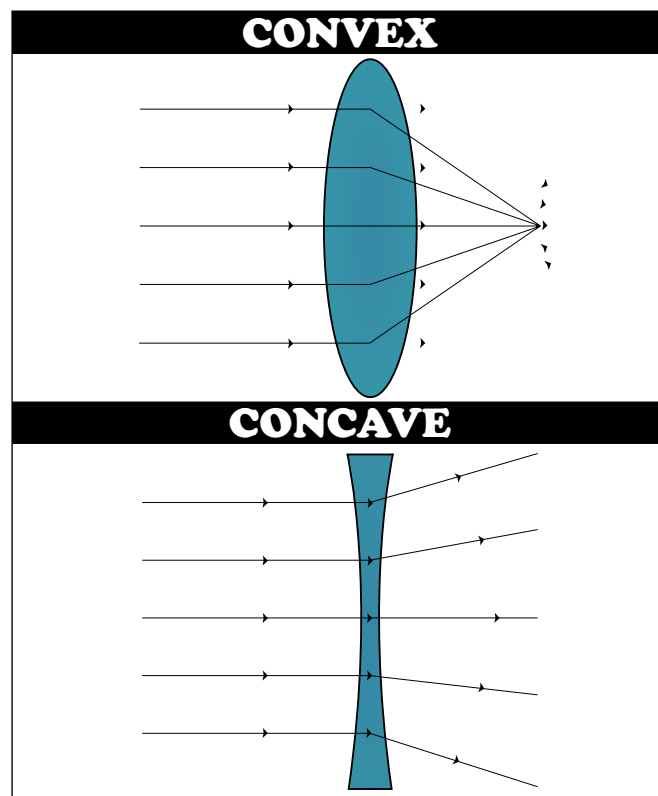
47

### Pages 46–47

- Ask students to read **page 46** to themselves. Have them write the heading “Eyeglasses” on the top of their sticky note.
- Have students write all the words associated with eyeglasses under their heading.
  - » *lenses, refraction, concave, and convex*
- 1. **COMP Inferential.** The author states that eyeglasses help correct vision problems. What would happen if the eyeglasses did not have convex or concave lenses?
  - » The lenses would not refract light at different angles, so they would not help to correct vision problems.

Remember that something convex curves outward. A convex **lens refracts** and bends light rays closer together. When you look through a convex **lens**, an object will look larger and closer. It looks **magnified** because the light rays are closer together.

A concave lens curves inward. A concave **lens refracts** and spreads light rays apart. If you look through a concave **lens**, an object will look smaller. It looks smaller because the light waves are spread apart.



Convex and concave **lenses** bend light in different directions. Do objects look larger or smaller through a convex **lens**? What about through a concave **lens**?

48

49

## Pages 48–49

- Have a student read the first paragraph on **page 48** aloud.
- On a sticky note, have students write the word *convex*.
  1. **VOC: Literal.** What word in the first paragraph explains the word *magnified*?
    - » *larger*
  2. **COMP Literal.** Why does an image look magnified when a person is looking through a convex lens?
    - » The light rays are closer together.
- Have students write the word *concave* on another sticky note.
  3. **COMP Literal.** What happens when light shines through a concave lens?
    - » The light rays are spread apart.
  4. **COMP Inferential.** Imagine you are looking at your pencil through a concave lens. What will the image look like?
    - » The pencil will look smaller.

## Challenge

Have students create their own diagrams of how light behaves when it goes through convex or concave lenses and label each part of the process using academic vocabulary words.

On your sticky notes, write words that will help you remember how images will appear through a concave and a convex lens and why.

- » Convex: rays are closer together and image is magnified; concave: rays are spread apart and image looks smaller.

5. **COMP Evaluative.** Do the diagrams on **page 49** help you to understand how light travels through different lenses? Why or why not?

A **magnifying glass** is an example of a simple convex **lens**. If you hold and look at something closely through a magnifying glass, it will look larger. People use a **magnifying glass** to more clearly see the details of something small.



*A **magnifying glass** has a convex **lens** that makes small details appear larger if you hold the **magnifying glass** close to the object you are looking at.*

## Pages 50–51

- Ask students to read **page 51** to themselves.
- Ask students to brainstorm different people who may use a magnifying glass in their jobs and list them on a sticky note. Have student pairs share their lists.



Convex **lenses** are also found in scientific instruments. A scientist might look through a microscope with a convex **lens**. The **lens magnifies** very small things that cannot be seen with the naked eye.

Scientists study outer space with telescopes. Telescope **lenses** are also convex. They make the moon, stars, and planets look larger and closer so scientists can learn more about them.



Scientists look through microscopes with a convex **lens** to see tiny things that are not visible to the naked eye, like these germs.



Scientists also use telescopes with convex **lenses** to study outer space.

52

53

## Support

Have students give examples of things they can see with the naked eye and things they can't see with the naked eye.

- » Some things can't be seen because they are too small, like germs, and some things can't be seen because they are too far away, like planets.

## Pages 52–53

- Have a student read the first paragraph on **page 52** aloud.

1. **VOC Inferential.** What does the phrase “naked eye” mean? **TEKS 3.6.F**
    - » It means without the help of instruments that magnify.
  2. **VOC Evaluative.** The word *microscope* comes from two ancient Greek words: *micro*, meaning “small,” and *scope*, meaning “to see or to look.” Do you think that it's a good word to describe the instrument? Why or why not? Use evidence from the text to support your answer.
- Read the second paragraph on **page 52** aloud.
  - 3. **VOC Evaluative.** The Greek word *tele* means “far off.” Do you think the word *telescope* is a good word to describe an instrument that helps to see the moon, stars, and planets? Why or why not?

Concave **lenses** are also useful. Remember that concave **lenses** spread out light rays. Concave **lenses** are used in **security cameras** because they provide a wider view of a place.

Do you have a peephole in your door at home? If so, you may have a concave **lens**. In many homes and apartments, the peepholes of doors have two lenses, one of which is concave. The other lens is convex and magnifies the image made by the concave **lens**. The people looking in from the outside can barely see what's inside. (Remember, concave **lenses** make things look smaller.) However, if you are looking from the inside out, you can see who is standing in front of your door.



*Concave **lenses** that spread out light rays are useful for **security** purposes.*

## Pages 54–55

- Have a student read **page 54** aloud.
  - Have students read the second paragraph on **page 54** aloud with their partner.
  - On a sticky note, have students draw a diagram of how the peephole with both the convex and concave lenses would work. They may use the diagram on **page 55** as a reference.
1. **COMP Literal.** Have students share their diagrams with the class and explain how the peephole works.

## Challenge

Students can research how different cameras work, such as security cameras, movie cameras, and tiny spy cameras.

## Support

Create small groups of students, according to their specific needs. Break text into smaller sections (paragraphs or sentences) and work with them to improve their comprehension.

## Activity Page 6.1



ENGLISH  
LANGUAGE  
LEARNERS



Writing  
Supporting Opinions

### Beginning

Provide 1:1 support for students to write in each section of the activity page, taking dictation if needed.

### Intermediate

Allow students to work with a partner to complete the activity pages.

### Advanced/Advanced High

Encourage students to use domain vocabulary and write in complete sentences where applicable.

**ELPS 1.E; ELPS 5.B**

## Challenge

Students can research the answers to the questions they generated in the last section of Activity Page 6.1.

## Lesson 6: Refraction and Lenses, Part 2

# Writing



**Primary Focus:** Students will write for a specific task, reflecting on what they've learned from the reading about refraction and lenses. **TEKS 3.12.D**

### THINK-WRITE-SHARE (25 MIN.)

**TEKS 3.12.D**

- Have students turn to Activity Page 6.1.
- Explain that they will be writing a letter to their partner explaining what they learned in the chapter and what they still need help understanding.
- Explain the categories on Activity Page 6.1. Tell students to think carefully about each category before they write.
- Tell students that they may use their Readers and information from their sticky notes for their letter.

### SHARING (15 MIN.)

- After they have completed the letter, they will exchange letters with their partner. Each partner will read the other's letter and try to answer the question at the end.
- Collect Activity Page 6.1 when complete.

## Lesson 6: Refraction and Lenses, Part 2

# Language



**Primary Focus:** Students will demonstrate understanding of the domain words *opaque*, *translucent*, and *transparent*. **TEKS 3.7.F**

Students will write words using spelling patterns and rules for words with the sound /æ/. **TEKS 3.2.B.i**

**TEKS 3.12.D** Compose correspondence such as thank you notes or letters; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

## WORD WORK: OPAQUE, TRANSLUCENT, AND TRANSPARENT (5 MIN.)



ENGLISH  
LANGUAGE  
LEARNERS

Language  
Exchanging Information  
and Ideas

### Beginning

Show images and/or actual objects when asking simple yes or no questions; for example, “Is a window opaque?”

### Intermediate

Ask students simple yes or no questions; for example, “Is a window opaque?”

### Advanced/Advanced High

Ask students to explain how they know if they are correct; for example, “How do you know a window is not opaque?”

**ELPS 1.E; ELPS 3.D**

1. In the Read-Aloud and the reading you heard, “Objects that most light can pass through, such as eyeglasses or a window, are called *transparent*; objects that let a little bit of light pass through, such as some liquids or stained glass, are called *translucent*. Objects that light cannot pass through, such as a tackle box or Jack’s hat, are called *opaque*.”
  2. Say the words *opaque*, *translucent*, and *transparent* with me.
  3. If something is opaque, it prevents light from shining through, which makes it impossible to see through it. If something is translucent, it lets some light pass through, which makes a blurry image. If something is transparent, it allows most light to shine through, making it possible to see a clear image through it.
  4. Mark could not see anything through the opaque magazine, but he could see many things through the transparent window; he could also see blurry trees and light through the thin, translucent curtains.
  5. Have you ever seen something that was opaque, something that was translucent, or something that was transparent? What were they? Be sure to use the words *opaque*, *translucent*, and *transparent* when you describe them.
    - Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “I saw an opaque \_\_\_\_\_” or “The \_\_\_\_\_ was translucent” or “\_\_\_\_\_ was transparent because \_\_\_\_\_.”
  6. What are the words we’ve been talking about? What part of speech are the words *opaque*, *translucent*, and *transparent*? (adjective)
    - Use a Making Choices activity for follow-up. Tell students that the words *opaque* and *transparent* are antonyms because they have opposite meanings. *Translucent* has a meaning in between *opaque* and *transparent*. Directions: Say, “I am going to name several things. If the object I name is opaque, say, ‘That is opaque.’ If the object I name is translucent, say, ‘That is translucent.’ If the object I name is transparent, say, ‘That is transparent.’”
1. A brick wall
    - » That is opaque.
  2. A clear window
    - » That is transparent.
  3. A piece of waxed paper
    - » That is translucent.

4. An eyeglass lens
  - » That is transparent.
5. A cardboard box
  - » That is opaque.
6. Fog
  - » That is translucent.

### SPELLING (30 MIN.)

- Tell students that this week they will review spellings of /æ/.
- As you introduce each of the spelling words, write it on the board, pronouncing it as you write it.
- Go back through the list of words, having students read the words and tell you which vowels to circle for the sound /æ/.

|                |                               |
|----------------|-------------------------------|
| 1. subway      | 12. obtain                    |
| 2. payment     | 13. breaker                   |
| 3. awaited     | 14. betrayer                  |
| 4. ballplayers | 15. beefsteak                 |
| 5. yesterday   | 16. dainty                    |
| 6. crayons     | 17. trainees                  |
| 7. explain     | 18. giveaway                  |
| 8. mermaid     | <b>Challenge Word:</b> family |
| 9. great       | <b>Challenge Word:</b> young  |
| 10. daydreams  | <b>Content Word:</b> straight |
| 11. daisies    |                               |

- Point to the Challenge Words on the board. Use the Challenge Words in sentences as examples for students: “My family enjoys watching movies together.” “We have a young puppy that is not trained yet.”
- Tell students that the Content Word, *straight*, does not follow the spelling patterns for this week, though the ‘aigh’ is pronounced /æ/. *Straight* is a content-related word defined as “without a bend or a curve” and describes light moving in straight lines.
- Refer to the previously prepared table or display Digital Projection DP.U5.L6.1.

## ➤ Projection DP.U5.L6.1

| 'ay' > /æ/ | 'ai' > /æ/ | 'ea' > /æ/ |
|------------|------------|------------|
|            |            |            |
|            |            |            |
|            |            |            |
|            |            |            |
|            |            |            |

- Ask students to refer to the spelling alternatives for /æ/ on the Individual Code Chart page 3. Point out that there are many spellings for /æ/ and ask students to name the different letters used to represent the word.
- Ask students to tell you which words to list under the 'ay' > /æ/ header, the 'ai' > /æ/ header, and the 'ea' > /æ/ header. Briefly explain the meaning of each word.

| 'ay' > /æ/                    | 'ai' > /æ/                   | 'ea' > /æ/                    |
|-------------------------------|------------------------------|-------------------------------|
| subway                        | awaited                      | great                         |
| payment                       | explain                      | breaker                       |
| ballplayers                   | mermaid                      | beefsteak                     |
| yesterday                     | daisies                      |                               |
| crayons                       | obtain                       |                               |
| daydreams                     | dainty                       |                               |
| betrayed                      |                              |                               |
| giveaway                      |                              |                               |
| <b>Challenge Word:</b> family | <b>Challenge Word:</b> young | <b>Content Word:</b> straight |

- Ask students to look at the Individual Code Chart for all of the different spellings for /æ/.

- Ask students, “Of the seven spellings, which is used most frequently?” (‘a’) Remind students to look at the power bar under the spellings and the order in which they are sequenced to determine frequency.
- Ask students to locate the three spellings for /æ/ in this week’s spelling words and determine whether they are frequently used spellings or not.
- Practice the words as follows during the remaining time: Call on a student to read any word on the chart. Then have the student orally use the word in a meaningful sentence. After the student says the sentence, have them ask the class: “Does that sentence make sense?” If the class says yes, then the student puts a check mark in front of the word and calls on another student to come to the front and take a turn. If the class says no, have the student try again or call on another student to come to the front and use the word in a meaningful sentence. This continues until all the words are used or time has run out.

## Lesson 6: Refraction and Lenses, Part 2

# Take-Home Material

- Tell students they will take home Activity Page 6.2 with this week's spelling words to share with a family member.

Activity Page 6.2





## 7

# What Is Color?

## PRIMARY FOCUS OF LESSON

### Reading

Students will find key ideas and details about light and color by reading the

✦ text. **TEKS 3.2.A.vii; TEKS 3.6.G; TEKS 3.7.E**

### Writing

Students will synthesize what they have learned about light and color through research and hands-on activities to write a summary demonstrating

✦ understanding of key concepts and vocabulary. **TEKS 3.6.H; TEKS 3.13.B; TEKS 3.13.E**

### Speaking and Listening

Students will listen to the story “What Is Color?” and answer questions based

✦ on content and vocabulary in the text. **TEKS 3.1.A; TEKS 3.6.F; TEKS 3.7.C**

✦ Students will demonstrate knowledge of spelling compound words. **TEKS 3.2.B.iii**

### Language

Students will use the meaning of suffixes *-ous* and *-ly* to write words and

✦ sentences. **TEKS 3.3.C**

## FORMATIVE ASSESSMENT

### Activity Page 7.1

✦ **Lab Notes—White Light Research** Find key ideas and details from reading. **TEKS 3.6.G**

### Activity Page 7.3

✦ **Lab Notes—Research Summary** Briefly research color and light and write a summary.

✦ **TEKS 3.6.H; TEKS 3.13.E**

### Activity Pages 7.4–7.7

✦ **Suffixes *-ous* and *-ly*** Add *-ous* and *-ly* to words to change the meaning of words. **TEKS 3.3.C**

✦ **TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating; **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.2.B.iii** Demonstrate and apply spelling knowledge by: spelling compound words, contractions, and abbreviations; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

## LESSON AT A GLANCE

|                                             | Grouping    | Time    | Materials                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------|-------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading (45 min.)                           |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Introducing the Chapter                     | Whole Group | 5 min.  | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Activity Pages 7.1, 7.2<br><input type="checkbox"/> white paper<br><input type="checkbox"/> sunlight<br><input type="checkbox"/> strong flashlights or projector<br><input type="checkbox"/> prisms (one for each pair of students)<br><input type="checkbox"/> large, round container of water<br><input type="checkbox"/> two pieces of cardboard<br><input type="checkbox"/> colored pencils or crayons |
| Previewing the Vocabulary                   | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Independent Reading: “Color and Light”      | Independent | 20 min. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Experiment 1                                | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Experiment 2                                | Partner     | 10 min. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Writing (20 min.)                           |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| What Is White Light?                        | Independent | 20 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Activity Pages 7.1, 7.2, 7.3, 7.3a                                                                                                                                                                                                                                                                                                                                                                         |
| Speaking and Listening (30 min.)            |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Introducing the Read-Aloud                  | Whole Group | 5 min.  | <input type="checkbox"/> Digital Flip Book: U5.L7.1– U5.L7.8<br><input type="checkbox"/> Image Cards C.U5.L.7.1–C.U5.L.7.4                                                                                                                                                                                                                                                                                                                                                                           |
| Presenting the Read-Aloud: “What is Color?” | Whole Group | 15 min. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Discussing the Read-Aloud                   | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Word Work: <i>Spectrum</i>                  | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Language (25 min.)                          |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Morphology : Suffixes -ous and -ly          | Whole Group | 15 min. | <input type="checkbox"/> Activity Pages 7.4–7.8<br><input type="checkbox"/> Morphology (Digital Projections)                                                                                                                                                                                                                                                                                                                                                                                         |
| Spelling                                    | Independent | 10 min. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Take Home Material                          |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Color and Light                             |             |         | <input type="checkbox"/> Activity Pages 7.9, 7.10                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Grammar: Build Sentences                    |             |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## ADVANCE PREPARATION

### Reading

- Prepare a large, round, clear container of water (like a fishbowl).
- Cut a small hole in the middle of one piece of cardboard. Tape the cardboard to the flashlight or projector so that only a small hole of light shines through.
- Cut a larger hole (about the size of a fist) in the middle of the second piece of cardboard.
- Have enough prisms and flashlights for each pair of students. Alternately, if only one prism is available, the teacher can conduct Experiment 2 while students observe and take notes.
- Have white paper, one sheet for each student pair.
- Prepare projector or other strong light source

### Speaking and Listening

- Identify the following digital images on the program's digital components site to project during the Read-Aloud: U5.L7.1–U5.L7.8.

### Language

#### Morphology

- On chart paper, write the following sentences or prepare Digital Projection DP.U5.L7.1.
  - The boy is filled with joy.
  - The boy sang with a joyous voice.
  - The boy joyously sang the song.
  - The large waves in the sea are full of danger.
  - The large waves in the sea are dangerous.
  - The large waves crashed dangerously on the beach.

#### Universal Access

- Ask students if they have any questions or need clarification from the previous lessons.
- Review vocabulary and key information from the previous lesson.
- Display Image Cards for today's lessons. Have students generate questions about them.

## Lesson 7: What Is Color?

## Reading



**Primary Focus:** Students will find key ideas and details about light and color by reading the text. **TEKS 3.2.A.vii; TEKS 3.6.G; TEKS 3.7.E**

### INTRODUCING THE CHAPTER (5 MIN.) **TEKS 3.6.G; TEKS 3.7.E**

- Make sure you and your students have a copy of *Adventures in Light and Sound*.
- Tell students that the title of today's chapter (Chapter 5) is "Color and Light."
- Ask students to turn to the Table of Contents, locate the chapter, and then turn to the first page of the chapter.
- Tell students that they will be reading the chapter silently to themselves and taking notes on key points on each page.
- Have students turn to Activity Page 7.1. Explain that they will take notes on each set of pages. Tell them to make sure they pay attention to any text features like photos and captions and any diagrams they may see.

### PREVIEWING THE VOCABULARY (5 MIN.)

#### Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the student reader.

**prism**, a wedge-shaped piece of transparent glass that breaks up light into all the colors of the spectrum

**spectrum**, the distribution of all the colors that make up the light we see

**indigo**, a dark purplish-blue color

**ultraviolet**, describes short, invisible light waves, beyond violet on the spectrum, that cause sunburn

**infrared**, describes long light waves, beyond red on the spectrum, that can be seen only with special instruments

**TEKS 3.2.A.vii** Demonstrate and apply phonetic knowledge by identifying and reading high-frequency words from a research-based list; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating;

### Activity Page 7.1



## Support

Pull a small group together to read the chapter aloud, and assist them in finding the key ideas from each page to record on Activity Page 7.1.

### ENGLISH LANGUAGE LEARNERS



Reading  
Reading/Viewing Closely

#### Beginning

Read the chapter aloud to students, pausing at key points and asking students if they can find key words to record.

#### Intermediate

Have students read and record notes with a partner.

#### Advanced/Advanced High

Have students read independently and share notes with a partner.

**ELPS 4.F; ELPS 4.G**

### Vocabulary Chart for “Color and Light”

| Type                | Tier 3<br>Domain-Specific Words     | Tier 2<br>General Academic Words |
|---------------------|-------------------------------------|----------------------------------|
| Vocabulary          | spectrum<br>ultraviolet<br>infrared | prism<br>indigo                  |
| Multiple Meaning    |                                     |                                  |
| Sayings and Phrases |                                     |                                  |

- Remind students that if they do not recall what a word means, they may look it up in the glossary.

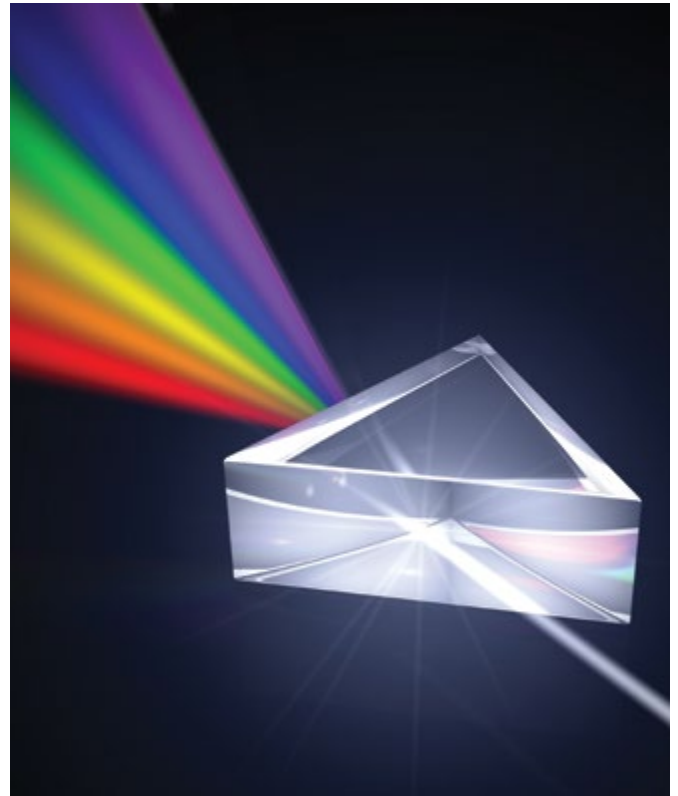
### INDEPENDENT READING: “COLOR AND LIGHT” (20 MIN.)

- Before the students begin reading, take a few moments to look through the chapter, looking at images and captions.
- Tell students that later in the lesson they will be conducting experiments, but right now they are conducting research and recording information in their Activity Page 7.1 Lab Notes like real scientists do. The notes they take will help them make predictions and understand the results from their experiments.
- As students read silently, circulate around the room, giving assistance if needed.
  - Alternately, have students work in pairs, reading the text silently but discussing the key points before they record them on Activity Page 7.1.

# 5 Color and Light

Do you remember what color sunlight is? Hopefully, you didn't say, no color! You learned that sunlight is white light. You also learned that instead of being "no color," white light is made up of all the colors of the rainbow. Remember, the sun looks yellow because it gives off more yellow light than it does the other colors.

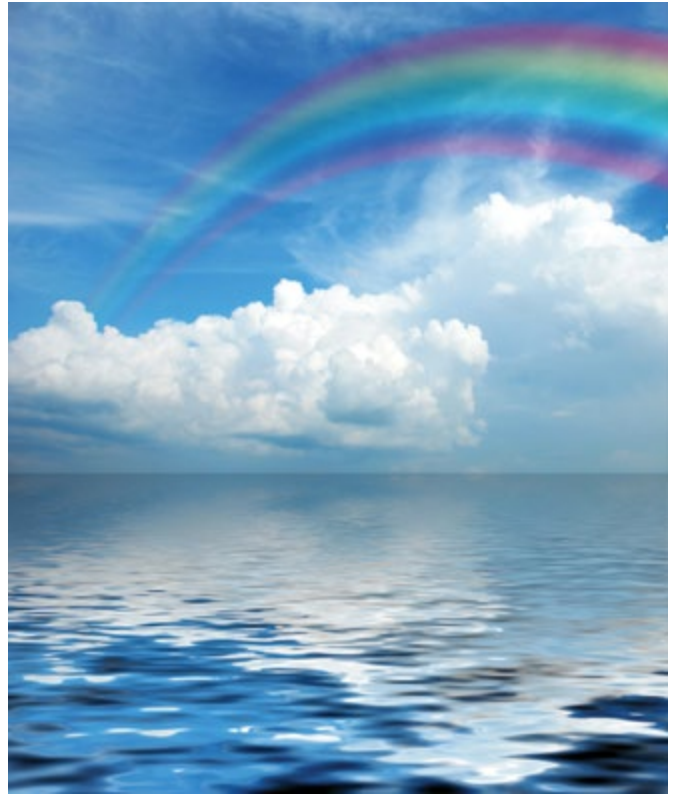
You can prove that white light is really many colors if you have a wedge-shaped piece of transparent glass called a **prism**. If you hold a **prism** near a sunny window, light will shine through and make a rainbow-like band of colors. This shows that white light is really made up of all colors.



*A **prism** refracts white light into all of the colors of a rainbow.*

Do you remember what you learned about refraction? What happens to light when it passes through something transparent like glass? The light slows down and changes its path. A **prism** has a special shape that refracts white light into all of the colors of the rainbow.

Have you ever seen a rainbow in the sky when the sun comes out after it rains? Raindrops in the sky refract the light, just like a **prism**. This is what creates the rainbow.



*A rainbow occurs when raindrops refract sunlight into all of the colors of visible light.*

When white light is refracted, it often separates into a combination of colors called the **spectrum**. The colors in the **spectrum** always appear in the same order: red, orange, yellow, green, blue, **indigo**, and violet. These colors are part of the visible light **spectrum**. They are the light waves that humans can see. The colors of visible light are a result of differences in wavelength. Red light has long wavelengths and violet light has short wavelengths.

You can remember the names of the colors in the visible light **spectrum** in the right order if you can remember this funny name: “Roy G. Biv.” Each letter in that name stands for a color in the rainbow. Say it out loud. Try to remember it!



*You can remember the order of the colors in the visible light **spectrum** if you remember “Roy G. Biv.”*



Did you know that the color of any object depends on what light wavelengths it reflects? Different objects absorb light wavelengths of some colors, but reflect others. This is what creates color.

Blue jeans appear blue because something in the **material** reflects blue light and absorbs all of the other light colors. Do you see anyone in your class today wearing a red sweater? The sweater appears red because something in the **material** reflects red light and absorbs all of the other light.

What about things that appear to be white? They look white because the object reflects all of the white light wavelengths and doesn't absorb any light. Can you guess why something looks black? Things that appear black do not reflect any light. They absorb all of the light wavelengths.



*Can you explain why each thing appears to be the color it is?*

Remember that the colors we see are from light of specific wavelengths. But, there is much more to light than just the wavelengths we can see. In fact, visible light is only a small part of the energy waves that come from sunlight.

For example, on the shorter wavelength end of the light **spectrum**, there are invisible **ultraviolet** light waves that cause sunburn. X-rays are even shorter wavelengths of light. We can't see these light x-rays but they can travel through the human body. You learned in *How Does Your Body Work?* that x-rays are used to create black and white photos of what's inside the body. Do you know of any other ways that x-rays are used?



*We can't see x-ray wavelengths but these light waves can pass through your hand and create an image of your bones on special x-ray film.*

Another type of invisible light is **infrared** waves. The wavelengths of **infrared** light are longer than those of red light. These are the type of light waves that you use when you click on the **remote control** to change television channels!



*Certain wavelengths of light are invisible. We can't see the **infrared** light from a **remote control** but we can see its effect when a channel is changed.*



## EXPERIMENT 1 (5 MIN.)

TEKS 3.7.E

- The teacher will conduct Experiment 1 while the students observe and take notes.
- Have students turn to Activity Page 7.2. Explain that you will be doing the first experiment and that they will be conducting the second experiment as a team.
- Put the large container of water in front of the projector or a strong flashlight.
- Tape the cardboard to the flashlight or projector so that only a small hole of light shines through.
- Explain to students that you are about to shine the light through the container of water so that it shines on the second piece of cardboard that you will be holding up behind the container. Ask students to write down their prediction about what they think will happen in the first box on Activity Page 7.2.
- Shine the light through the small hole in the cardboard and toward the water while you or a student holds up the second piece of cardboard with the larger hole near the water. A rainbow should appear on the second piece of cardboard.
- Have students write down their observations in the second box under their prediction and then draw a picture of what the result of the experiment looked like in the third box.
- Have a few students share their observations.

## EXPERIMENT 2 (10 MIN.)

- Divide students into pairs. Make sure that each pair has a prism, a sheet of white paper, and access to either sunlight or a strong flashlight.
- Have students write their predictions for what they think will happen in the first box under Experiment 2 on Activity Page 7.2.
- Allow students to perform the experiment in pairs for several minutes and then record their observations and draw a picture in the remaining boxes.
- Have a few students share their observations.

### Activity Page 7.2



### Support

If students have difficulty finding details and a taking notes, break text into smaller chunks, either paragraph or sentence level, and look for key information.



**TEKS 3.7.E** Interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating.



Writing  
Writing

### Beginning

Provide 1:1 prompting and support as students write their summaries, and/or use Activity Page 7.3a.

### Intermediate

Review key ideas and vocabulary from the students' notes and provide prompting as needed.

### Advanced/Advanced High

Encourage students to use domain vocabulary and complete sentences.

**ELPS 1.E; ELPS 2.C**

### Activity Page 7.3



### Challenge

Have students write out the procedure for conducting an experiment with light. Have them include which materials are needed, the procedure order, and what the expected results of the experiment would be.

## Lesson 7: What is Color?

# Writing



**Primary Focus:** Students will synthesize what they have learned about light and color through research and hands-on activities to write a summary demonstrating understanding of key concepts and vocabulary. **TEKS 3.6.H; TEKS 3.13.B; TEKS 3.13.E**

### WHAT IS WHITE LIGHT? (20 MIN.)

**TEKS 3.6.H**

- Have students turn to Activity Page 7.3. Explain that they'll be combining the research they did about light with the observations they made during the experiments to write a research summary.
- Tell them that they'll use the information from Activity Pages 7.1 and 7.2 to complete the summary. They may also use *Adventures in Light and Sound* as a reference.
- Students will complete Activity Page 7.3 independently.
- Collect Activity Pages 7.1 and 7.3 when complete.
- If students had difficulty combining the reading information and the hands-on experiment information, create a T-chart showing what the reading and the experiments have in common. Have students summarize the similarities orally first before writing.

## Lesson 7: What Is Color?

# Speaking and Listening



**Primary Focus:** Students will listen to the story "What Is Color?" and answer questions based on content and vocabulary in the text.

**TEKS 3.1.A; TEKS 3.6.F; TEKS 3.7.C**

Students will demonstrate knowledge of spelling compound words. **TEKS 3.2.B.iii**

### INTRODUCING THE READ-ALOUD (5 MIN.)

1. Who were the two new characters we met in the last Read-Aloud about the trip to the fair?

**TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.2.B.iii** Demonstrate and apply spelling knowledge by: spelling compound words, contractions, and abbreviations.

» Ethan and Amy, Samuel's grandchildren

2. What happened in the story?

3. What did Ethan and Amy see at the fair that had to do with reflection and refraction?

- Tell students that, to get warmed up for today's story, you'll ask them a series of statements starting with "Raise your hand if . . ." Tell students to raise their hands if the statement is true about light.
  - Raise your hand if . . .
    - Light can travel through an opaque object like a book.
    - Light bends when it travels through a glass of water. (raise hands)
    - Eyeglass lenses are transparent. (raise hands)
    - A flat, bathroom mirror on the wall is a convex mirror.
    - A convex lens magnifies an object. (raise hands)
    - Light changes direction when it passes through a lens. (raise hands)
    - Light speeds up when it goes through certain objects.
    - You can always see a clear image when looking through a translucent object.
    - A flat mirror on the wall is a plane mirror. (raise hands)
- Show Image Card C.U5.L7.1 (Light Energy from the Sun).
- Explain that it shows all types of light energy that are produced by the sun and make their way through space to Earth. Tell students that some light energy is visible to us and some of the light waves are invisible to us. The visible light is what allows us to see the world as we do. Remind students that they may already know about some invisible types of light energy, such as X-rays, microwaves, and radio waves.
- Show Image Card C.U5.L7.2 (Rainbow).
  - What do you see in this image?
  - Have you ever seen a rainbow?
  - Where did you see it?
  - What do these two images (Image Cards C.U5.L7.2 and C.U5.L7.1) have in common?
  - Ask students to predict what they think causes a rainbow.
  - Tell students to listen to the story to find out more about light and to see if their predictions about what causes a rainbow are correct.

Image Card  
C.U5.L7.1

**Light Energy from  
the Sun**



Image Card  
C.U5.L7.2

**Rainbow**



## PREVIEWING THE VOCABULARY

### Core Vocabulary

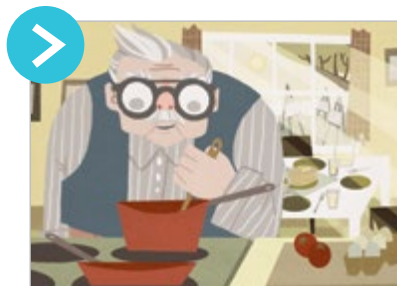
- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**optometrist**, a doctor who examines people’s eyes to check if their vision needs to be corrected in any way by wearing glasses or contact lenses, or by medical treatment

**x-ray**, a powerful invisible ray of energy that can pass through an object and make it possible to see inside of it; a picture that shows what makes up the inside of something, such as the bones of the skeleton

| Vocabulary Chart for “What is Color?” Read-Aloud |                                 |                                  |
|--------------------------------------------------|---------------------------------|----------------------------------|
| Type                                             | Tier 3<br>Domain-Specific Words | Tier 2<br>General Academic Words |
| Vocabulary                                       | optometrist<br>x-ray            |                                  |
| Multiple Meaning                                 |                                 |                                  |
|                                                  |                                 |                                  |
| Sayings and Phrases                              |                                 |                                  |

## PRESENTING THE READ-ALoud: “WHAT IS COLOR?” (15 MIN.)



### Show Image U5.L7.1: Samuel at the stove

It was a sunny Saturday morning, and Samuel had invited Amy, Ethan, and Jack to breakfast. It had been three days since Samuel had seen Jack and

his grandchildren, because he had traveled to the city to a special hospital to have his eyes checked by an optometrist.

*What do you think an optometrist is? Can you figure it out from the text?*

Samuel set up two extra easels in the garden next to his easel. He was trying to encourage his grandchildren to paint with him. He had long since given up trying to get Jack to take up painting as a hobby. When he was at the hospital, the optometrist had advised Samuel to rest his eyes, but he found it difficult to give up his daily trip to the garden to paint. Amy and Ethan arrived first. They really enjoyed having breakfast with their grandfather. Samuel always served homemade pancakes, eggs, sausages, bacon, and hash browns. The breakfasts were always amazing.

“Hey, Granddad!” yelled Ethan. “I’m starving. Is breakfast ready?”

“I doubt you are actually starving,” replied Samuel, “but it’s almost ready. Just scrambling the eggs.”

Moments later Jack arrived, just in time to help Samuel serve the breakfast feast.

*What is a synonym for the word feast?*



**Show Image U5.L7.2:**  
**Everyone eating breakfast at kitchen table**

Once the food had been served, Alfie arrived in the kitchen with the hope of getting a tasty morsel. Samuel

pretended to be strict about feeding Alfie from the table, but in truth he liked to spoil him.

“You’ve outdone yourself,” said Jack appreciatively. He, too, enjoyed Samuel’s famous breakfasts.

“What’s the plan for today?” asked Jack, hoping that there wouldn’t actually be one.



“Well, I’m going to make these two monkeys work a little,” said Samuel grinning. “They are going to have a painting lesson, and all three of you are going to have a lesson on the science of color.”

“That just means he’s going to talk a lot,” announced Jack.

The children laughed.

Samuel, Jack, and the children spent the next hour eating, talking, and enjoying each other’s company. Ethan secretly reached down under the table and fed Alfie small pieces of sausage, though Samuel was perfectly aware of what he was doing. Then, after loading the dishwasher and tidying up the kitchen, they made their way out into the garden.



### Show Image U5.L7.3:

#### Everyone outside in shade of apple tree

*Tell students to listen carefully for adjectives and adverbs that make the scene more vivid.*

Samuel had set the easels up under the shade of the large apple tree.

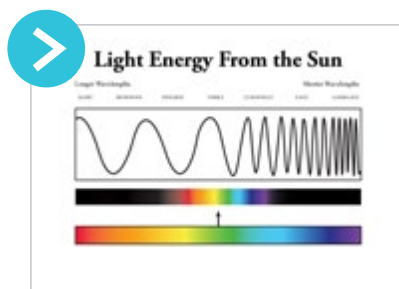
Once everyone was settled, including Alfie, he advised the children to pick a subject to paint—something they could clearly see and would enjoy painting.

“I’d like to paint the bird feeder,” pronounced Ethan.

“I think I’ll paint that potted geranium,” said Amy, pointing to a plant with vivid red petals sitting snugly in a terra-cotta pot.

“I’ve chosen to sit here and close my eyes,” said Jack and then promptly did just that.

*What adjectives and adverbs did you hear? (large, clearly, potted, vivid, red, snugly, terra-cotta, promptly)*



**Show Image U5.L7.4:**  
**“Light Energy from the Sun” Graphic**

“The first thing I want you to understand, and I’ve already explained this to Jack, is that waves of light energy race through space from the

sun to Earth,” Samuel began. “Each type of light energy has its own unique wavelength.”

- Picture Pause: Point to the tops of the two waves in the graphic.
- Tell students, “A wavelength is the distance between two crests, or tops, of the two waves. Some waves are longer than others.”
- Point to the microwave and x-ray parts of the graphic.

Who can tell me which type of invisible light has a longer wavelength, the microwave or the x-ray?

» microwave

“We cannot see all of the sun’s light energy, but the energy we can see is called visible light. White light is made up of a spectrum of all the colors we see in visible light.

*A spectrum is a series or range of objects, things, or ideas arranged in a particular order.*

*Tell students they’ll be talking more about the word spectrum during Word Work.*

*Point to the visible light.*

*This range of wavelengths—red, orange, yellow, green, blue, indigo, and violet—is visible to humans without using any special equipment.*

*Do these colors remind you of something? (a rainbow)*

“Some light is invisible, such as x-rays,” continued Samuel.

Image Card  
C.U5.L7.3

X-Ray



Challenge

Students can research how x-ray machines were invented.

Image Card  
C.U5.L7.4

Reflection and Color



Show Image Card C.U5.L7.3 (X-Ray)

Has anyone ever had an x-ray? (If so, have a student briefly describe the experience.)

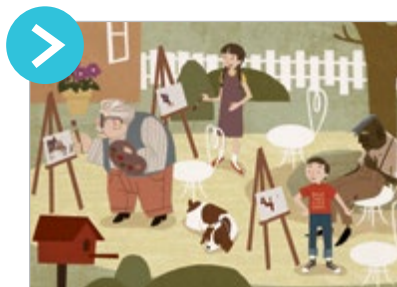
An x-ray is a powerful, invisible ray of energy that can pass through an object, and special x-ray machines make it possible to see what is inside.

“That’s complicated,” chimed in Ethan.

“Not really,” said Samuel.

“I agree with him,” said Jack, opening one eye and pointing at Ethan.

“Let me finish explaining, and it might make more sense,” continued Samuel. “We need light to be able to see. Light from the sun travels to Earth. Most of it is invisible to us unless we have equipment like x-ray machines. The visible light shines on objects in the world around us. Some of the light reflects off objects and into our eyes. Then, parts of our eyes receive that information and communicate with our brain. The brain figures out what colors we are seeing. However, and this is what is really interesting,” said Samuel eagerly, “the color of an object is determined by whether that object transmits, reflects, or absorbs light. Sometimes it is a combination.”



Show Image U5.L7.5:  
Everyone in garden with paintings in progress

“Oh, it’s so much easier to understand now,” joked Jack.

Show image card C.U5.L7.4 (Reflection and Color). Point to the grass and the arrows as you read the next paragraph.

“Think of it this way,” continued Samuel. “Look at the grass. It looks green because it reflects green light waves, but it absorbs the other wavelengths of visible light, meaning it absorbs all the other colors.”

“What does absorb mean?” asked Ethan with a puzzled look on his face. He had by now finished sketching the bird feeder and was dipping his paintbrush into some carefully mixed brown paint.

*Who remembers what absorbed means?*

“Absorbed light is the light that is soaked up by an object and is therefore no longer visible. The color you see when you look at an object is actually the reflected light. An object has no color if there is no reflected light,” explained Samuel.

*Point to the child’s red shirt on Image Card C.U5.L7.4. What wavelength of light is reflected from the shirt? (red)*

*Who can explain why a blue balloon appears to be blue? (The balloon is reflecting blue light waves.)*

*When you look at objects of different colors, like green grass or a red shirt, or a blue balloon, what can you say about the other visible light waves that hit the objects? (They are absorbed by the object).*

*Reread the paragraph if necessary.*

“Oh, I get it,” said Amy, who by now was painting the terra-cotta pot.

“That’s why my art teacher said that black materials absorb all colors of light and do not reflect any. So, in a way, black is not a true color; it is more a lack of light.”

“That’s exactly right, Amy,” said Samuel. “White is the opposite of that. An object that appears white to our eyes reflects all the colors of the spectrum and absorbs none of them.”

“Is that why people say you should wear white clothes in the summertime?” asked Ethan, who was concentrating hard on painting the roof of the bird feeder.

“Exactly!” exclaimed Samuel. “White material reflects most of the light that hits it and absorbs very little, so if you wear white clothing, you tend to stay a little cooler.”

## Support

Ask if the picture clues help students to understand what the word *terra-cotta* means. Explain that terra-cotta is a type of pottery that is brownish-red or brownish-orange in color.

*What other energy comes from light waves that make this true? (Heat energy comes from light waves from the sun, so white clothing that reflects almost all the light waves will be cooler.)*

*What happens when you wear black on a sunny day? (The black clothing absorbs almost all the light and heat energy from the sun, making you feel warmer.)*

“Who would like some ice cream?” asked Jack loudly. He had grown restless and wanted to do something fun.

“Yay! Ice cream!” screeched Ethan.

“Yes, please,” said Amy.

“Here’s an interesting question,” said Samuel. “Which would melt faster—chocolate or vanilla ice cream?”

The children frowned thoughtfully.

“Chocolate!” called Ethan.

“And why is that?” asked Samuel.

“Because it’s a darker color and would absorb more light!” said Amy.

“Very good,” said Samuel.

“Do you have mint chocolate chip?” asked Ethan.

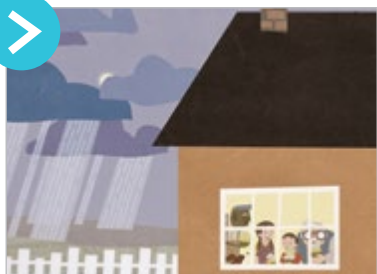
“That’s my favorite!” yelled Jack.

“Mine too,” agreed Ethan.

“Do you have strawberry ice cream?” asked Amy.

“I sure do,” said Samuel.





**Show Image U5.L7.6:**  
**Everyone in kitchen having ice cream**

Samuel didn't need a reply. Jack and the children were already walking toward the kitchen door. They hadn't realized it, but they had been out in the garden for quite some time, and in that time rain clouds had gathered in the distance.

Moments later, Samuel, Jack, Amy, and Ethan were sitting at the kitchen enjoying double scoops of ice cream. Amy and Ethan had drizzled chocolate sauce on top of theirs. There was even a very small scoop of strawberry ice cream for Alfie, even though Samuel knew he really shouldn't have any.

"What do you call a ghost's mother and father?" asked Ethan as he licked chocolate sauce from around his mouth.

"I don't know. What do you call a ghost's mother and father?" repeated Jack.

"Transparents!" announced Ethan.

"Which one runs faster, hot or cold?" Ethan continued.

"Hot. Everyone can catch cold," answered Amy.

"Ahhh! You've heard it," said Ethan, sounding disappointed.

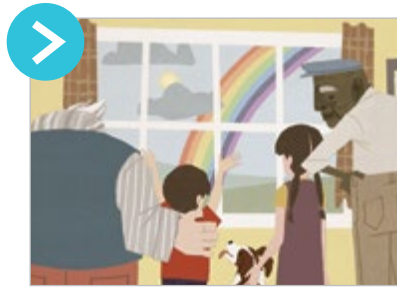
"Okay, how about this one?" said Amy. "Why is it so hot in a stadium after a football game?"

Samuel, Jack, and Ethan thought for a while but could not come up with a good enough answer.

"Okay, smarty pants, tell us the answer," said Jack.

"Because all the fans have left," said Amy, clearly delighted with herself.

*The word clearly is an example of what part of speech? (adverb)*



### Show Image U5.L7.7:

#### Clearing sky and rainbow visible through window

"Look at that," said Samuel pointing through the kitchen window.

"It's a rainbow!" exclaimed Amy.

*What kind of word is rainbow? (a compound word)*

*What is a compound word? (a word made up of two or more smaller words that are joined together to make a new word)*

✚ *What are the two words that make up rainbow? (rain and bow)* **TEKS 3.2.B.iii**

*Why do you think those two words were put together to describe it? (You see rainbows during or after rain, and they are shaped like a bow shape or arc.)*

"Oh, no! He's going to tell us how they are formed," said Jack pointing his spoon at Samuel.

"Well, as a matter of fact," replied Samuel, "A rainbow is a perfect spectrum of colors." We see this spectrum when waves of white light encounter millions of falling raindrops. Just like the glass of water and the straw, Ethan, the light waves slow down and refract when they come into contact with the transparent raindrops. Essentially, beams of white light break apart into the colors of the rainbow. Each transparent raindrop acts as a prism, perfectly splitting white light into all of its colors," explained Samuel.

"Oh, we used prisms in class!" shouted Ethan. "It was so cool. It was like making your own rainbow."

*Who knows what a prism is?*

*Remember our prism experiments earlier in the lesson? What can you tell happens to visible light when it goes through a prism? (The light refracts or bends and the different wavelengths separate into the colors.)*



### Show Image U5.L7.8: Amy and Ethan's finished paintings

Samuel, Jack, Amy, and Ethan continued to chat and joke and enjoy each other's company. After a while, they returned to the garden where

Samuel continued the painting lesson. He advised the children to pay attention to the angles and qualities of light and shade that hung in the air like soft, clear, transparent wings. He talked to them about texture and tone. All the while, Jack sat in his garden chair and napped. Morning turned to afternoon, and afternoon to early evening, and no one wanted to leave the comfort and shade of the beautiful garden—not even Alfie.

## DISCUSSING THE READ-ALoud (5 MIN.)

1. **Evaluative.** Were your predictions correct about how rainbows are created? Why or why not?

» Answers will vary.

2. **Inferential.** What is visible light?

» Visible light is light that we can see.

You heard that white light is related to visible light. What is white light made of? Hint: Remember ROY G BIV.

» White light is all of the colors we can see in visible light: red, orange, yellow, green, blue, indigo, and violet.

3. **Literal.** What type of invisible light was used to create this image?

» x-ray

4. **Literal.** How does light travel?

» Light travels in waves.

5. **Literal.** How are light waves measured?

» Light waves are measured in wavelengths, from the top of one wave to the top of the next.

Image Card  
C.U5.L7.3

X-Ray



Image Card  
C.U5.L7.1

Light Energy from  
the Sun







Speaking and Listening  
Listening Actively

**Beginning**

Ask questions with one-word answers (for example, "What one word describes a rainbow?").

**Intermediate**

Ask for more details in students' answers (for example, "What causes a rainbow?").

**Advanced/Advanced High**

Ask higher-level questions (for example, "Would we see a rainbow if the light was shining through something that is translucent?").

**ELPS 2.E; ELPS 2.H**

6. **Inferential.** Why does my shirt look \_\_\_\_\_?

» The \_\_\_\_\_ colored shirt absorbs all the colors of white light except the \_\_\_\_\_ light.

7. **Inferential.** What causes an object to look black?

» Black is the absence of reflected light that occurs when all colors of the spectrum are absorbed.

8. **Inferential.** Describe the spectrum of colors and how it is formed.

» The spectrum is all the colors of the rainbow. When the waves of white light are refracted through in just the right way by something transparent, a band of colors appears.

9. **Evaluative.** *Think-Pair-Share.* In a completely dark room, is it possible to see colors? Why or why not?

» No, because there is no color without light.

**WORD WORK: SPECTRUM (5 MIN.)**

1. In the Read-Aloud, you heard, "A rainbow is a perfect spectrum of colors."

2. Tell students that Image Card C.U5.L7.2 shows the spectrum of colors that are produced when white light passes through the raindrops in the atmosphere. Say the word *spectrum* with me.

3. A spectrum is a series or range of objects, things, or ideas arranged in a particular order.

4. Max could see the entire spectrum of colors after the light went through his prism, and he noticed that the colors were in the same arrangement as the rainbow he had seen in the sky after the thunderstorm.

5. Have you ever seen a spectrum of colors before? What was causing the spectrum? Be sure to use the word *spectrum* when you tell about it.

- Ask two or three students. If necessary, guide and/or rephrase the students' responses to make complete sentences: "I saw a spectrum of colors when \_\_\_\_\_" or "\_\_\_\_\_ was a spectrum of colors."

6. What's the word we've been talking about? What part of speech is the word *spectrum*? (*spectrum*; noun)

- Use a Making Choices activity for follow-up. Directions: Say, "I am going to name some things. If what I name is a spectrum, say, 'That is a spectrum.' If what I name is not a spectrum, say, 'That is not a spectrum.'"

1. only the colors red and blue
  - » That is not a spectrum.
2. all of the colors of a rainbow
  - » That is a spectrum.
3. the colors that are created when white light is refracted by a prism
  - » That is a spectrum.
4. only the color green
  - » That is not a spectrum.
5. invisible x-ray light
  - » That is not a spectrum.

## Lesson 7: What Is Color?

# Language



**Primary Focus:** Students will use the meaning of suffixes *-ous* and *-ly* to write words and sentences. **TEKS 3.3.C**

### MORPHOLOGY: SUFFIXES *-OUS* AND *-LY* (15 MIN.)

#### Introducing Suffixes *-ous* and *-ly*

- Remind students that suffixes are added to the end of a root word.
- Tell students that the two suffixes they will study this week are *-ous* and *-ly*.
- Write the suffixes on the board and point out that the suffix *-ous* is pronounced /us/, like the tricky spelling in *cousin*, and *-ly* is pronounced /lee/.

#### Adding Suffix *-ous*

- Explain to students that *-ous* means “full of.”
- Tell students that, in this part of the lesson, they will add the suffix *-ous* to root words that are all nouns. When *-ous* is added to a noun, the word becomes an adjective.
- Write the word *joy* on the board. Briefly discuss the meaning of the word and then use it in a sentence. (a feeling of great happiness; At the celebration, everyone was filled with joy.)

**TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

- Add the suffix *-ous* to *joy* and have students read the suffix, read the new word, and then discuss the meaning of the new word. (full of a feeling of great happiness)
- Ask students to provide sentences using the word *joyous*. (Answers may vary.)
- Ask students for synonyms of *joyous*. (*happy, cheerful, merry*)
- Continue in this manner for the remaining *-ous* words, using the following chart as a guide.

**Note:** You will not write the information in the shaded columns on the board, as that information is intended for use during oral instruction.

- Point out for students that for the word *fame*, the “e” must first be dropped before adding *-ous*. Also point that for *mystery* and *fury*, “y” is changed to “i” before adding *-ous*.

| Root Word | Meaning                                                                                      | Affixed Word | Meaning and Synonyms                                                                                                                 | Sentence                                                              |
|-----------|----------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| danger    | (noun) the chance that something bad will happen                                             | dangerous    | (adjective) full of the chance that something bad will happen<br>Synonyms: unsafe, risky                                             | The <u>dangerous</u> fire blazed out of control.                      |
| mountain  | (noun) land that rises very high above its surroundings                                      | mountainous  | (adjective) full of land that rises very high above its surroundings<br>Synonyms: steep, high, rocky                                 | The <u>mountainous</u> road was very windy.                           |
| poison    | (noun) a substance that can hurt or kill people or animals if touched, swallowed, or inhaled | poisonous    | (adjective) full of a substance that can hurt or kill people or animals if touched, swallowed, or inhaled<br>Synonyms: toxic, deadly | Watch out for <u>poisonous</u> snakes!                                |
| fame      | (noun) the state of being well known                                                         | famous       | (adjective) full of the state of being well known<br>Synonyms: well known, legendary                                                 | The Statue of Liberty is a <u>famous</u> statue.                      |
| mystery   | (noun) something that is hard to understand                                                  | mysterious   | (adjective) full of something that is hard to understand<br>Synonyms: strange, puzzling                                              | A <u>mysterious</u> letter with no name or address was in my mailbox. |
| fury      | (noun) extreme anger or force                                                                | furious      | (adjective) full of extreme anger or force<br>Synonyms: mad, upset, violent                                                          | The <u>furious</u> preschooler had a temper tantrum.                  |
| humor     | (noun) a funny or amusing quality                                                            | humorous     | (adjective) full of a funny or amusing quality<br>Synonyms: hilarious, entertaining, silly                                           | The <u>humorous</u> joke made us all laugh.                           |

## Adding Suffix *-ly*

- Explain to students that *-ly* means “in a way.”
- Tell students that they will now add the suffix *-ly* to the words they previously added *-ous* to. When *-ly* is added to an adjective, the word becomes an adverb.
- Tell students that adverbs with *-ly* describe verbs, specifically how a verb happens. Remind students that they learned about these adverbs in Grammar earlier in this unit.
- Write the word *dangerous* on the board. Briefly discuss the meaning of the word and then use it in a sentence. (full of the chance that something bad will happen; The dangerous broken glass covered the parking space.)
- Add the suffix *-ly* to *dangerous* and have students read the suffix, read the new word, and then discuss the meaning of the new word. (in a dangerous way)
- Ask students to provide sentences using the word *dangerously*.
  - » Answers may vary.
- Continue in this manner for the remaining *-ly* words, using the following chart as a guide.

**Note:** You will not write the information in the shaded columns on the board, as that information is intended for use during oral instruction.

- Point out to students that not all of the *-ous* words they learned will have *-ly* added to them.

## Comparing Sentences with Affixed Words

- Direct students' attention to the first sentence you prepared in advance:
  - The boy is filled with joy.
- Ask students. “What is the boy filled with?” They should respond *joy*. Ask them for the part of speech (noun) and draw a circle around the word *joy*.
- Then, display the next sentence:
  - The boy sang with a joyous voice.
- Ask students what the boy sang with. (voice) Draw a circle around *voice*, stating that it is a noun.
- Ask students, “What kind of voice did the boy use?” (*joyous*) Draw a box around *joyous* and then draw an arrow to *voice*, stating that *joyous* is an adjective that describes the noun *voice*.

- Now, display the next sentence:
  - The boy joyously sang the song.
- Ask students, “What did the boy do?” (sang) Draw a wiggly line under sang and identify it as a verb.
- Then ask students, “How did the boy sing?” (joyously). Draw a triangle around *joyously*, stating that it is an adverb. Remind students that adverbs ending in *-ly* describe verbs, telling how. Draw an arrow from *joyously* to *sang*.
- Repeat the same process and demonstration with the second set of sentences.
- Complete Activity Pages 7.4–7.7 in the same manner in which you have completed these worksheets in previous lessons.
- Collect Activity Pages 7.4–7.7.

## SPELLING (10 MIN.)

### Blank Busters

- Tell students that they will practice writing their spelling words for the week.
- Tell students to turn to Activity Page 7.8. Note for students that some sentences have two blanks.
- Point out to students that the spelling words are listed in the box on the worksheet and on the board. Students may also have to add an appropriate suffix to have the sentence make sense: *-s*, *-es*, *-ing*, or *-ier*.
- Ask students to read the statement in number 1 silently and fill in the blank. When students have completed number 1, call on one student to read number 1 aloud with the spelling word in the blank.
- Ask students if anyone had a different answer. Discuss the correct answer to be sure students understand why it is correct.
- Discuss the proper spelling of the word in the blank, referencing the table of this week’s spelling words. Have students compare their spelling with the spelling in the table.
- Have students complete the rest of the activity independently, using the table of this week’s spelling words to check their work.

## Activity Pages 7.4–7.7



ENGLISH  
LANGUAGE  
LEARNERS

Language  
Modifying to Add Details

### Beginning

Provide 1:1 support for students to complete Activity Pages 7.4–7.7.

### Intermediate

Provide additional examples and model adding the *-ous* and *-ly* endings and discuss how the words changed.

### Advanced/Advanced High

Have students brainstorm more words that have *-ous* and *-ly* endings and describe how the original word changed in meaning.

### ELPS 2.C

## Activity Page 7.8



**Lesson 7: What Is Color?**

# Take-Home Material

Activity Pages  
7.9 and 7.10



- Have students take home Activity Page 7.9 to complete and Activity Page 7.10 to read to a family member at home. Collect Activity Page 7.9 before beginning Lesson 8.





# Pausing Point 1

## Note to Teacher

This is approximately the halfway point of the *Light and Sound* unit. Students have studied the properties of light, the way light travels, how light can be manipulated, the visible light spectrum and instruments that use light. It is recommended that you pause here and spend a day reviewing, reinforcing, or extending them the material taught so far.

You may do the activities in any order or combination, using the whole class or small groups to meet the needs of the students.

## CORE CONTENT UP TO THIS PAUSING POINT

Students will:

- Identify the sun as Earth's main source of light and name other light sources.
- Identify light as a form of energy that travels in waves.
- Explain why light is so important.
- Describe how light waves travel in different mediums.
- Explain how shadows are formed.
- Explain how light is absorbed, reflected, or transmitted.
- Describe the three types of mirrors: plane, concave, and convex.
- Compare and contrast the terms concave and convex.
- Compare and contrast transparent, translucent, and opaque objects.
- Describe how mirrors and lenses are used in a variety of instruments.
- Explain how light is refracted.
- Explain that color is determined by how light is absorbed and reflected.
- Explain what causes a rainbow to occur.
- Identify the spectrum of colors that makes up white light.

## ACTIVITIES

### Image Card Review

- **Materials:** Image Cards

Hold the image cards you have used so far fanned out like a deck of cards. Ask a student to choose a card, but not to show it to anyone else in the class. The

student must then give a clue about the image she is holding. The rest of the class will guess what the image is or what light concept is being described. Proceed to the next card when the correct answer is given.

## Graffiti Wall

- **Materials:** Chart paper and markers

Give students a key domain concept or vocabulary such as *energy*. Have them brainstorm everything that comes to mind when they hear the words, such as *physical power*, needed by living things to exist, not unlimited, etc. Students will record their response in both words and pictures on the chart paper. Have students do a gallery walk of other groups' charts.

## Riddles

- **Materials:** Paper and pencils

Have students create and exchange riddles to review everything they've learned about light so far. For example, "I am created when something or someone blocks a light source. What am I?"

## Compare and Contrast

- **Materials:** Chart paper or whiteboard

Draw a Venn diagram on the chart paper or whiteboard. Tell students that you are going to compare and contrast two things students have learned about, related to light by asking how they are similar and how they are different. Choose from the following list or create a pair of your own:

- a lens and a prism
- all light energy and white light
- opaque and convex objects
- reflection and refraction

Some students may do this activity on their own, or create a three-way Venn diagram to compare and contrast three things, that is, opaque, translucent, and transparent objects; a telescope, a microscope, and a magnifying lens, etc.

## Design a Light Experiment

- **Materials:** Paper and Pencils

Have students design an experiment that they would like to do regarding light. They will need to list the question they are going to investigate, the materials they will need, and the procedure they will need to follow to conduct

the experiment. They should also make predictions as to what they think the results of the experiment will be.

### **Class Book: Light and Sound**

- **Materials:** Drawing paper and drawing tools

Tell the class or group of students that they are going to create a class book to help them remember what they have learned so far. Have students brainstorm important information about the properties of light. Have each student choose one idea to draw a picture of, and ask them to write a caption for the picture. You may choose to add pages about the properties of sound upon completion of the entire unit before binding the book.

### **Creating a Sundial**

- **Materials:** Sturdy, straight stick; rocks or chalk; and watch or clock

Have students find a grassy place outside that gets the most direct sunlight throughout the school day. Once the place is found, put the stick into the ground so that it is vertical. Each hour of the school day, on the hour, place a stone showing where the stick's shadow falls across an imaginary arc circling the stick. Once the sundial has been created, students may return to examine the sundial on the following day. Ask students to observe how the shadow moves throughout the day. Discuss how the sundial works and how this instrument was used in the past to tell time. Have students discuss how the sundial and clock are different and similar.

### **Making and Using a Periscope**

- **Materials:** Two quart-size milk or juice cartons; two small mirrors; scissors; and tape

Open the tops of two empty cartons. Then, either with tape or glue, connect the cartons together. With scissors, cut out an opening on the back of the box on top and an opening on the front of the box at the bottom. Cut out two diagonal slots on one side of the box. Both slots should be parallel, with one close to the top opening and the other close to the bottom opening. Next, place a mirror into each of the slots. The mirrors should be able to reflect what is seen through the top portion of the periscope and vice versa. Have students examine the top and bottom of the periscope, and then have them discuss what makes this instrument useful.

## Light Poetry

- **Materials:** Paper and pencil

Have students create an acrostic poem using the word *light*. For example:

**L**—*lumens*

**I**—*illuminates*

**G**—*glowing*

**H**—*heat*

**T**—*telescope*

Students can also choose another word from the Light unit or write a different type of poem.

## Writing Prompts

- **Materials:** Paper and pencil

Students may be given an additional writing prompt such as the following:

- The most interesting thing I've learned thus far is \_\_\_\_\_ because \_\_\_\_\_.
- My favorite instrument that we have discussed so far is \_\_\_\_\_ because \_\_\_\_\_.
- A rainbow is formed by \_\_\_\_\_.
- Light can be manipulated by \_\_\_\_\_.
- My favorite translucent material is \_\_\_\_\_ because \_\_\_\_\_.
- The direction of a ray of light can change its path because \_\_\_\_\_.


## Independent Reading **TEKS 3.5**

- **Materials:** Assortment of books about light or energy.

Have students read additional trade books about light in your classroom or from the library. After reading, have the students write a book review that includes the following:

- The title and author.
- Why did you choose the book?
- A brief summary.
- Your favorite part.
- What do you really want a reader to know about this book?
- Would you recommend the book to others? Why?

---

 **TEKS 3.5** Self-select text and read independently for a sustained period of time.

## 8

# What Is Sound?, Part 1

## PRIMARY FOCUS OF LESSON

### Reading

Students will write to show the relationship between content vocabulary words about light, using information from a glossary, notes, and text.

✚ **TEKS 3.6.H; TEKS 3.7.F**

### Speaking and Listening

Students will discuss and answer comprehension and vocabulary questions related to the Read-Aloud text about how sound waves are created and how

✚ they travel. **TEKS 3.1.A; TEKS 3.3.B; TEKS 3.7.C; TEKS 3.7.F**

### Writing

Students will identify the correct sequence of events to explain how sound is

✚ created and how it travels. **TEKS 3.9.D.iii; TEKS 3.12.B**

Students will write a prediction about how sound travels after watching a

✚ video clip. **TEKS 3.6.F; TEKS 3.7.C**

### Language

✚ Students will write words using suffixes *-ous* and *-ly*. **TEKS 3.3.C**

## FORMATIVE ASSESSMENT

### Activity Page 8.1

**Triangle Connections** Find connections between

✚ vocabulary words. **TEKS 3.6.H; TEKS 3.7.F**

### Activity Page 8.2

**Sequencing Sentences** Sequence and write about

✚ how sound travels. **TEKS 3.12.B**

### Activity Page 8.3

**Exit Ticket—Visualizing Vibrations** Write a

✚ prediction after viewing a video. **TEKS 3.6.F; TEKS 3.7.C**

### Activity Page 8.4

**Suffixes –ous and –ly** Change words and their

✚ meaning by adding *-ous* and *-ly*. **TEKS 3.3.C**

✚ **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.3.B** Use context within and beyond a sentence to determine the meaning of unfamiliar words and multiple-meaning words; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.9.D.iii** Recognize characteristics and structures of informational text, including: organizational patterns such as cause and effect and problem and solution; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

## LESSON AT A GLANCE

|                                             | Grouping    | Time    | Materials                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------|-------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading (25 min.)                           |             |         |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Triangle Connections                        | Independent | 25 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> All Lab Notes<br><input type="checkbox"/> Activity Page 8.1                                                                                                                                                                                                                                            |
| Speaking and Listening (40 min.)            |             |         |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Introducing the Read-Aloud                  | Whole Group | 10 min. | <input type="checkbox"/> Digital Flip Book: U5.L8.1–U5.L8.7<br><input type="checkbox"/> Image Cards C.U5.L8.1–C.U5.L8.4<br><input type="checkbox"/> sticky notes, index cards, or scrap paper<br><input type="checkbox"/> images showing various meanings of the word medium (optional)                                                                                                          |
| Presenting the Read-Aloud: “What is Sound?” | Whole Group | 15 min. |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Discussing the Read-Aloud                   | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Word Work: <i>Vibration</i>                 | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Multiple-Meaning Word: <i>Medium</i>        | Whole Group | 5 min.  |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Writing (20 min.)                           |             |         |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sequencing Sentences                        | Small Group | 10 min. | <input type="checkbox"/> Image Card C.U5.L8.5 (Sound Waves Entering the Ear)<br><input type="checkbox"/> Sequence Sentence Strips<br><input type="checkbox"/> envelopes<br><input type="checkbox"/> Activity Page 8.2<br><input type="checkbox"/> Activity Page 8.2a Support<br><input type="checkbox"/> Video: Visualizing Vibrations<br><input type="checkbox"/> Activity Page 8.3 Exit Ticket |
| Video: Visualizing Vibrations               | Whole Group | 10 min. |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Language (35 min.)                          |             |         |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Sayings and Phrases                         | Whole Group | 5 min.  | <input type="checkbox"/> Activity Pages 8.4, 8.5<br><input type="checkbox"/> Language Chart (Digital Projections)                                                                                                                                                                                                                                                                                |
| Morphology: Suffixes -ous and -ly           | Independent | 15 min. |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Spelling                                    | Independent | 15 min. |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Take-Home Material                          |             |         |                                                                                                                                                                                                                                                                                                                                                                                                  |
| Take-Home Letter                            |             |         | <input type="checkbox"/> Activity Pages 8.6, 8.7                                                                                                                                                                                                                                                                                                                                                 |

## ADVANCE PREPARATION

### Speaking and Listening

- Prepare to project images U5.L8.1-U5.L8.7
- Prepare enough copies of the Sound Sequence Sentence strips, found at the end of this lesson, so that each small group of three to four students has one set.
- Cut out the sentence strips for one set and mix them up before putting into an envelope. Each small group will have one set of strips in their envelope.
- Search online for the PBS video “Sounds and Solids: Visualizing Vibrations” and have it ready to project.

### Language

- On chart paper, create the following chart or prepare Digital Projection DP.U5.L8.1.

| “ay” > /ae/ “ai” > /ae/ “ea” > /ae/ |         |           |
|-------------------------------------|---------|-----------|
| failed                              | blazes  | statement |
| says                                | greatly | daytime   |

### Universal Access

- Students will learn about sounds from musical instruments. If possible, have recordings of the instruments (guitar, violin, recorder) so students can make auditory connections.
- If possible, have a tuning fork on hand for demonstrations and exploration.

## Lesson 8: What Is Sound?, Part 1

## Reading



**Primary Focus:** Students will write to show the relationship between content vocabulary words about light, using information from a glossary, notes, and

text. **TEKS 3.6.H; TEKS 3.7.F**

## TRIANGLE CONNECTIONS (25 MIN.)

- Have students take out their Student Readers, Lab Notes from the unit, and Activity Page 8.1.
- Tell students they will review what they've learned about light by making connections between the vocabulary words in the unit.
- Have students turn to the back of *Adventures in Light and Sound* and find the glossary.
- Explain that they have not seen all of the words in the glossary yet because the rest of the unit will be about sound.
- Ask students to look through the glossary for words that have to do with light. Have a few students share words that they found.
- Next, ask students to look at Activity Page 8.1.
- Explain that they will choose three words from the glossary that have to do with light.
- Explain that they will write one of the words on each of the blanks.
- Read the directions: Using your Lab Notes and the glossary in your Student Reader, select three words we've studied in the unit so far and arrange them in a triangle shape. Then, connect the first word to the second word with a line, and write on the line how the two words are connected. Next, draw a line from the second word to the third word and write on the line how those two words are connected. Finally, draw a line from the third word to the first word and write the connection.
- Make sure students understand the directions before letting them work independently on the task. Remind them that they can use any of their Lab Notes and *Adventures in Light and Sound* to help them make the connections.
- Collect Activity Page 8.1.

**TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate.

## Activity Page 8.1



**ENGLISH  
LANGUAGE  
LEARNERS**

Reading  
Selecting Language  
Resources

## Beginning

Provide a short list of glossary words from the unit and review their definitions. Provide support to students to create sentences using the words.

## Intermediate

Provide two content-related words and their definitions. Have students verbally state how the words are connected before writing the sentence.

**Advanced/Advanced High**  
Encourage students to write complete sentences.

**ELPS 1.E; ELPS 4.E**

## Support

Have students choose two words instead of three. Have students state verbally how the pair of words is connected before writing the sentence.

## Challenge

Have students explain how all three words are connected in the center of the triangle of words, or on a separate piece of paper.



## Lesson 8: What Is Sound?, Part 1

# Speaking and Listening



**Primary Focus:** Students will discuss and answer comprehension and vocabulary questions related to the Read-Aloud text about how sound waves are created and how they travel. **TEKS 3.1.A; TEKS 3.3.B; TEKS 3.7.C; TEKS 3.7.F**

### INTRODUCING THE READ-ALOUD (10 MIN.)

1. What do you think sound is?
2. How do we perceive sound? What sensory organ is used?
3. How do you think light and sound are similar? How do you think they are different?
4. Can you name different sources of sound? (Answers will vary but may include some of the following: people, animals, televisions, computers, iPods, radios, cell phones, telephones, cars, planes, motorbikes, machinery, musical instruments, household appliances, thunder, rain, hail, ocean, waterfalls, etc.)
5. If an instrument is a type of tool used for a specific purpose, what is the purpose of a musical instrument?
  - Show students Image Card C.U5.L8.1 (Tuning Fork) and, if possible, a real tuning fork as well. Ask if any students have seen or used a tuning fork. Ask students how they think the tuning fork might be used to create vibrations. If possible, demonstrate the tuning fork. Share with students that a tuning fork is a useful tool for singers and musicians because it can be used to obtain a specific musical note.
  - Ask students which character in the story has hearing loss. Write “Jack Audire” on chart paper, the chalkboard, or a whiteboard. Write the word *auditory*, which means having to do with hearing or listening. Ask students which parts of *auditory* and *Audire* are the same. Underline *aud* in both words. Tell students that *aud* is a Latin root that means to hear. Ask students to list other words that contain this root. They may suggest *auditorium*, *audio*, *auditory*, *audition*, or others. Discuss how each word relates to hearing or listening.
  - Ask students, “If a person cannot hear well, what are some ways to help their communication with others?” Allow students time to share; some may have friends or family members who have hearing loss. Explain that there are devices, or tools, called hearing aids that improve, or increase, the sound that

Image Card  
C.U5.L8.1

Tuning Fork



**TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.3.B** Use context within and beyond a sentence to determine the meaning of unfamiliar words and multiple-meaning words; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate.

can be heard. People with hearing loss also use other cues to communicate effectively—they can read lips and nonverbal gestures. Remind students that if they are speaking to someone with hearing loss, it is helpful to speak clearly and to look at them, so they can read your lips and see your facial cues.

- Tell students to listen carefully to find out the answer posed in the title of the Read-Aloud, “What Is Sound?” and to listen for the kinds of sounds that Samuel, Jack, Ethan, and Amy experience on their trip to New York City. Have students also listen for ways that sound and light are similar and different.

PREVIEWING THE VOCABULARY

Core Vocabulary

- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

**cacophony**, a harsh, unpleasant noise

**medium**, a substance that light or sound can travel through, like a solid, liquid, or gas

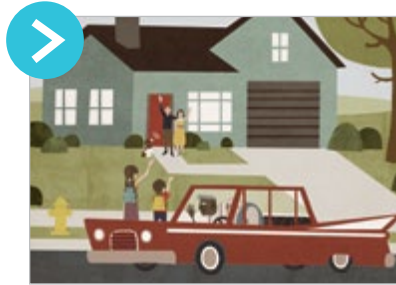
**sound**, vibrations that are produced and that travel through particles, and are heard by our ears

**sound waves**, the form that sounds take when they travel through a surrounding medium, such as air, liquid, or solid

**vibration**, rapid movement back and forth

| Vocabulary Chart for “What Is Sound?” Read-Aloud |                                    |                                  |
|--------------------------------------------------|------------------------------------|----------------------------------|
| Type                                             | Tier 3<br>Domain-Specific Words    | Tier 2<br>General Academic Words |
| Vocabulary                                       | sound waves                        | cacophony<br>sound<br>vibration  |
| Multiple Meaning                                 |                                    | medium                           |
|                                                  |                                    |                                  |
| Sayings and Phrases                              | “His bark is worse than his bite.” |                                  |

**PRESENTING THE READ-ALoud: “WHAT IS SOUND?” (15 MIN.)**



**Show Image U5.L8.1:**

**Jack and Samuel in Samuel's car**

Come on, Samuel, we haven't got all day!" called Jack. "You're going to have to drive a little faster than you did on the way here!"

"Why all the rush?" asked Samuel. "We've got plenty of time."

"I don't want to miss the train!" urged Jack, reaching over to honk the horn to signal the children to come outside.

Samuel and Jack were taking Amy and Ethan to New York City for the day. They were going to park at the train station and take the train into the city. The day would be filled with a boat tour around Manhattan followed by a concert and dinner.

"They're here!" called Ethan from the doorway. The children ran excitedly toward the car, waving goodbye to Alfie and their mom and dad.

Alfie barked excitedly in response.

"Alfie, behave yourself and don't bark all day at squirrels!" called Samuel.

"Ha!" laughed Jack, "His bark is worse than his bite."

"You mean like yours?" quipped Samuel.

"Ha, ha," said Jack dryly.

*What sources of light do you see in this image? What sources of sound do you see? If possible, display a map of New York City and Manhattan and briefly show students. Explain that the overall setting of the story is New York State, but that in this part of the story they are taking a trip to the city. Who has ever visited a big city? What do you remember seeing and hearing?*



**Show Image U5.L8.2:**  
**Train passing through the beautiful countryside**

They arrived and made their way to the platform, where the train was already waiting. The four travelers

boarded the train and went in search of four seats together. Moments later, their train pulled out of the station.

“You see?” exclaimed Jack. “We just made it in time!”

Images of the leafy countryside and the sparkling Hudson River flashed past. The children talked excitedly about the sights they would see and the food they would eat in New York City. After a while they sat back in their seats and admired the view. Samuel had brought his new cane with him. And while his new glasses had improved his vision to some extent, walking with a cane helped him to feel even more secure.

“Granddad,” said Ethan, “do you like the sound of the train? I really, really like it. It makes me feel as if we are going on a real adventure.”

“We are going on a real adventure,” Samuel replied. “Did you know that sound travels in sound waves just as light travels in light waves?” Samuel asked.



**Show Image U5.L8.3:**  
**Jack lecturing on the train**

“Now hold on a minute,” yelled Jack. “You are a wonderful painter, Samuel, and you have taught us all you know about light. You have explained to us

how it helps you create beautiful images. But I do declare, Samuel, you are not going to lecture us about sound. If anyone is going to do that, it should be me—Jack Audire!”

*Why might Jack know more about sound than Samuel? What do you know about Jack? (Jack had studied music.) Point to Jack Audire's name on the board. What part of Jack's name has to do with hearing?*

"I don't think I've taught you everything I know about light," retorted Samuel, "but if you want to tell us some interesting facts about sound, then please do. I would love to hear what you have to say. After all, you are a talented musician and have spent your life dedicated to music."

"Flattery will get you nowhere, Samuel Van Lumen!" yelled Jack, continuing the conversation. "Did you know that our ears, the receptors of sound, are usually self-cleaning?" said an animated Jack. *What is flattery?*

"Oh, that's just plain gross!" exclaimed Amy.

"Okay, well, how about this?" Jack continued. "Your ears don't stop working, even when you are asleep. Your brain shuts out noises. Well, as much as it possibly can."

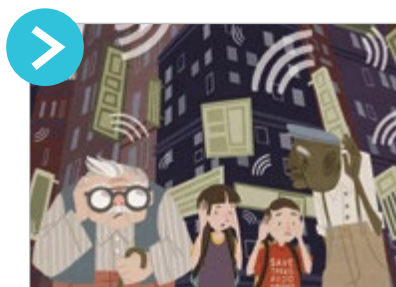
"Jack, is that really true?" asked Ethan quizzically.

"Sure it is," Jack replied confidently. "That's why alarm clocks work—if they're loud enough!"

"Oh, look at the horses!" exclaimed Amy excitedly.

"They're galloping!"

"All right, kiddos. I think we should all sit back and relax. When we are in the city, I will share my knowledge and wisdom with you, whether you like it or not! In the meantime, enjoy the view." With that, Jack sat back and stared contentedly out of the train window.



**Show Image U5.L8.4:**  
**The four travelers in busy, loud NYC**

It was well over two hours before they reached their destination. As the four disembarked the train and made their way out of the train station, a

cacophony of city sounds rose up into the morning air. People were

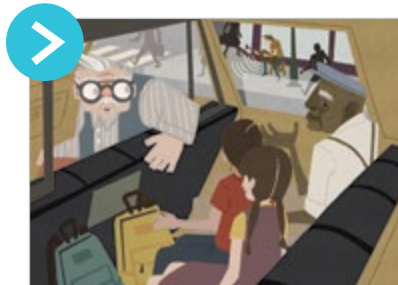
shouting, horns were honking, and traffic was moving in all directions.

*What word clues help you to understand what the word cacophony means? (sounds, shouting, honking)*

“It’s so noisy!” screeched Ethan.

“Ethan, hold Jack’s hand please,” instructed Samuel. “Amy, give me your arm.”

Together the four made their way toward a row of bright yellow taxicabs parked in front of the train station. Moments later they were sitting inside one of the cabs on their way to the city harbor. There they would take a boat ride around the island of Manhattan.



**Show Image U5.L8.5:**  
**Everyone inside taxi looking out at the sights**

The children stared out of the taxi windows at the hustle and bustle of the city. Sunlight glimmered and shined on the windows that adorned

or decorated the high-rise buildings. As the cab moved through the congested city streets, they were engulfed by what felt like a wave of sound and movement.

“As you can tell,” said Jack enthusiastically, looking at the children’s amazed expressions, “even if you couldn’t see the city, you sure can hear it. But do you know what sound is and how it travels?” he asked.

“Not really,” Amy replied. Ethan simply shook his head. At that moment their cab came to a stop again. It was in a long line of cars trying to turn left, but nothing was moving. Jack took this opportunity to talk to the children.

“Well, just like light, sound is a form of energy,” Jack continued.

“There are many, many different kinds of sounds. All sound is made by the movement of objects. That movement is called vibration.

When you pluck a guitar string, the string vibrates, or moves back

Image Cards  
C.U5.L8.2 and  
C.U5.L8.3

#### Guitar and Recorder



and forth. The vibrations make the air shake. The air shakes because tiny particles in the air have been disturbed by the vibration. Those vibrations are called sound waves,” said Jack authoritatively.

*How did Jack say that light and sound are alike? (Both are forms of energy.) All sound is made by what? (the movement of objects) What is that movement called? (vibrations) What does a vibration do? (makes the air shake) Why does the air shake? (Tiny particles in the air are disturbed.) The vibrations are called \_\_\_\_? (sound waves) Show Image cards C.U5.L8.2 (Guitar) and C.U5.L8.3 (Recorder). If the guitar makes a sound by plucking the string, how does a wind instrument like this recorder make sound? (Vibrations are caused by the flow of air around and through the instrument, which disturbs particles in the air and allows the vibrations to travel as sound waves.)*



#### Show Image U5.L8.6: Objects producing different sounds

“That’s cool,” said Ethan who was listening intently. “So, just as light enters our eyes in light waves, the sounds of the horns, people, and cars

rushing by enter our ears in sound waves,” he offered.

“Exactly,” said Jack cheerfully. “Sound waves move outward from a vibrating object, kind of like ripples of water. Just like light, sound waves can travel through solids, liquids, and gases. Sometimes we can feel very strong vibrations through solid objects like the ground or the hard floor of a building.”

“Interestingly, though,” Jack continued enthusiastically, “sound waves cannot travel through space.”

“Why not?” asked Amy.

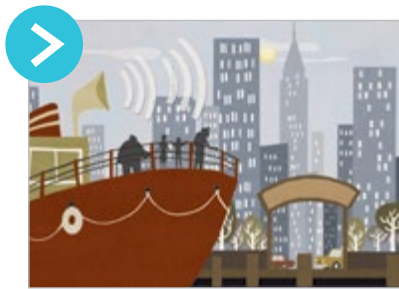
“Well, unlike light, sound cannot travel through space because it is quite nearly a vacuum. There are almost no particles to disturb in the vacuum of space. For example, think about a rocket that can be seen shooting through space. You might be able to see it, but it simply cannot be heard,” Jack explained.

“Wow,” pondered Ethan. “It’s strange that something that is so loud on Earth would be silent in space!”

Jack added, “Light waves travel better when there are fewer particles, and sound waves travel better when there are more particles. The very fact that space is a vacuum is what allows light waves to travel so quickly through it. On the other hand, the vacuum of space doesn’t allow sound to travel through it at all!”

Suddenly Samuel announced, “We’re here!”

*How are sound waves and light waves alike when they travel? (They both can travel through solids, liquids and gases.) How are they different? (Light can travel through space but sound cannot.)*



**Show Image U5.L8.7:**  
**Four travelers on a boat leaning over handrail**

Samuel paid the taxicab driver, and the four travelers made their way toward the big sign that said “Harbor Tours.”

Before long they were onboard a tour boat and were busily munching on hot dogs, pizza, and pretzels. As they gazed out into the harbor filled with a variety of boats, the warm breeze ruffled Ethan’s hair.

“This is so cool, Granddad!” exclaimed Ethan excitedly. “I can’t wait for the boat to start moving.”

“I hope you’ve brought your sea legs,” said Jack as he devoured a salted pretzel. *Has anyone ever heard the phrase “sea legs”? What does it mean? (If you have sea legs, you have the ability to keep your balance on a moving boat.)*

“Oh, and before I forget, you should also know,” Jack continued, “that sound waves travel much more slowly than light waves do. Sound waves travel at different speeds depending on the medium through which the vibrations are traveling—whether it’s a solid, a liquid, or a gas. Sound waves travel fastest through solids.”

Image Card  
C.U5.L8.4

**Sound Traveling  
Through String**







Speaking and Listening  
Listening Actively

**Beginning**

Ask questions with yes or no answers; for example, "Would a bus make a loud noise?"

**Intermediate**

Ask students to name sounds; for example, "Name sounds that you would hear in a big city."

**Advanced/Advanced High**

Ask students to use describing words; for example, "What are some words you would use to describe a fire truck?"

**ELPS 2.E**

Show students Image Card C.U5.L8.4 (Sound Traveling Through String). *Has anyone ever tried this experiment? Why would you be able to hear the other person? (The sound waves cause the string to vibrate from one can to another when you hold the string tight.)*

*Which part of this tin can telephone is the medium? (the string)*

"Oh," said Amy. "That is the opposite of light waves, which travel fastest through a vacuum!"

Samuel smiled at her keen observation.

The captain of the boat tooted the horn and announced that they were about to set off on a tour around Manhattan.

"And another thing," said Jack. "On a warm day like today, the sound of the horn travels faster than it would on a cold day. Do you know why?"

Amy and Ethan shrugged.

"When it is warm, the particles in the air vibrate faster, which causes the sound waves to travel faster."

"Awesome!" said Ethan as he stared up at the large horn.

As the boat moved away from its mooring, the captain tooted the horn again. Ethan listened to the sound of the horn as it seemed to be carried away by the wind, and thought long and hard about the things Jack had just explained to him about sound.

*Does light or sound travel faster in the air? (light) Tell students that light travels 850 times faster than sound through the air. What medium does sound travel fastest through? (solids).*

**DISCUSSING THE READ-ALoud (5 MIN.)**

1. **Literal.** What is sound?

- » Sound is a form of energy that is caused by the vibration of particles and that travels in waves.

2. **Inferential.** How do we sense the vibrations of sound waves?

- » Our ears receive the sound waves and help us to hear. We can also feel vibrations through solid objects.

3. **Evaluative.** You heard the word *cacophony* in the story. What does it mean?

» harsh, unpleasant noise; lots of loud noises together

4. **Evaluative.** What does the setting of this part of the story have to do with cacophony?

» They are in New York, which is a big city that has many sounds like talking, cars, taxis, etc.

5. **Evaluative.** What is the loudest place you have ever been?

» Answers will vary.

6. **Evaluative.** Was it a cacophony of sound or was it pleasant sounds? Use descriptive words.

7. **Evaluative.** Compare and contrast the setting from our earlier stories at Samuel's home to the setting of this part of the story?

» Answers will vary.

- Say, "I am going to ask a question. I will give you a minute to think about the question and then I will ask you to turn to your neighbor and discuss the question. Then, I'll call on several of you to share what you discussed with your partner."

8. **Evaluative.** *Think-Pair-Share.* When you experience a thunderstorm, do you see the lightning first or hear the thunder first? Why do you think this is?

» Because light travels faster than sound, you see the lightning before you hear the thunder.

Do your other senses detect thunder or lightning?

» You can feel thunder vibrate your house or the ground. Some people can "taste" lightning because the lightning releases ions (electrically charged particles) into the air, which combine with the saliva in your mouth, to produce a bitter tasting solution.

### WORD WORK: VIBRATION (5 MIN.)

1. In the Read-Aloud you heard, "All sound is made by the movement of objects. That movement is called *vibration*."
2. Say the word *vibration* with me.
3. A *vibration* is a rapid movement back and forth.
4. The vibration of the guitar strings made a beautiful sound.

5. Have you ever heard a vibration? What was causing the vibration? If it was a musical instrument, then what was that instrument? Be sure to use the word *vibration* when you speak about it.
  - Ask two or three students. If necessary, guide and/or rephrase the students' responses to make complete sentences: "I heard a vibration from \_\_\_\_\_," or "\_\_\_\_\_ was causing the vibration."
6. What's the word we've been talking about? What part of speech is the word *vibration*? (*vibration*; noun)
  - Use a Discussion and Hands-On activity for follow-up. Have students observe and discuss different types of vibrations. Have students put their hands to their throats and hum or speak to feel the vibration of their voice. Demonstrate the tuning fork again. Discuss different musical instruments that produce vibrations (e.g., violin, harp, recorder, guitar). Stretch a rubber band across a cup and show students the vibration. As students share, make sure that they use the word *vibration* in a complete sentence.



#### **MULTIPLE-MEANING WORD: MEDIUM (5 MIN.)**

**TEKS 3.3.B**

1. In the Read-Aloud, you heard the word *medium* as in, "Sound waves travel at different speeds depending on the medium." Who can tell me what *medium* means in this example?
  - » a type of substance or material through which something can travel—in this, case sound energy
2. What are the three types of mediums mentioned in the Read-Aloud?
  - » solids, liquids, and gases
3. Show Image Card C.U5.L8.4 (Sound Traveling Through String). What is the medium in this image?
  - » the stringWhat type of medium is it?
  - » a solidWhat form of energy is moving through this solid medium?
  - » soundWhat is an example of a liquid medium for sound?
  - » sound traveling through water



**TEKS 3.3.B** Use context within and beyond a sentence to determine the meaning of unfamiliar words and multiple-meaning words.

What is an example of a gas medium for sound?

- » sound traveling through the atmosphere

Can a vacuum be a medium for sound?

- » no

Why not?

- » There are no particles to vibrate and cause sound.

4. What other form of energy have you learned about that travels through different mediums?

- » Light and sound travel through different mediums in different ways and at different speeds. For example, light cannot travel through an opaque solid, such as a wall, but sound can; sound cannot travel through a vacuum, but light can.

5. The word *medium* has several other meanings. With your neighbor, brainstorm as many meanings for *medium* as you can and discuss ways you can use the word *medium*. (Have partners jot down the different meanings and/or sentences they discover together on index cards, sticky notes, or scrap paper. Tell students they will revisit these notes at the end of the activity.)

6. You may hear the word *medium* in art class, because paint, crayons, chalk, and clay are all different mediums for art expression. The paint, crayons, chalk, or clay become the channel through which an artist's expression is conveyed to others. (Ask for a volunteer to share a sentence using the word *medium* with this meaning.)

7. *Medium* can also refer to something that is in a middle position or size. For instance, if you were selecting a medium-sized drink, and it was not the largest or the smallest, it would be in the middle. (Ask for a volunteer to share a sentence using the word *medium* with this meaning.)

8. The word *medium* can also be used to describe a surrounding environment. For instance, you might plant flower seeds in a medium like a special potting soil that would provide excellent nourishment for those seeds to grow. (Ask for a volunteer to share a sentence using the word *medium* with this meaning.)

9. Check your notes to see if you predicted any meanings correctly, or if you have any other word meanings to share. Now quiz your neighbor on the different meanings of *medium*. For example, you could say, "I think the medium-sized hat fits me best. Which meaning of *medium* am I using?" And your neighbor should say, "That meaning of the word *medium* is a middle position or size."

Image Card  
C.U5.L8.5

Sound Waves Entering  
the Ear



Activity Page 8.2



ENGLISH  
LANGUAGE  
LEARNERS



Writing  
Writing

### Beginning

Provide 1:1 prompting  
and support and/or use  
Activity Page 8.2a.

### Intermediate

Have students match the  
sequence of the sentence  
strips to parts of Image  
Card C.U5.L8.5 and  
verbally describe what is  
happening before writing.

### Advanced/Advanced High

Encourage students to use  
domain vocabulary and  
complete sentences.

**ELPS 1.E; ELPS 3.I;**

**ELPS 5.B**

### Support

Have students use  
Activity Page 8.2a. Work  
with individuals or small  
groups of students to  
complete the activity.

## Lesson 8: What Is Sound?, Part 1

# Writing



**Primary Focus:** Students will identify the correct sequence of events to explain  
how sound is created and how it travels. **TEKS 3.9.D.iii; TEKS 3.12.B**

Students will write a prediction about how sound travels after watching a video  
clip. **TEKS 3.6.F; TEKS 3.7.C**

### SEQUENCING SENTENCES (10 MIN.)

- Divide the students into groups of three or four students each.
- Distribute the envelopes with the prepared sentence strips to each group.
- Tell students that they will put the sentence strips in the order of how sound waves are created and how the sound travels so it is received by the ear.
- Display Image Card C.U5.L8.5 (Sound Waves Entering the Ear) and tell them they can use it as a guide for solving the sequence.
- Give students a few minutes to put the sentences in order.
- Have each group raise their hands when they think they have the sequence correct.



### Check for Understanding

Check each group's sequence to see if it is correct. Give assistance  
if necessary.

- Have students turn to Activity Page 8.2.
- Have a student read the directions at the top: "Write a paragraph that describes how sound is created and how it travels. Be sure to use sequencing words and use correct spelling, capitalization and punctuation."
- Before they begin to write, brainstorm a list of time sequence words they can use to write their paragraph. Write the words on the board or on chart paper. (Words can include *first, second, third, after, then, next, finally, lastly*, etc.)
- Collect Activity Page 8.2 when complete.

**TEKS 3.9.D.iii** Recognize characteristics and structures of informational text, including: organizational patterns such as cause and effect and problem and solution; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.7.C** Use text evidence to support an appropriate response

## VIDEO: VISUALIZING VIBRATIONS (10 MIN.)

- Show the video “Sounds and Solids: Visualizing Vibrations” (1 minute).

### ► Video: Sounds and Solids: Visualizing Vibrations

#### Written Response to Video

- Have students turn to Activity Page 8.3, Exit Ticket. They will be writing their prediction about whether they think they would be able to hear the tuning fork sound under water and give reasons to support their answer.

## Lesson 8: What Is Sound, Part 1

# Language



**Primary Focus:** Students will write words using suffixes *-ous* and *-ly*.

✚ **TEKS 3.3.C**

## SAYINGS AND PHRASES (5 MIN.)

- Proverbs are short, traditional sayings that have been passed along orally from generation to generation. Help your students understand the difference between the literal meanings of the words and their implied or figurative meanings.
- Reread the following excerpt from the Read-Aloud:

“Alfie, behave yourself and don’t bark all day at squirrels!” called Samuel.

“Ha!” laughed Jack. “His bark is worse than his bite.”
- Ask students if they have ever heard anyone else say that “his bark is worse than his bite.” Have the students repeat the saying. Ask students if they have an idea about what this saying may mean, and discuss their ideas. Explain that the literal meaning of this saying is that a dog is more apt to bark loudly and viciously than it is likely to bite; oftentimes when this saying is used, it is referring to a person who may talk in a harsh tone, but is actually harmless. Instead of Jack saying, “His bark is worse than his bite,” he could have said, “Don’t worry, Alfie is harmless.”
- Ask the following questions:

1. Do you think Alfie barking means that he would bite? Why or why not?

» No, Alfie just barks because he is excited.

✚ **TEKS 3.3.C** Identify the meaning of and use words with affixes such as *im-* (into), *non-*, *dis-*, *in-* (not, non), *pre-*, *-ness*, *-y*, and *-ful*.

## Challenge

Have students research how sound waves change when they travel through gas, liquid, and solid and write a sequence paragraph for each.

## Activity Page 8.3



**ENGLISH  
LANGUAGE  
LEARNERS**

## Speaking and Listening Activity

### Beginning

Help students work as a group to discuss predictions and complete page 8.3. Circulate for support.

### Intermediate

Have students work in pairs to complete page 8.3. Circulate for support.

### Advanced/Advanced High

Have students work individually to complete page 8.3. Circulate for support.

**ELPS 2.F**

2. What do you think Samuel meant when he says to Jack, “You mean like yours?”
  - » Samuel was joking that “Jack’s bark is worse than his bite,” meaning that his grumpy talk is harmless and that Jack wouldn’t hurt anyone.
3. Can you think of a time when someone may have complained or been grumpy when speaking to you, but they did not do anything that was harmful?
  - » Answers may vary.
- Tell students to listen for instances when this phrase is appropriate, as they continue listening to the story. Try to find other opportunities to use this saying in the classroom.



## MORPHOLOGY: SUFFIXES –OUS AND –LY (15 MIN.)

TEKS 3.3.C

### Practicing Suffixes –ous and –ly

- Tell students that today, they will practice how to determine whether words in sentences should have the suffix –ous or have both the suffixes –ous and –ly.
- Direct students’ attention to the first sentence you wrote on the board in advance:
  - I wear a helmet when I ride my bike because it is \_\_\_\_\_ to ride without a helmet on the road with cars.
- Call on one student to read the sentence aloud.
- Ask students what word, either with the suffix –ous or with both the suffixes –ous and –ly, goes in the blank. Students should say *dangerous*.
- Ask students what part of speech the word is that correctly fills in the blank.
  - » adjective
- Discuss with students why *dangerous* fits in the blank and not *dangerously*. (The word that will fill in the blank will describe a noun. Adjectives describe nouns. *Dangerous* is an adjective. *Dangerously* is an adverb, which is a part of speech that describes verbs. That is not the part of speech that will correctly fit in this blank.)
- Follow the same procedures for the other two sentences you prepared in advance. (For sentence 2, the word that will fit in the blank will describe a verb. Adverbs are words that describe verbs. *Furiously* is the adverb that fits in this sentence. For sentence 3, the word that will fit in the blank will describe a noun. Adjectives describe nouns. *Mountainous* is the adjective that fits in this sentence.)

## ENGLISH LANGUAGE LEARNERS



### Language Modifying to Add Details

#### Beginning

Provide 1:1 support for students to complete Activity Pages 8.4.

#### Intermediate

Provide additional examples and model adding the –ous and –ly endings and discuss how the words changed.

#### Advanced/Advanced High

Have students brainstorm more words that have –ous and –ly endings and describe how the original word changed in meaning.

ELPS 2.C



TEKS 3.3.C Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful.

- Have students turn to Activity Page 8.4. Ask students to work independently to complete the activity.
- Collect Activity Page 8.4.

### SPELLING (15 MIN.)

- Tell students they will sort words with /ae/ spelled “ay”, “ai”, and “ea”.
- Direct students’ attention to the example on the board.
- Ask students to identify the vowel patterns.
  - » “ay” > /ae/, “ai” > /ae/, “ea” > /ae/
- Tell students to read the words below the headers with you.
  - failed, blazes, statement, says, greatly, daytime
- Ask students which vowel(s) in the word *failed* have the same sound as /ae/. Circle the ‘ai’ in *failed*. Ask students under which header to put *failed*. (“ai” > /ae/) Write the word under the correct header.
- Repeat with the remaining words.
- Note for students that *blazes*, *statement*, and *says* do not belong under any header, as they do not follow any of the patterns listed. Ask students what vowels make the /ae/ sound in *blazes* and *statement*. (“a\_e”) Note for students that *says* is pronounced /sez/.
- Have students turn to Activity 8.5 and complete it independently.
- Have students compare their words with a partner and against the spelling lists, and make corrections if necessary.

End Lesson

### Activity Page 8.4



### Activity Page 8.5



### Activity Page 8.6



### Lesson 8: What Is Sound?

# Take-Home Material

- Have students take home Activity Page 8.6 to share with a family member at home.



## Sound Sequencing Sentence Strips

---

**The violinist moves her bow across the strings of the violin.**

---

**The violin strings vibrate.**

---

**The vibrating violin strings cause air particles to vibrate.**

---

**The sound waves travel through the medium of the air.**

---

**Sound waves are received by the listener's ears.**

---



## 9

# What Is Sound?, Part 2

## PRIMARY FOCUS OF LESSON

### Reading

Students will compare and contrast sound and light energy.

✦ **TEKS 3.6.B; TEKS 3.6.G; TEKS 3.6.H**

### Writing

Students will write and answer questions based on reading about how sound travels.

✦ **TEKS 3.6.B; TEKS 3.13.A**

### Speaking and Listening

Students will participate in a group discussion following a sound experiment and share ideas and information.

✦ **TEKS 3.1.C**

### Language

Students will choose adjectives, adverbs, and synonyms to expand simple sentences.

✦ **TEKS 3.11.D.iv; TEKS 3.11.D.v; TEKS 3.3.D**

✦ Students will use dictionary skills to find the meaning of words. **TEKS 3.3.A**

## FORMATIVE ASSESSMENT

### Activity Page 9.2

✦ **Compare and Contrast: Light and Sound** Compare and contrast using a graphic organizer. **TEKS 3.6.H**

### Activity Page 9.3

✦ **Question Wall** Ask and answer questions about the reading. **TEKS 3.6.B; TEKS 3.13.A**

### Discussion

✦ **Seeing Sounds Lab Notes** Explain ideas in a small group discussion. **TEKS 3.1.C**

### Activity Page 9.4

✦ **Building Sentences** Expand sentences by choosing specific words for effect. **TEKS 3.11.D.iv; TEKS 3.11.D.v; TEKS 3.3.D**

### Activity Page 9.5

✦ **Dictionary Skills** Demonstrate dictionary skills. **TEKS 3.3.A**




### Writing Studio

If you are using Writing Studio, you may begin Unit 3, Lesson 1 after completing this lesson. If you have not done so already, you may wish to review the Writing Studio materials and their connection to this unit.

## LESSON AT A GLANCE

|                                      | Grouping    | Time    | Materials                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading (60 min.)                    |             |         |                                                                                                                                                                                                                                                                                                                                 |
| Introducing the Chapter              | Whole Group | 10 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Activity Pages 9.1, 9.2                                                                                                                                                                                                               |
| Whole Group Reading:“What is Sound?” | Whole Group | 20 min. |                                                                                                                                                                                                                                                                                                                                 |
| Partner Reading                      | Partner     | 15 min. |                                                                                                                                                                                                                                                                                                                                 |
| Compare and Contrast                 | Independent | 15 min. |                                                                                                                                                                                                                                                                                                                                 |
| Writing (25 min.)                    |             |         |                                                                                                                                                                                                                                                                                                                                 |
| Question Wall                        | Independent | 25 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Lab Notes<br><input type="checkbox"/> sticky notes (four per student)<br><input type="checkbox"/> blank space on wall or whiteboard<br><input type="checkbox"/> Activity Page 9.3                                                     |
| Speaking and Listening (20 min.)     |             |         |                                                                                                                                                                                                                                                                                                                                 |
| Seeing Sounds                        | Small Group | 20 min. | <input type="checkbox"/> variety of boxes the size of a shoebox and smaller<br><input type="checkbox"/> rubber bands of different widths and sizes<br><input type="checkbox"/> large bowl<br><input type="checkbox"/> plastic wrap<br><input type="checkbox"/> salt or rice<br><input type="checkbox"/> Seeing Sounds Lab Notes |
| Language (15 min.)                   |             |         |                                                                                                                                                                                                                                                                                                                                 |
| Grammar: Building Sentences          | Independent | 15 min. | <input type="checkbox"/> Activity Page 9.4                                                                                                                                                                                                                                                                                      |

 **TEKS 3.6.B** Generate questions about text before, during, and after reading to deepen understanding and gain information; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.13.A** Generate questions on a topic for formal and informal inquiry; **TEKS 3.1.C** Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively; **TEKS 3.11.D** Edit drafts using standard English conventions, including: (iv) adjectives, including their comparative and superlative forms; (v) adverbs that convey time and adverbs that convey manner; **TEKS 3.3.D** Identify and explain the meaning of antonyms, synonyms, idioms, homophones, and homographs in a text; **TEKS 3.3.A** Use print or digital resources to determine meaning, syllabication, and pronunciation.

## Take-Home Material

"What Is Sound?"

☐ Activity Pages 9.5, 9.6

Spelling: Dictionary Skills

## ADVANCE PREPARATION

### Reading

- Have enough sticky notes so that each student has at least four. Prepare a blank space, such as the board, a wall, or chart paper for the notes to be posted.

### Speaking and Listening

- Prepare the following: a variety of boxes the size of a shoebox and smaller; rubber bands of different widths and sizes; and a large bowl with plastic wrap tightly stretched across the top. If possible, have enough boxes and rubber bands so that each small group of three to four students has several to conduct the experiment.
- Prepare enough copies of the Seeing Sounds Lab Notes found at the end of this lesson so there is one for each group.

### Universal Access

- Create small groups strategically for the Speaking and Listening activity.
- Remind students about the rules for working and discussing in small groups.

~~~~~ Start Lesson ~~~~~

Lesson 9: What Is Sound?, Part 2

Reading



Primary Focus: Students will compare and contrast sound and light energy.



TEKS 3.6.B; TEKS 3.6.G; TEKS 3.6.H

INTRODUCING THE CHAPTER (10 MIN.)

Note: The next several chapters introduce the concept of sound and its characteristics. Students will complete graphic organizers such as Lab Notes as they read the chapter, just as they did with light.



TEKS 3.6.B Generate questions about text before, during, and after reading to deepen understanding and gain information; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.6.H** Synthesize information to create new understanding.

- Make sure you and your students have a copy of *Adventures in Light and Sound*.
- Tell students that the title of today’s chapter (Chapter 6) is “What Is Sound?” Tell them that they will learn many interesting facts about sound.
- Ask students to turn to the Table of Contents, locate the chapter, and then turn to the first page of the chapter.
- Ask students to turn to Activity Page 9.1. Tell students that this is the beginning of the Lab Notes they will be keeping as they read and learn about sound.
- Have students look over the Lab Notes and ask any questions they might have.

Activity Page 9.1



PREVIEWING THE VOCABULARY

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of *Adventures in Light and Sound*.

vocal cords, n. muscles that produce sound when air passes over them

medium, n. a substance that light or sound can travel through, like a solid, liquid, or gas

| Vocabulary Chart for Chapter 6 “What Is Sound?” | | |
|---|---------------------------------|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | vocal chords | medium |
| Multiple Meaning | | medium |
| | | |
| Sayings and Phrases | | |

WHOLE GROUP READING: “WHAT IS SOUND?” (20 MIN.)

- Read the title of the chapter together as a class, “What Is Sound?”

6 What Is Sound?

An alarm clock rings, a dog barks, a voice calls, “Time to get up!” Every day is full of familiar sounds but what exactly is sound?

Sound is caused by a back and forth movement called vibration. Try this. Close your lips and hum. While you are humming, feel your throat under your chin. Do you feel something buzzing or vibrating? What you feel is caused by something moving back and forth very fast. When you hum, the **vocal cords** in your throat vibrate back and forth. This makes the air around them vibrate, which then creates the sound you hear.



*When you hum, your **vocal cords** vibrate to make sounds.*

Pages 68–69

- Draw students’ attention to the picture on **page 69** and read the caption aloud.
- Ask students, “Why do you think there is an image of a person humming in a chapter about sound?”
 - » Answers may vary.
- Have students read **page 68** to themselves to find the answer to the question: “What causes sound?”
- When students have finished reading, restate the question and call on a student to answer.
 - » Sound is caused by vibrations, such as when something moves back and forth very quickly.
- Have students hum while feeling their throats just under the chin. Ask them to pay attention to the “buzzing” feeling in their throats.

- Have students give you a thumbs up if they feel the “buzzing” vibration.
- Ask, “What in your throats is causing the vibration?”
 - » When you hum, the vocal cords in your throat vibrate back and forth.
- Have students add the following to their Lab Notes to answer the question “What is it?” Write the word *vibration*.

Sound, like light, is a form of energy. Also like light, sound moves in waves. **Sound waves** move out from a vibrating object, making the air move back and forth in a way that we can't see.

Two things must happen to create a sound. First, something needs to vibrate and create **sound waves**. Then, something like air or another **medium** needs to carry the **sound waves**. You hear sounds more clearly if you are close to whatever is vibrating and making the **sound waves**. The farther away that the **sound waves** spread out, the weaker they get. That is why you can hear a friend standing right next to you better than if they are calling to you from across the street.



*This is what a **sound wave** might look like if we could see it.*



The next time you turn on your radio or TV, lightly put your fingers on the speakers. Do you feel the sound vibrations?

70

71

Pages 70–71

- Direct students' attention to the top image on **page 71** and read the caption aloud as a class.
- Say to students, "I wonder what sound waves are. Let's read **page 70** to find out more."
- When students have finished reading, restate the question and have students answer.
 - » Sound waves move out from a vibrating object, making the air move back and forth in a way that we can't see.
- Ask, "What two things are needed to create sound?"
 - » The two things needed to create sound are something to vibrate and create sound waves and something, like air or another medium, to carry the sound waves.

- Ask, “Why are some sounds easier to hear than others?”
 - » The farther away sound waves spread out from their source, the weaker they get.
- Direct students’ attention to the bottom images on **page 71** and ask them to read the caption.
- Have students add the following to the Lab Notes: To answer the question “How do we get it?” write *vibrating waves* and draw a wavy line under the words.

Sound travels not only through air, which is a gas, but through other **mediums**. In fact, sound can travel through solids, liquids, and gases.

Think about sound traveling through solids, like a window or even a closed door. If you are close enough, you can still hear sounds on the other side of a window or door.

How about liquids? Have you ever been underwater in a swimming pool when you have heard someone's voice or another sound? It probably sounded different than it would if you were not under water, but you were still able to hear it. This is an example of sound traveling through a liquid—the water in the pool.

One place that sound cannot travel is in outer space. Sound cannot travel through the emptiness, or vacuum, of space. There is no sound in outer space because there is no **medium** to carry it.



Sound travels through solids, liquids, and gases (air).

72

73

Support

Remind students of the definition of *medium*. Have students recall the Read-Aloud and the Multiple-Meaning Word activity in the previous lesson. Which type of medium are we talking about?

Challenge

Have students give several examples of types of solids, liquids, and gases that sound would travel through and make predictions about what it would sound like.

Pages 72–73

- Ask students to read **page 72** to themselves to find the answer to the question: “Through what mediums does sound travel?”
- When students have finished reading, restate the question and have students answer.
 - » Answers may vary but should at least include solids, liquids, and/or gases.
- Direct students’ attention to the images on **page 73**. Have one student read the caption to the class.
- Ask, “What is one place where sound cannot travel and why is that so?”
 - » Outer space is one place sound cannot travel because outer space is a vacuum. Sound needs a medium to carry it and there is no air in a vacuum.
- Have students add the following to the Lab Notes: To further answer the question, “How do we get it?” under the wavy line, have students write the word *medium* and shade the area behind the word.

You might wonder about the speed at which sound travels. **Sound waves** travel much slower than light waves. **Sound waves** travel at about 750 miles per hour. That's fast, but not close to the 186,000 miles per second that light can travel. It would take a sound 33 hours to travel around Earth once. Remember that light can go seven times around Earth every second!

Here's an example to prove that light travels faster than sound. Think about the last time you were around a storm with thunder and lightning. Did you notice that you saw each flash of lightning before you heard the clap of thunder? That's because light travels faster than sound!



During a storm, you will see lightning before you hear thunder. That is because light travels faster than sound.

Pages 74–75

- Ask students to read **page 75** to themselves to find the answer to the question “Which travels faster, sound or light?”
- When students have finished reading, restate the question and have students answer.
 - » Light travels much faster.
- Remind students that light travels at different speeds depending on what it is traveling through. Ask, “Does sound travel at a different speed than light? How do you know?”
 - » Yes, because you can see lightning before you hear thunder.
- Have students add the following to the Lab Notes: In the row labeled “Speed of Sound vs. Speed of Light,” Write SOUND, 750 Miles Per Hour on the left and draw a snail underneath. Write LIGHT, 186,000 Miles Per Second on the right and draw a rabbit underneath.

The **medium** through which sound travels affects its rate of speed. Interestingly, **sound waves** travel fastest through solids. In old western movies, you may have seen a cowboy put his ear down to the steel railroad tracks to hear if a train is coming. That is because the sound travels faster through the steel than through the air.

Try this. Listen while you drum your fingers on your desk. Now, rest your ear right on the surface of the desk and drum your fingers again. Which way sounded louder?

The sound was louder when you put your head on the desk. This is because the sound traveling through the solid wood of your desk traveled faster than if it had first traveled through the air. Every time sound changes **mediums**, it loses some of its loudness.



Sound travels fastest through solids, such as the wood of your desk or a wall.

Pages 76–77

- Have students read **pages 76** to themselves to find the answer to the question “Does sound travel faster through a solid or a gas?”
- When students have finished reading, restate the question and have students answer.
 - » Sound travels faster through a solid.
- Ask students to tap their desk with their fingers and listen. Then have students put one ear down on their desks and listen to the tapping again. Ask, “Which is louder, when you have your head up or when your ear is on the desk?”
 - » when your ear is on the desk
- If there is time, have students try listening through other mediums, such as a piece of paper, the classroom door, or a window, and share their experiences.

- As students add the following to their Lab Notes: Tell them that even though the chapter didn't mention liquids on this page, sound travels faster through liquids than gases but not as fast as through solids. (Refer to the illustration on **page 77.**)
- Have students add the following to their Lab Notes:
 - To answer the question "How does it travel?" write FASTEST and SOLID (DOOR) and draw a door.
 - Write FASTER and LIQUID (WATER) and draw a glass of water.
 - Write FAST and GASES (AIR) and draw a picture of squiggly lines to show air.
 - Write CANNOT TRAVEL and VACUUM (SPACE) and draw stars.

Support

Pull together a small group of students who may need support in decoding. Record any miscues or patterns of errors that may need to be addressed.

Activity Page 9.2



**ENGLISH
LANGUAGE
LEARNERS**



Reading
Reading/Viewing Closely

Beginning

Provide 1:1 prompting and support as students complete their graphic organizers, helping them locate key ideas in their notes.

Intermediate

Have students work with a partner to complete the graphic organizer.

Advanced/Advanced High

Have students compare their notes with those of a partner before completing the writing portion of the graphic organizer.

ELPS 4.D

PARTNER READING (15 MIN.)

- Pair students to reread and discuss the chapter. You may wish to use any or all of the following pairings: strong readers with readers who need more support; readers of similar skill levels; or English learners with native speakers. Student pairings should change throughout the year. As students read, circulate among the class, monitoring students' focus and progress.
- You may also wish to pull together a small group of students who need more support.
- Explain to students that, for this lesson, they will both read aloud to their partners. They will take turns reading aloud each paragraph on the page. Students can ask their partner for help with sounding out or defining words as necessary. They may also use the glossary to help with definitions.
- This activity allows for the teacher to listen to students reading individually and take anecdotal records of their fluency, or the teacher may conduct a more formal fluency assessment of several individual students.

COMPARE AND CONTRAST (15 MIN.)

- Have students turn to Activity Page 9.2.
- Tell students that they will be using a graphic organizer to compare and contrast light and sound. Ask students to explain how it is used.
- Provide examples of some key ideas that would go under the light category and the sound category to get them started.
- Tell them they may use any of their light or sound lab notes, *Adventures in Light and Sound*, etc., to find details.
- Circulate as the students are putting ideas in the chart to make sure they are on the right track.
- Before having students complete the writing portion of the organizer, have a few students share some of their ideas.
- Collect Activity Page 9.2 when complete.

Lesson 9: What Is Sound?, Part 2

Writing



Primary Focus: Students will write and answer questions based on reading about how sound travels. **TEKS 3.6.B; TEKS 3.13.A**



**ENGLISH
LANGUAGE
LEARNERS**

Writing
Reading/Viewing Closely

Beginning

Reread text in smaller chunks and ask students questions with one-word answers; for example, "Sound cannot travel through a ____."

Intermediate

Model turning sentences in the text into questions.

Advanced/Advanced High

Encourage students to use domain vocabulary and complete sentences.

ELPS 1.E; ELPS 5.B

Support

Have students locate facts in the text. Have students read the sentence with the fact and then change the words so that the sentence becomes a question.

Challenge

Have students write bonus questions about both light and sound and answer others' questions. They may use any previous Lab Notes to create their questions.

QUESTION WALL (25 MIN.)

TEKS 3.6.B; TEKS 3.13.A

- Distribute four sticky notes to each student.
- Tell students that they are going to challenge their neighbors by writing questions based on the reading.
- They need to write three questions about sound that someone else can answer using evidence from the text. They will write each question on a separate sticky note and put their initials on the sticky note.
- After students have written their questions, call them up in groups to stick their questions to the wall, whiteboard, or any other space available in the classroom. Encourage students to mix up their questions so they are not all next to each other on the wall.
- Once all the questions are on the wall, call students two at a time to come to the wall and select three questions. They should do it quickly and without reading the questions first. They should not select their own questions.
- Once everyone has selected their questions, have students turn to Activity Page 9.3. They will write and answer the questions they selected. When completed, they will put the sticky notes they chose on the back for handing in.
- Discussion questions:
 - Ask: "Was it easier to write the questions or write the answers?"
 - Ask: "Who thinks that they got a really difficult question to answer?" (Have students share their questions and answers.)

TEKS 3.6.B Generate questions about text before, during, and after reading to deepen understanding and gain information;
TEKS 3.13.A Generate questions on a topic for formal and informal inquiry.

Seeing Sounds Lab Notes



ENGLISH LANGUAGE LEARNERS



Speaking and Listening Exchanging Information and Ideas

Beginning

Ask simple yes or no questions; for example, “Did one rubber band make a soft sound?”

Intermediate

Have students create a movement or gesture to go with their one-word description of the sound.

Advanced/Advanced High

Encourage students to speak in complete sentences when explaining why they chose the word.

ELPS 1.D

Support

Group students with similar needs together and work directly with them to complete the task, giving assistance as needed.

Challenge

Have students design their own sound experiment to demonstrate how sound waves travel. They should include what materials would be needed, the procedure, and the expected results.

Lesson 9: What Is Sound?, Part 2

Speaking and Listening



Primary Focus: Students will participate in a group discussion following a sound experiment and share ideas and information. **TEKS 3.1.C**

SEEING SOUNDS (20 MIN.)

- Briefly review what a vibration is and how vibrations make sounds.
- Divide students into groups of three or four each. Have one member from each group collect a variety of boxes and rubber bands. Alternately, the teacher may conduct the experiment for the whole group, then have the students discuss in their small groups after each different box and rubber band combination.
- Distribute one copy of Seeing Sounds Lab Notes to each group.
- Tell students they will stretch one of the rubber bands over a box and then make predictions as to what kind of sound it will make when it is strummed.
- After strumming the rubber band, each group member will say one word that describes what they saw or heard and why they chose it. One student will record the student name and the word they chose on the Seeing Sounds Lab Notes.
- Ask for some of the groups to share what they observed and heard. Ask them to use sensory words in their descriptions.
- Continue until the students have tried out many different box and rubber band combinations.
- Circulate among the small groups to make sure that students are on task and that all participants are taking part in the discussion.
- Discuss the results of the experiment as a whole class.
- Next, display the bowl with the plastic wrap over the top.
- Have a volunteer clap their hands close to the bowl. Ask: Did you hear the sound? (yes) Did you see the vibration? (no)
- Next, put the salt or rice on top of the plastic and repeat the experiment again. Ask: Did you see the vibrations that time? Why?
 - » yes, the salt or rice is bouncing because of the vibrations on the plastic wrap



TEKS 3.1.C Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively.

- Try having students clap loudly or softly, quickly and slowly, and discuss what they see and hear.
- If possible, put the bowl next to a radio speaker and play a loud sound. Ask: Can you see the vibrations now?
- Collect the Seeing Sounds Lab Notes from each of the groups.

Lesson 9: What Is Sound?, Part 2

Language



Primary Focus: Students will choose adjectives, adverbs, and synonyms to expand simple sentences. **TEKS 3.11.D.iv; TEKS 3.11.D.v; TEKS 3.3.D**

Students will use dictionary skills to find the meaning of words. TEKS 3.3.A

GRAMMAR: BUILD SENTENCES (15 MIN.)

- Tell students to take out Activity Page 9.4 and add adjectives, adverbs, and synonyms to the starter sentences to make more interesting sentences.
- Collect Activity Page 9.4 when complete.

Activity Page 9.4



**ENGLISH
LANGUAGE
LEARNERS**

Grammar
Selecting Language Resources

Beginning

Provide a word bank of adjectives and adverbs to use in the sentences. Review definitions of the words.

Intermediate

Working in small groups, have students brainstorm adjectives and adverbs that could be used for each sentence.

Advanced/Advanced High

Encourage students to use a variety of adjectives, adverbs, and synonyms and write in complete sentences.

ELPS 1.C

Challenge

Have students create their own starter sentences and then add adjectives, adverbs, and synonyms to write a new sentence.

TEKS 3.11.D Edit drafts using standard English conventions, including: (iv) adjectives, including their comparative and superlative forms; (v) adverbs that convey time and adverbs that convey manner; **TEKS 3.3.D** Identify and explain the meaning of antonyms, synonyms, idioms, homophones, and homographs in a text; **TEKS 3.3.A** Use print or digital resources to determine meaning, syllabication, and pronunciation.

Lesson 9: What Is Sound?, Part 2

Take-Home Material

Activity Page 9.5



Activity Page 9.6



- Have students take home Activity Page 9.5 to complete and Activity Page 9.6 to read to a family member. Remind them to study for the spelling assessment.

Seeing Sounds Lab Notes

Write the group member's name, the word they chose to describe the experiment, and put a check mark in the box if they explained why they chose it.

Experiment #1

| Name | Word | Why? |
|------|------|------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Experiment #2

| Name | Word | Why? |
|------|------|------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Experiment #3

| Name | Word | Why? |
|------|------|------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Experiment #4

| Name | Word | Why? |
|------|------|------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

10

Characteristics of Sound

PRIMARY FOCUS OF LESSON

Language

Students will write words using spelling patterns and rules for words with the /ae/ sound. **TEKS 3.2.B.i**

Reading

Students will read and answer comprehension questions about sound and its characteristics. **TEKS 3.7.C**

Speaking and Listening

Students will listen to the story about sound qualities and answer listening comprehension questions. **TEKS 3.1.A; TEKS 3.6.F; TEKS 3.6.G**

Writing

Students will write a reflection about what they've learned about sound in the reading and through the Read-Aloud. **TEKS 3.6.B; TEKS 3.12.B**

FORMATIVE ASSESSMENT

Activity Page 10.1

Spelling Assessment Spell words with the /ae/ sound correctly. **TEKS 3.2.B.i**

Activity Page 10.3

3-2-1 Reflection Write in response to what they've learned through reading and listening. **TEKS 3.6.B; TEKS 3.12.B**

TEKS 3.2.B.i Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.G** Evaluate details read to determine key ideas; **TEKS 3.6.B** Generate questions about text before, during, and after reading to deepen understanding and gain information; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.

LESSON AT A GLANCE

| | Grouping | Time | Materials |
|---|-------------|---------|---|
| Language (20 min.) | | | |
| Spelling Assessment | Independent | 20 min. | <input type="checkbox"/> Activity Page 10.1 |
| Reading (40 min.) | | | |
| Introducing the Chapter | Whole Group | 5 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i>
<input type="checkbox"/> Activity Page 10.2 |
| Whole Group Reading: "Characteristics of Sound" | Whole Group | 20 min. | |
| Lab Notes: Comprehension Questions | Partner | 15 min. | |
| Speaking and Listening (45 min.) | | | |
| Introducing the Read-Aloud | Whole Group | 5 min. | <input type="checkbox"/> Digital Flip Book: U5.L10.1–U5.L10.10
<input type="checkbox"/> Image Cards C.U5.L10.1–C.U5.L10.3, C.U5.L7.1, C.U5.L8.4
<input type="checkbox"/> sheet music (optional) |
| Presenting the Read-Aloud: “Qualities of Sound” | Whole Group | 25 min. | |
| Discussing the Read-Aloud | Whole Group | 10 min. | |
| Word Work: <i>Frequency</i> | Whole Group | 5 min. | |
| Writing (15 min.) | | | |
| 3-2-1 Reflection | Independent | 15 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i>
<input type="checkbox"/> Activity Page 10.3 |
| Take-Home Materials | | | |
| <i>Characteristics of Sound</i> | | | <input type="checkbox"/> Activity Page 10.4 |

ADVANCE PREPARATION

Speaking and Listening

- Prepare to project Images U5.L10.1–U5.L10.10
- Prepare to display digital or physical versions of Image Cards C.U5.L10.1–C.U5.L10.3, C.U5.L7.1, and C.U5.L8.4.

Universal Access

- Provide support in completing Activity Page 10.3 by reviewing key ideas from previous lessons.
- Display image cards from the unit.

Start Lesson

Lesson 10: Characteristics of Sound Language



Primary Focus: Students will write words using spelling patterns and rules for words with the /ae/ sound. **TEKS 3.2.B.i**

SPELLING ASSESSMENT (20 MIN.)

TEKS 3.2.B.i

- Have students turn to Activity Page 10.1 for the spelling assessment.
- Tell students that for this assessment, they will write their words under the header to which they belong. For example, if you call out the word *hay*, they would write that word under the header 'ay' > /ae/.
- Tell students that should a spelling word fit under more than one header, they should only write the word under one.
- Using the list below, call out the word using the following format: say the word, use it in a sentence, and say the word once more.
- After you have called out all of the words including the Challenge Words and the Content Word, go back through the list slowly, reading each word just once more.

Activity Page 10.1



TEKS 3.2.B.i Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

| | |
|--------------|--------------------------------------|
| 1. daydreams | 12. great |
| 2. payment | 13. dainty |
| 3. daisies | 14. breaker |
| 4. awaited | 15. obtain |
| 5. yesterday | 16. ballplayers |
| 6. crayons | 17. beefsteak |
| 7. betrayer | 18. trainees |
| 8. explain | Challenge Word: <i>family</i> |
| 9. mermaid | Challenge Word: <i>young</i> |
| 10. subway | Content Word: <i>straight</i> |
| 11. giveaway | |

- Ask students to write the following sentences as you dictate them.
 - Gail is the greatest ballplayer on the team.
 - Our art teacher asked us to add color to the sailboat with crayons.
- You may find it helpful to use the Spelling Analysis Chart found at the end of this lesson to analyze students' mistakes. This will help you understand any patterns that are beginning to develop, or that are persistent among individual students.

Lesson 10: Characteristics of Sound

Reading



Primary Focus: Students will read and answer comprehension questions about sound and its characteristics. **TEKS 3.7.C**

INTRODUCING THE CHAPTER (5 MIN.)

- Make sure you and your students each have a copy of *Adventures in Light and Sound*.
- Review with students what they learned about sound in the previous chapter by referring back to Activity Page 9.1.

Activity Page 9.1



TEKS 3.7.C Use text evidence to support an appropriate response.

- Remind students that:
 - Sound is caused by vibrations.
 - Sound travels through mediums.
 - Sounds travel fast through gases, faster through liquids, and fastest through solids. Sound cannot travel through space because it is a vacuum and sound needs a medium in order to travel.
 - Sound travels slower than light.
- Ask students to turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.

Previewing the Vocabulary

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the Reader.

pitch, how high or low a sound is`

volume, the loudness or intensity of a sound

intense, strong

damage, hurt, harm

| Vocabulary Chart for “Characteristics of Sound“ | | |
|---|---------------------------------|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | pitch | intense
damage |
| Multiple Meaning | | volume |
| | | |
| Sayings and Phrases | | |

Chapter 7 Characteristics of Sound

Let's review what you have learned so far about sound by comparing it to light. How is sound different from light? Sound must have a medium to travel through—a solid, liquid, or gas. Light does not need a medium. Remember, light can travel through the emptiness, or vacuum, of outer space. Sound cannot.

The speed at which light and sound travel is also different. Light travels much faster than sound.

There are important ways that light and sound are similar. They are both forms of energy that travel in waves. There are also other similarities.

sound waves



light waves



Both light and sound are forms of energy that travel in waves.

78

79

WHOLE GROUP READING: "CHARACTERISTICS OF SOUND" (20 MIN.)

Pages 78–79

- Draw students' attention to the images on **page 79** and read the caption.
- Ask students to read **page 78** to themselves to find ways in which sound and light are the same and different.
- When students have finished reading, restate the question and ask one student to answer.
 - » similarities: both are forms of energy that travel in waves; differences: sound needs a medium, light does not; light travels faster than sound
- Ask students if this confirms what they put in their graphic organizer in the previous lesson.

When you learned about light, you learned that light waves can be different lengths. Some are long and some are short. It is the length of a light wave that makes it appear to be a particular color.

Perhaps you are wondering whether sound waves differ from one another. Imagine these two sounds—a baby crying for its mother and an adult yelling. Both of these are sounds. The sound waves of each travel through the same medium, air, so they are alike in that way. But a baby crying surely sounds different than an adult yelling! The baby makes a high-**pitched**, “screeching” sound. When an adult yells, it is a low-**pitched**, deep tone. Could this difference in **pitch**, or how high or how low a sound is, come from different kinds of sound waves?



Both of these sounds travel through air. How are they different?

Pages 80–81

- Ask students to look at the images on **page 81**.
- Read the caption, “Both of these sounds travel through air. How are they different?”
- Ask students to read **page 80** to themselves to find out how these sounds are different.
- When students have finished reading, restate the question and call on a student to answer.
 - » The baby makes a high-pitched “screeching” sound and an adult yelling makes a low-pitched, deep sound.

The answer is yes and it has to do with the length of the sound waves! It helps if we first understand how vibrations affect sound waves. Faster vibrations produce shorter sound waves, which make sounds with a higher **pitch**. The baby's screeching sound vibrates very rapidly, making shorter, but more, sound waves. Can you think of some other sounds that have a high **pitch**?

Slower vibrations produce longer waves, which make sounds with a lower **pitch**. A yelling voice makes longer, fewer waves so you hear a lower **pitch**. **Pitch** describes the highness or lowness of a sound. Can you think of some sounds that have a low **pitch**?

Try changing your voice **pitch**. Can you speak in a high, squeaky voice? Can you speak in a low, rumbling voice?



Which sounds are high-pitched? Which are low-pitched?

82

83

Pages 82–83

- Ask students to read **page 82** to themselves to find the answer to the question “What creates changes in pitch? Why is one sound high-pitched and another low-pitched?”
- When students have finished reading, restate the questions and have students answer.
 - » Faster vibrations produce shorter sound waves, which make sounds with a higher pitch. Slower vibrations produce sounds with longer sound waves, which make sounds with a lower pitch.
- Then, ask students, “What kind of vibrations produce the sound waves of a baby crying?”
 - » faster vibrations
- Finally, ask students, “What kind of vibrations produce the sound waves of an adult yelling?”
 - » slower vibrations

Sound also varies in loudness. If you're listening to the radio and a favorite song comes on, you might say, "Turn it up!" and reach for the knob marked **VOLUME**.

When you turn up the **volume**, you are making the sound louder. A scientist might say that you are increasing the sound's **intensity**. More **intense** sound waves carry more energy and make louder sounds.

How far away you can hear a sound depends on its **intensity**. A quiet sound, like a whisper, doesn't travel very far. A really loud sound can travel for hundreds of miles. When fireworks are set off, the sound can be heard miles away.



*Sounds with greater **intensity** are louder and travel greater distances.*

Pages 84–85

- Draw students' attention to the images on **page 85**. Have one student read the caption to the class.
- Ask students to read **page 84** to themselves to find the answer(s) to the question "What are features of loud sounds?"
- When students have finished reading, restate the question and ask them to read the answer(s) from the page.
 - » Loud sounds have more intensity. A loud sound travels far, much farther than a quiet sound.
- Discuss if the word *volume* has another meaning.
 - » a unit of measure

Very loud sounds can **damage** your hearing. People who work around loud sounds all day long often wear ear coverings or plugs to protect their hearing. You should be careful, too, not to turn the **volume** too loud if you like to listen to music.



*Listening to loud sounds repeatedly can **damage** your hearing.*

86

87

Pages 86–87

- Have students read **page 86** to themselves, noting why the word *damage* would be a vocabulary word in this chapter.
- Ask students, “What should you do to protect your hearing from loud sounds?”
 - » Answers may vary but could include use earplugs, turn the volume down, etc.

Activity Page 10.2



**ENGLISH
LANGUAGE
LEARNERS**



Reading
Reading/viewing closely

Beginning

Provide 1:1 prompting and support to students, reading aloud portions of the text if necessary.

Intermediate

Read through each of the multiple-choice answer choices to ensure understanding.

Advanced/Advanced High

Review the directions of the activity and encourage students to write in complete sentences where applicable.

ELPS 4.G

Support

You may wish to use any or all of the following pairings: strong readers with readers who need more support, readers of similar skill levels, or English learners with native speakers.

Challenge

Have students work independently to complete the activity.

LAB NOTES: COMPREHENSION QUESTIONS (15 MIN.)

- Have students reread the chapter with a partner while they complete Activity Page 10.2.
- Once completed, discuss answers with the whole class briefly.
- Pull together small groups and work directly with them to complete the activity.

Lesson 10: Characteristics of Sound

Speaking and Listening



Primary Focus: Students will listen to the story about sound qualities and answer listening comprehension questions. **TEKS 3.1.A; TEKS 3.6.F; TEKS 3.6.G**

INTRODUCING THE READ-ALoud (5 MIN.)

- Ask students if they remember which of the characters in the story has been teaching about sound.
 - » Jack
- Where were the characters the last time we read about them?
 - » New York City
- Ask students if they have ever heard of an orchestra. Show Image Card C.U5.L10.1 (Orchestra) and explain that an orchestra is made of up a group of musicians who play a variety of instruments—including stringed, woodwind, brass, and percussion—that produce a variety of sounds. If possible, show the students a piece of sheet music.
- You may wish to play a piece of music played by an orchestra on a CD or show a video from the Internet.
- You may use one or two easily available instruments: a harmonica, a recorder, a child's drum, or a bell will work fine for this discussion. Ask the students to look at the instrument and think about how vibrations are created. Ask the students to predict how the particular instrument makes changes in its sounds. You may choose, or ask a volunteer, to demonstrate the way the instrument makes sounds, and the ways it allows the musician to change the sound.



TEKS 3.1.A Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.F** Make inferences and use evidence to support understanding; **TEKS 3.6.G** Evaluate details read to determine key ideas.

- Ask the students to describe the qualities of the sound the instrument makes. Ask, “Do you find the sounds pleasing or displeasing?” Explain that in this Read-Aloud, students will hear about an orchestra concert and the sounds instruments make.
- Tell students to listen to find out more about sound and the different qualities that cause variations in sounds.

Previewing the Vocabulary

Core Vocabulary

- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

audiologist, a doctor who studies hearing and how to help people with hearing loss

composing, creating or writing; arranging

frequency, the rate at which sound waves are produced; the number of times something happens within a particular period of time

intensity, the measured strength of light and sound; the amount of energy or power something has

Image Card
C.U5.L10.1

Orchestra



| Vocabulary Chart for “Qualities of Sound” | | |
|---|---------------------------------------|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | audiologist
frequency
intensity | composing |
| Multiple Meaning | | |
| | | |
| Sayings and Phrases | | |

PRESENTING THE READ-ALoud: “QUALITIES OF SOUND” (25 MIN.)



Show Image U5.L10.1

Travelers eating ice cream cones

The children had a great time on the boat tour of Manhattan. They had admired the Statue of Liberty, Ellis Island, and the Brooklyn Bridge, and

had especially enjoyed waving to passengers on other boats that passed them by. *Who can tell me why the Statue of Liberty and Ellis Island are significant?* (Students may recall from Grade 2 Immigration that Ellis Island was the first place of entry for many immigrants into the United States, and the Statue of Liberty is a symbol of the United States and of freedom for people immigrating to this country.)

Once they were back on land, Samuel insisted that they all have ice cream. No one protested. They stood on the edge of the curb as Samuel waved his cane in the air in the hope of attracting a taxi.

“It looks like you are planning to attack someone with a large stick!” Jack exclaimed.

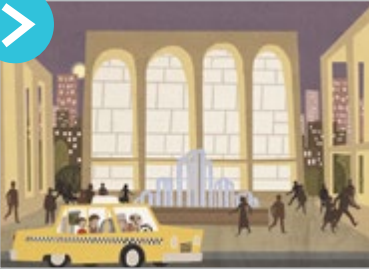
Both Amy and Ethan burst out laughing.

“I’m trying to hail a taxi,” Samuel explained.

“Well, I don’t know if I would stop!” yelled Jack. “I think I would fear for my life.”

Nevertheless, after a few minutes of cane waving, a taxi slowed to a halt. The driver poked his head out of the window and asked, “Where to?”

“Lincoln Center,” Jack replied.

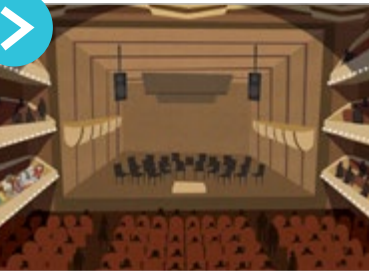


Show Image U5.L10.2 **Cab pulling up to Lincoln Center**

Jack had arranged for them to attend an afternoon concert at the Lincoln Center. They were going to listen to an orchestra made up of young musicians from all over the United States. After the concert, they were going to have dinner before catching the train home.

The traffic seemed to be moving a little faster than it had been earlier in the day, and before they knew it they had arrived at their destination. Once again, they paid the taxi driver and piled out of the cab. Immediately, Jack took charge and led them toward an impressive building known as Avery Fisher Hall.

Inside the main door, Jack collected four tickets from the box office, and after showing the tickets to a member of the staff, they were handed programs and directed to their seats. *What is an impressive building? Does the image give you a clue?*



Show Image U5.L10.3 **Inside the concert hall**

Jack had bought tickets in the first balcony to the left of the stage. They sat down together in the comfortable plush seats and took in the beautiful sights and sounds of the famous concert hall.

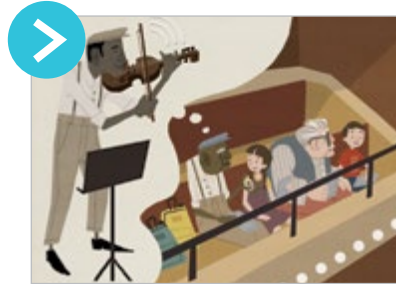
“What sort of music will we hear?” asked Ethan.

“The musicians are going to play music from well-known movies. I think you’ll enjoy it, Ethan,” explained Jack.

“Which movies?” asked Amy.

“Take a look in the program,” advised Samuel. “There you will find the titles of all the pieces being played today.”

Amy and Ethan immediately began to scour the pages of the program.



Show Image U5.L10.4

Jack telling about playing his violin

Turning to the children, Jack said, “As you know, I am a musician who has been composing and playing combinations of carefully arranged

musical notes most of my life. Each musical note has a particular sound. When you combine these sounds successfully, the end result is a perfectly harmonious musical composition.” *What is the word Jack used to describe a written piece of music? (composition) What is the root word in composition? (compose) What do you think harmonious means? What is the root word?*

“So, music is like the gift of sound,” Ethan mused.

“That’s a nice way to think about it,” Amy replied.

Jack reached into his pocket and pulled out a small hearing aid and placed it inside his left ear.

“Jack, I didn’t know you used a hearing aid,” Amy said.

“Yes, the audiologist I went to see gave this device to me. I should use it more than I do,” replied Jack. “Today I want to make sure that I can hear these wonderful musicians.” *What does the root in audiologist have in common with Jack’s last name, Audire? (Aud) Based on what you know, what do you think an audiologist does? Show Image Card C.U5.L10.2 (Hearing Aid). Explain that a hearing aid is a small device that is worn in the ear to make sounds louder so a person can hear better.*

“He doesn’t wear it when I am talking to him,” announced Samuel.

“What would be the point of that?” joked Jack. He was no longer yelling. It was clear that the hearing aid was helping him to hear.

Image Card
C.U5.L10.2

Hearing Aid





Show Image U5.L10.5

Orchestra playing

Before long it was time for the concert to begin. The lights began to dim, the musicians appeared, the conductor took his place, and the sound of music

burst forth into the air. *Point to the conductor in the image and ask, "What does a conductor do?"*

The orchestra played a number of well-known pieces. Amy and Ethan recognized some of them from their favorite movies. They watched and listened intently as the musicians played.

After about forty-five minutes, the lights in the concert hall brightened for the intermission, and people began to stretch their legs and wander out into the atrium, or entrance hall.



Show Image U5.L10.6

String and bass instruments

Jack pointed to the violinist, who was adjusting the tightness of the strings on his instrument. *Point to the violin*

and explain that it is classified as a member of the string family of instruments. Ask if anyone can name other stringed instruments. (guitar, harp, banjo, etc.)

"Have I ever explained to you how my favorite instrument, the violin, works?" asked Jack. "The strings of the violin determine how high or low its sound is. The thickness, tightness, and length of the strings all make a difference in the kind of sound it makes."

"I love when you play the violin," said Amy, smiling.

"What's that instrument called, Jack?" Ethan asked curiously, pointing to a large brass instrument toward the back of the orchestra.

Support

Explain that brass is a type of metal.

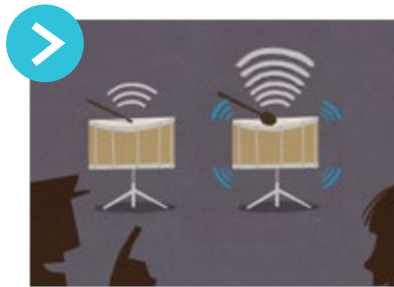
“Oh, the tuba! Another one of my favorites!” exclaimed Jack with pleasure. *The tuba is classified as a brass instrument. Can anyone name other brass instruments?* (French horn, trumpet, trombone)

“The musician blows on the mouthpiece to produce the vibrations inside the instrument. His fingers press the valves, or buttons, on the tuba. This changes the length of the tube through which the air flows.”

“Let me guess!” cried Amy. “The length of the air tube makes the sound lower or higher!”

“You would make a fine musician!” beamed Jack.

“Or maybe a scientist,” Amy responded proudly.



Show Image U5.L10.7

Comparison of drums' intensity showing loud and soft sounds

“This might sound like a silly question,” said Amy, “but what makes sound loud or soft?”

“That’s not a silly question at all,” replied Jack. “You see, the loudness or softness of a sound is caused by the amount of energy being carried in the vibration. The greater the intensity, or power, of a sound wave, the louder the sound. Think about the difference between a drum that is tapped lightly and one that is struck very hard. When the drummer taps lightly, there is less energy applied to the drum—less energy means lower intensity and a softer sound. When the same drum is struck with greater energy, the sound has higher intensity and it’s—loud!”



Show Image U5.L10.8

Comparison of two different drums' pitches

“I see,” said Ethan. “I have another question. What is pitch?”

I heard that word in music class, but I didn't know what it meant," Ethan continued.

"Another excellent question," said Jack. "In order to explain that, let me go back a step or two. When an object vibrates, such as the top of a drum, it does not produce just one sound wave, but many sound waves per second. The faster something vibrates, the shorter the wavelengths it produces. For example, the top of a larger drum vibrates more slowly than the top of a smaller drum. The tightness and thickness of the top of the drum make a difference, too."

Jack took a breath and Samuel jumped in, "If the sound waves have a short wavelength, there are many waves per second. If the waves have a longer wavelength, there are fewer waves per second."

Amy and Ethan giggled as Jack glared at Samuel.

"The rate at which sound waves are produced is known as the frequency of sound," resumed Jack. *Hold up Image Card C.U5.L7.1 (Light Energy from the Sun) and Image Card C.U5.L8.5 (Sound Waves Entering the Ear). Explain that both light waves and sound waves are measured in wavelengths and can have both high and low frequencies.*

Amy nodded. "I see. So, a sound with a long wavelength and fewer waves per second, like the sound produced by the larger drum, has a low frequency, whereas one with a short wavelength and more waves per second, like the sound produced by the smaller drum, has a high frequency?"

"Exactly," said Jack. "And to answer your first question, pitch describes how high or low a sound wave sounds."

"Oh, I understand now," said Amy cheerily. "High frequency sound waves have high pitches, and low frequency sound waves have low pitches." *Show Image Card C.U5.L10.3 (Violin and Bass). Which instrument would produce higher frequency vibrations? (violin). Would it have a higher or lower pitch than the bass? (higher) Why? (The violin—which is small and has short strings—has a higher pitch than a stand-up bass, which is large with much longer strings.)*

Image Cards
C.U5.L7.1 and C.U5.L8.5

**Light Energy from
the Sun and Sound
Waves Entering the Ear**



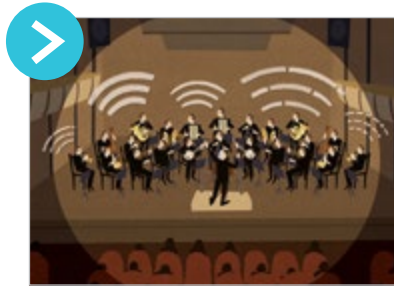
Image Card
C.U5.L10.3

Violin and Bass



“So, the sound of a bird chirping is a high-pitched sound, but the sound of a cow mooing is a low-pitched sound,” burst in Ethan, who was now mooing loudly like a cow.

“You’ve got it,” said Jack. “Variations in sound waves cause sounds with different qualities.”

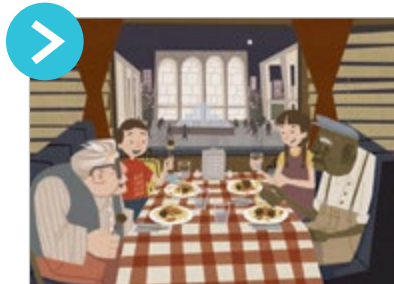


Show Image U5.L10.9

Show resuming

Before long, the musicians and the conductor returned to the stage. Samuel, Jack, Amy, and Ethan sat back and enjoyed the rest of the

concert. Each musical composition created an atmosphere of its own. The audience listened attentively and applauded enthusiastically, especially when the better-known pieces were played. Music from well-known superhero movies, fantasy movies, and Disney movies were particularly well received. The music recreated magical images and brought back memories for each member of the audience.



Show Image U5.L10.10

Everyone having dinner

When the concert was over, Samuel and Jack took the children to their favorite Italian restaurant. The restaurant was less than a block from

the concert hall, and the four laughed and joked as they walked to the restaurant and talked about their favorite parts of the concert.

“I wish we could have brought Alfie to the city!” said Ethan eagerly.

Jack shook his head. “Alfie would have gone crazy! You know all of those loud sounds we heard today? He would have heard even more sounds.”

“What do you mean?” asked Amy.

“Well, have you ever seen someone using a dog whistle? A dog whistle produces a very high sound; the frequency is so high that we cannot hear it, but dogs can. Alfie is able to hear a greater range of sounds—higher pitch sounds and lower pitch sounds—than we can hear. As with light, some wavelengths or frequencies cannot be sensed by humans.”

“Oh, wow,” said Ethan. “Maybe that’s why Alfie can always hear a thunderstorm coming before we do! The storm must produce vibrations that are too low for us to hear.”

“Yup,” said Jack.

Over dinner, Samuel and Jack recalled how they, too, had been taken on a trip to the city when they were young.

“When we were in the fourth grade, your grandfather’s father took us to a concert at Carnegie Hall. That was the day I decided that I wanted to be a professional musician,” recalled Jack.

Samuel smiled. “I remember that day as if it were yesterday,” he said.

Jack smiled, too. “My life was never the same after that experience.”

DISCUSSING THE READ-ALoud (10 MIN.)

1. **Evaluative.** What is the setting for most of this Read-Aloud?
 - » Avery Fisher Hall at Lincoln Center in New York City.What are some adjectives and other words you could use to describe this setting?
 - » large, beautiful, impressive, crowded, exciting, elegant, etc.
2. **Evaluative.** What are some sources of sound that the characters heard inside the concert hall?
 - » Answers may vary, but may include applause, people talking, musicians tuning up, orchestra playing, etc.
3. **Inferential.** How does the frequency of sound waves affect the pitch of a sound?
 - » High frequency waves have a higher pitch, or higher sound. Low frequency sound waves have a lower pitch, or lower sound.



ENGLISH
LANGUAGE
LEARNERS

Speaking and Listening
Listening Actively

Beginning

Ask simple questions with yes or no answers, e.g., “Does a tuba have a low-pitched sound?”

Intermediate

Ask questions with two-choice answers, e.g., “Is a cow’s mooing high-pitched or low-pitched?”

Advanced/Advanced High

Encourage students to answer in complete sentences using domain vocabulary words.

ELPS 1.E; ELPS 3.D

4. **Evaluative.** What are some examples of high-pitched sounds?
- » Answers may vary, but may include birds chirping, babies crying, a whistle, a violin, etc.
5. **Evaluative.** What are some examples of low-pitched sounds?
- » Answers may vary but may include growls, cows mooing, a bass, a tuba, someone singing with a low voice.
6. **Evaluative.** What is intensity?
- » Energy or power.
- What is an example of a high-intensity sound?
- » a jackhammer, loud music.
- What is an example of a low intensity sound?
- » a whisper, rustling leaves
- Say, “I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.”
7. **Inferential.** *Think-Pair-Share.* How do pitch, frequency, and intensity affect the qualities and variations of the sounds we hear? You may use examples to explain.
- » Answers may vary but should include content vocabulary.

WORD WORK: FREQUENCY (5 MIN.)

1. In the Read-Aloud, you heard, “The rate at which sound waves are produced is known as the frequency of sound.”
2. Say the word *frequency* with me.
3. The *frequency* of sound is how often sound waves are produced; sound waves can have a high frequency or a low frequency. *Frequency* also means the number of times something happens within a particular period of time.
4. Tobias knew that the sound of the jet engine had a high frequency because it was producing many sound waves in a short period of time.
5. Have you ever heard something that had a high or low frequency? Be sure to use the word *frequency* when you tell about it.
 - Ask two or three students. If necessary, guide and/or rephrase the students’ responses to make complete sentences: “I heard a high/low frequency _____,” or “_____ had a high/low frequency.”

6. What's the word we've been talking about? What part of speech is the word *frequency*?

» *frequency*; noun

- Use a Brainstorm and Discussion activity for follow-up. Have students discuss different types of sounds they have heard, making a list of high-frequency and low-frequency sounds. You may choose to provide a theme, such as animal sounds or instrument sounds. You may also choose to discuss the correlation of frequency to pitch. Finally, you may choose to review the meaning of *frequency* as it relates to anything that is repeated. As students add to and review the list, make sure that they use the word *frequency* in a complete sentence.

Lesson 10: Characteristics of Sound

Writing



Primary Focus: Students will write a reflection about what they've learned about sound in the reading and through the Read-Aloud. **TEKS 3.6.B; TEKS 3.12.B**

3-2-1 REFLECTION (15 MIN.)

- Have students turn to Activity Page 10.3.
- Have a student read the directions at the top of the page.
- Students will work independently to complete the activity.

End Lesson

Lesson 10: Characteristics of Sound

Take-Home Material

- Have students take home Activity Page 10.4 to read aloud to a family member.

TEKS 3.6.B Generate questions about text before, during, and after reading to deepen understanding and gain information;
TEKS 3.12.B Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.



Writing Writing

Beginning

Provide 1:1 prompting and support, referring students to their notes and discussing what they've learned.

Intermediate

Allow students to work with a partner on Activity Page 10.3.

Advanced/Advanced High
Encourage students to write in complete sentences, using domain vocabulary.

ELPS 1.E; ELPS 5.B

Activity Page 10.3



Support

Work with students to look back on their Lab Notes so far and the Student Reader to make a list of things that they have learned.

Challenge

Have students research to find the answer to the question they generated.

Activity Page 10.4



| Spelling Assessment Analysis Chart | | | | | | | | | | | | | | | Student Name |
|------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--------------------------------------|
| | | | | | | | | | | | | | | | 1. daydreams |
| | | | | | | | | | | | | | | | 2. payment |
| | | | | | | | | | | | | | | | 3. daisies |
| | | | | | | | | | | | | | | | 4. awaited |
| | | | | | | | | | | | | | | | 5. yesterday |
| | | | | | | | | | | | | | | | 6. crayons |
| | | | | | | | | | | | | | | | 7. betrayer |
| | | | | | | | | | | | | | | | 8. explain |
| | | | | | | | | | | | | | | | 9. mermaid |
| | | | | | | | | | | | | | | | 10. subway |
| | | | | | | | | | | | | | | | 11. giveaway |
| | | | | | | | | | | | | | | | 12. great |
| | | | | | | | | | | | | | | | 13. dainty |
| | | | | | | | | | | | | | | | 14. breaker |
| | | | | | | | | | | | | | | | 15. obtain |
| | | | | | | | | | | | | | | | 16. ballplayers |
| | | | | | | | | | | | | | | | 17. beefsteak |
| | | | | | | | | | | | | | | | 18. trainees |
| | | | | | | | | | | | | | | | Challenge Word: <i>family</i> |
| | | | | | | | | | | | | | | | Challenge Word: <i>young</i> |
| | | | | | | | | | | | | | | | Content Word: <i>straight</i> |

SPELLING ANALYSIS DIRECTIONS

Unit 5, Lesson 10

- Students are likely to make the following errors
 - For 'ay', students may write 'ai' or 'ea'
 - For 'ai', students may write 'ay' or 'ea'
 - For 'ea', students may write 'ay' or 'ai'
- While the above student-error scenarios may occur, you should be aware that misspellings may be due to many other factors. You may find it helpful to record the actual spelling errors that the student makes in the analysis chart. For example:
 - Is the student consistently making errors on specific vowels? Which ones?
 - Is the student consistently making errors at the end of the words?
 - Is the student consistently making errors on particular beginning consonants?
- Did the student write words for each feature correctly?
- Also, examine the dictated sentences for errors in capitalization and punctuation.

11

The Human Voice

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will listen to the story about the human voice and its variations and answer questions about the text. **TEKS 3.1.A; TEKS 3.6.C**

Reading

Students will read and answer comprehension questions about the human voice and how it is produced. **TEKS 3.7.C**

Writing

Students will use vocabulary and concepts from the reading and Read-Aloud to write a descriptive paragraph about a particular sound. **TEKS 3.7.F; TEKS 3.12.A**

Language

Students will read and write words using alternate spellings for the /ae/ sound. **TEKS 3.2.B.i**

FORMATIVE ASSESSMENT

Activity Page 11.1

Can You Guess My Sound? Write a descriptive paragraph about a specific sound.

TEKS 3.7.F; TEKS 3.12.A

TEKS 3.1.A Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.C** Make and correct or confirm predictions using text features, characteristics of genre, and structures; **TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.12.A** Compose literary texts, including personal narratives and poetry, using genre characteristics and craft; **TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

LESSON AT A GLANCE

| | Grouping | Time | Materials |
|--|-------------|---------|--|
| Speaking and Listening (45 min.) | | | |
| Introducing the Read-Aloud | Whole Group | 10 min. | <input type="checkbox"/> Digital Flip Book: U5.L11.1—U5.L11.9

<input type="checkbox"/> Image Card C.U5.L11.1 (Anatomy of a Voice) |
| Presenting the Read-Aloud: “Voice” | Whole Group | 20 min. | |
| Discussing the Read-Aloud | Whole Group | 5 min. | |
| Sayings and Phrases | Whole Group | 5 min. | |
| Word Work: <i>Variations</i> | Whole Group | 5 min. | |
| Reading (35 min.) | | | |
| Introducing the Chapter | Whole Group | 10 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i> |
| Whole Group Reading: “The Human Voice” | Whole Group | 25 min | |
| Writing (20 min.) | | | |
| Descriptive Writing | Independent | 20 min. | <input type="checkbox"/> Activity Page 11.1 |
| Language (20 min.) | | | |
| Spelling | Whole Group | 20 min. | <input type="checkbox"/> Individual Code Charts
<input type="checkbox"/> Spelling Chart (Digital Projections) |
| Take-Home Materials | | | |
| Take-Home Letter “The Human Voice” | | | <input type="checkbox"/> Activity Pages 11.2, 11.3 |
| Chapter 9: Light and Photography | | | |

ADVANCE PREPARATION

Speaking and Listening

- Prepare to project Images U5.L11.1–U5.L11.9.
- Prepare to display physical or digital version of Image Card C.U5.L11.1.

Language

- Create the following chart or prepare Digital Projection DP.U5.L11.1:

| 'a_e' > /ae/ | 'a' > /ae/ |
|--------------|------------|
| | |
| | |
| | |
| | |
| | |
| | |

Universal Access

- Provide audio clips of different sounds and brainstorm words to describe them prior to the Writing section. Record descriptive words on a chart as reference.

Start Lesson

Lesson 11: The Human Voice

Speaking and Listening



Primary Focus: Students will listen to the story about the human voice and its variations and answer questions about the text. **TEKS 3.1.A; TEKS 3.6.C**

INTRODUCING THE READ-ALOUD (10 MIN.)

- Ask students to brainstorm questions that they have about how humans make sounds.
- Then have students touch their throats while they hum or talk so they can feel the vibrations.
- Ask the students the following:
 - What do the vibrations feel like?

TEKS 3.1.A Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.6.C** Make and correct or confirm predictions using text features, characteristics of genre, and structures.

- Can you feel the vibrations on the inside, the outside, or both?
- What other objects make vibrations we can hear?
- Have students touch their throats while they make a soft sound and a loud sound.
 - How does your throat feel different when you make these two different sounds?
 - What is *intensity*?
 - Which kind of sound, soft or loud, has the most intensity?
- Have students touch their throats while they make a high-pitched sound and a low-pitched sound.
- Ask students the following:
 - How does your throat feel different when you make these two different kinds of sounds?
 - What is *frequency*?
 - How does it affect the pitch of the sound that is made?
- Ask students to predict how they think their bodies produce their voices.
- Ask students, “If you could not speak, how else would you communicate?” Explain that people who cannot use their voice boxes to speak are *mute*. Tell students that people who are mute have the ability to communicate with others using sign language and the written word. Explain that there is also technology that helps people who cannot speak to communicate effectively.
- Tell students to listen carefully to learn more about voice and to see whether or not their predictions about how our voices are produced are correct.

PREVIEWING THE VOCABULARY

Core Vocabulary

- The following are core vocabulary words used in this lesson. Preview the words with the students before the lesson. Students are not expected to be able to use these words immediately, but with repeated exposure throughout the lessons they will acquire a good understanding of most of the words. Students may also keep a “domain dictionary” notebook along with definitions, sentences, and/or other writing exercises using these vocabulary words.

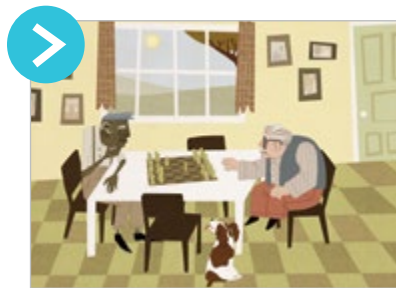
variations, changes in amount, form, or level of something

voice box, the larynx

diaphragm, the sheet of muscle that separates the lungs from the lower part of the torso and that allows air to be breathed into the lungs

| Vocabulary Chart for “Voice” | | |
|------------------------------|------------------------------------|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | voice box
diaphragm | variations |
| Multiple Meaning | | |
| | | |
| Sayings and Phrases | “Actions speak louder than words.” | |

PRESENTING THE READ-ALoud: “VOICE” (20 MIN.)



Show Image U5.L11.1

Jack and Samuel playing chess in the kitchen

Many weeks passed before Samuel, Jack, Amy, and Ethan were able to spend some time together again.

After a long, hot summer, school had reopened, and the children were also involved in after-school sports. During that time, Samuel had undergone eye surgery to remove cataracts from his eyes, and Jack now had to wear his hearing aid all the time.

The outside world had changed, too. Fall had arrived. Green leaves had been replaced by a montage of copper, red, yellow, and brown leaves. Gone was the warm morning air, and in its place was a chilly morning breeze. There were many mornings when frost lay on the ground. Everyone was looking forward to Thanksgiving as a joyful holiday to spend with family and friends.

It was a Saturday morning, and Jack was sitting in Samuel's kitchen. The two men were playing their weekly game of chess. They had first played chess together when they were third-grade classmates.

Support

Explain that a cataract is a clouding of the lens of the eye that prevents a person from seeing clearly.



Show Image U5.L11.2
Amy and Ethan entering the kitchen waving tickets

They had not been playing for long when Amy and Ethan arrived and scampered eagerly into the kitchen, closely pursued by Alfie. They had

come to visit their grandfather, and Amy had some exciting news to share with him.

“Slow down, slow down,” advised Samuel. “You’ll go crashing into the wall if you aren’t careful!” he warned. As Samuel spoke, Alfie wagged his tail and promptly sat down on Ethan’s feet.

“Hello, Granddad,” said Amy cheerfully. “How are you?”

“I’m very well,” replied Samuel cheerily. “What have you troublemakers been up to?”

“It’s almost Thanksgiving,” said Ethan excitedly. “We’re going to sing in a concert at school.”

“You are, are you?” said Jack. “Well, I hope we’re invited to hear you sing.”

“Oh, yes, you are,” chimed in Amy. “We brought you tickets—see?” Amy held up two tickets.

“It’s next Wednesday, and you have front row seats. The third, fourth, and fifth grade classes are going to sing traditional songs from around the world. My class is singing ‘An Irish Lullaby,’” Amy explained.

“My class is going to sing a French song called ‘Frère Jacques,’” said Ethan.

Support

Explain that the two songs are traditional songs from the countries of Ireland and France.

Image Card
C.U5.L11.1

Anatomy of a Voice



Show Image U5.L11.3

X-ray view of all four characters talking

- Before reading, ask students what this image looks like.

» an x-ray

What kind of light is used in an x-ray?

» invisible

“Sounds very entertaining,” said Jack, as he contemplated his next move on the chess board. “You know, each human voice is quite unique. Each voice has its own tone. That’s the reason why you can recognize a person by his or her voice,” explained Jack. *What does contemplated mean? (thought)*

“Our voices are as unique as we are,” Samuel agreed. “Only I have my voice.”

“Precisely,” agreed Jack. “However, although human voices differ from one another, they are all produced in the same way.”

“They are?” said Ethan.

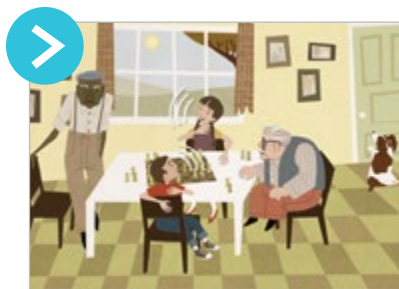
“Indeed they are,” Jack continued, having finally decided to move one of his bishops. *Hold up Image Card C.U5.L11.1 (Anatomy of a Voice) before reading the next section. Point to each body part as you read.*

“If you could see inside your body, you would discover that inside your throat, at the top of your windpipe, or trachea, is your voice box. The voice box is also known as the larynx. Within your larynx are two bands of muscle called vocal cords. These vocal cords enable humans to make a wide range of sounds.” *Point back to Image U5.L11.3 Can someone point to the trachea in this image? You just learned about the voice box, which can be found at the top of the trachea or windpipe. If the voice box was added to this image, where would the artist put it? What is another name for a voice box? (larynx)*

“Neat,” said Ethan. “But how is the sound made?”

“It’s not as complicated as you might think,” explained Jack. “When you breathe in, your vocal cords relax so that air can reach your lungs. When you breathe out, a muscle called the diaphragm moves upward to force air out of your body. When you speak, air leaves your body, too. Your lungs and diaphragm force air through the opening in your throat, past the vocal cords. This movement of air causes the vocal cords to vibrate, and so sound is produced. As your vocal cords tighten and relax, different sounds are produced.” Refer back to Image U5.L11.3.

Who can point to the lungs in this image? What important muscle for breathing is not shown in this image? (diaphragm) If the artist were to add the diaphragm, where would it go? Can you point to where your diaphragm is?



Show Image U5.L11.4 Jack getting up to go outside

“Check,” announced Samuel.

“What?” yelled Jack. “Don’t tell me you’re going to beat me again, Samuel Van Lumen.” Jack stared furiously at

the chessboard and tried to find a way out of his predicament. Does the word furiously seem like a good word to use here? Why? Can you figure out what the word predicament means from the context?

“Come on, Alfie,” said Jack. “Let’s go play ball.” To the children, he said, “I wasn’t finished telling you about the power of the human voice.”



Show Image U5.L11.5 Children playing in the yard

“I’m coming, too,” Amy announced, and with that the two children and Alfie ran out into Samuel’s backyard. The children played with Alfie for quite

a while. Then they stayed for lunch with Samuel and Jack. Finally it was time for them to go home.

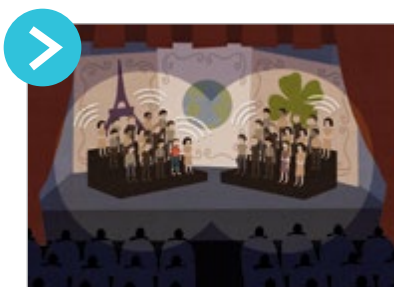
Support

Explain that “check” in the game of chess means that the opponent’s king is in danger of being captured, ending the game.

“See you on Wednesday at the concert,” said Ethan.

“You will indeed,” said Samuel.

“I’ll continue my lesson then,” threatened Jack.



Show Image U5.L11.6 **School auditorium**

Before they knew it, Wednesday had arrived. It was a cool day, and rain had been forecast. Samuel and Jack arrived early and took their seats in the front of the school auditorium.

Thirty minutes later the auditorium was full, and parents waited anxiously to see their children perform. *Listen to the word auditorium. What root do you hear that has to do with sound? (aud). Based on the root, what do you think an auditorium is? (A large place to go to hear music or speeches).*

Samuel’s daughter, Anna, and her husband, John, had also arrived and were eager to hear Amy and Ethan sing.

First up was Ethan’s class singing “Frère Jacques,” a traditional French song. Behind them was a large screen with an image of the Eiffel Tower displayed on it. The children sang the song perfectly. Samuel and Jack smiled proudly. “I can hear Ethan’s voice distinctly!” said Jack. *Ask a volunteer to point to the image of the Eiffel Tower. The Eiffel Tower is a real structure in Paris, France. Its designer also helped design the steel framework for the Statue of Liberty in New York City, which was a gift from France to the U.S. Why do you think Jack said he heard Ethan’s voice distinctly? (Answers may vary but should include that each person’s voice is unique. Could also include that Jack was probably wearing his hearing aid so he could hear more clearly.)*

Then it was Amy’s class’s turn. They sang “An Irish Lullaby” beautifully.

Samuel nodded at Jack and said, “I can hear Amy’s voice, too—nice and strong.”



Show Image U5.L11.7 Everyone at the café

When the concert was over, the family walked together to the local café for hot chocolate. They took their seats, and minutes later they were all sipping mugs of hot chocolate piled high with marshmallows.

As they talked about the show, Jack complimented the children on their singing.

“My teacher says I have perfect pitch,” said Amy proudly.

“What’s that?” Ethan asked, looking puzzled.

Amy was happy to explain, “When my chorus teacher is ready for my class to sing, she likes us to start on the note of middle C. Instead of her playing it on the piano, I just sing it.”

“Wow!” said Jack. “Did I tell you that the pitch of your voice is determined by the size of your larynx and vocal cords?”

“No, you didn’t,” chimed in Ethan with marshmallow on his top lip.

Support

Explain that musical notes are named after the letters ABCDEFG. Middle C is the note in the middle of the piano keyboard. Keys to the left of C are lower notes or have a lower pitch and keys to the right of C have higher pitch or higher notes.



Show Image U5.L11.8 Everyone talking and laughing

“That’s why a young child’s voice is generally higher in pitch than an adult’s,” explained Jack. “The larger your larynx and vocal cords, the louder and lower your voice is. The pitch

of your voice is also determined by the tension of the surrounding muscles. Trained singers learn how to control these muscles to produce variations in pitch and intensity.” *Why would singers want to produce variations in pitch and intensity in their voices?*

“Oh, so that’s what it means to train your voice,” said Amy. “And I bet men usually have longer vocal cords than women and that’s why their voices are deeper.”

“You’ve got it!” said Jack.

“You and Granddad are so smart,” said Ethan.

“I’m much smarter than he is,” joked Jack.

“Well,” laughed Samuel, “actions speak louder than words.” Jack’s eyebrows raised as Samuel made the motions of struggling with a fishing pole.

“You are both very clever,” Amy laughed. “I’m so glad we have been able to spend so much time with both of you!”

“Me, too!” shouted Ethan.



Show Image U5.L11.9

Thanksgiving dinner in Samuel's home

The next day was Thanksgiving. Samuel, Jack, and an array or group of family members and friends gathered in Samuel's home for dinner.

They ate, laughed, and enjoyed each other's company. They gave thanks for each other and the bonds that Samuel and Jack had nurtured for so many years. *What does nurtured mean? (taken care of)*

Image Card
C.U5.L11.1

Anatomy of Voice



DISCUSSING THE READ-ALoud (5 MIN.)

1. **Evaluative.** Were your predictions correct about how your body produces your voice? Why or why not?
 - » Answers may vary.
- Show Image Card C.U5.L11.1 (Anatomy of Voice).

2. **Literal.** What body parts do you see that work together to produce your voice?
 - » lungs, diaphragm, vocal cords, trachea, and larynx or voice box
3. **Literal.** What is the name of the muscle below the lungs that also helps to produce your voice by allowing air to move in and out of the body?
 - » diaphragm
4. **Inferential.** How are variations created in voices?
 - » Larger larynxes and voice boxes produce lower sounds; trained singers can learn to produce variations; the way the air passes out of the body affects the vibration and therefore the voice; etc.
5. **Evaluative.** What can you do to make your voice have a higher pitch to it? How can you make your voice have a lower pitch to it? You may wish to allow students to experiment with their own voices before answering.
 - » Answers may vary, but may include tightening or relaxing your vocal cords, and changing your breath using your diaphragm.
- Say, “I am going to ask a question. I will give you a minute to think about the question, and then I will ask you to turn to your neighbor and discuss the question. Finally, I will call on several of you to share what you discussed with your partner.”
6. **Evaluative.** *Think-Pair-Share.* Who are some people you can recognize just by voice? Are there some singers or actors you can recognize just from their voice? What do you think it would be like if we all sounded the same or were not able to produce variations in our voices?
 - » Answers may vary.

SAYINGS AND PHRASES (5 MIN.)

Note: Proverbs are short, traditional sayings that have been passed along orally from generation to generation. These sayings usually express general truths based on experiences and observations of everyday life. It is important to help your students understand the difference between the literal meanings of the words and their implied or figurative meanings.

- Reread the following excerpt from the Read-Aloud:
 - “I’m much smarter than he is,” joked Jack.
 - “Well,” laughed Samuel, “actions speak louder than words.”



**ENGLISH
LANGUAGE
LEARNERS**

Speaking and Listening Listening Actively

Beginning

Ask students to point to the correct body part on Image Card C.U5.L11.1 when asking questions, e.g., “Where are the lungs?”

Intermediate

Have students provide the domain word when asked definition questions, e.g., “What body part is a tube where oxygen can go into the lungs?”

Advanced/Advanced High

Encourage students to answer questions using complete sentences.

ELPS 1.E; ELPS 1.H

ELPS 3.D; ELPS 3.J



Language Activity

Beginning

Provide 1:1 support and prompting, helping students discuss situations where someone's actions made an impression on them. Encourage them to share their experiences using parts of the phrase.

Intermediate

Have students work in groups to discuss situations where someone's actions made an impression on them. Encourage students to use the phrase "Actions speak louder than words". Circulate for support.

Advanced/Advanced High

Have students work in pairs to discuss situations where someone's actions made an impression on them. Encourage students to use the phrase "Actions speak louder than words". Circulate for support.

ELPS 1.H

- Ask students if they have ever heard anyone else say "actions speak louder than words." Have the students repeat the proverb. Ask students, "What are actions?" Generate a list of action words (verbs) as a class.
- Ask students, "Can any of these actions we listed actually speak? What is the name of the literary device that describes when an animal or a nonliving thing acts like a human?"
 - » personification
- Explain that actions do not really speak, but the things we do can make more of a statement than the things we say. For example, it can be easy to say that you are someone's friend, but to actually show this with your actions, perhaps by being loyal, makes a bigger impact.
- Instead of saying "actions speak louder than words," Samuel could have said, "Jack, you may say you are smarter than I am, but your actions, such as reeling Alfie in with a fishing pole without realizing it, show that you are not smarter than I am!"
- Ask students if they ever faced a situation where someone's actions made an impression on them and were more powerful than any words that could have been said. Give students an opportunity to share their experiences, and encourage them to use the saying.
- Tell students to listen for times when this phrase is appropriate as they continue listening to the story. Try to find other opportunities to use this saying in the classroom.

WORD WORK: VARIATIONS (5 MIN.)

1. In the Read-Aloud, you heard that, "Trained singers learn how to control these muscles to produce variations in pitch and intensity."
 2. Say the word *variations* with me.
 3. *Variations* are changes in the amount, form, or level of something.
 4. Marissa was an expert at playing the saxophone because she could make multiple variations, or changes, to the sound of her instrument.
 5. Have you ever heard variations in sound? Be sure to use the word *variations* when you tell about it.
- Ask two or three students. If necessary, guide and/or rephrase the students' responses to make complete sentences: "I heard variations in _____," or "The variations were _____."

6. What's the word we've been talking about? What part of speech is the word *variations*?

» noun

- Use a listening activity for follow-up. Have students sit in a circle or in a different seat than usual and close their eyes. Tell them that when you tap them on the shoulder they should say the word variation. The rest of the class should guess who is speaking by trying to recognize the voice.

Lesson 11: The Human Voice

Reading



Primary Focus: Students will read and answer comprehension questions about the human voice and how it is produced. **TEKS 3.7.C**

INTRODUCING THE CHAPTER (10 MIN.)

- Review with students what they learned in the previous chapter by referring to the Lab Notes from previous lessons.
- Remind students of the following: The greater the intensity or power of a sound wave, the louder the volume of the sound.
 - High-pitched sounds are created when an object or surface vibrates back and forth quickly, creating shorter and more sound waves.
 - Low-pitched sounds are caused when an object or surface vibrates back and forth slowly, creating longer and fewer sound waves.
- Remind students that in an earlier lesson in this unit, they heard Jack and Samuel talking about the human voice and the parts of your body that are used for speech.
- Ask students to spend a few moments recalling what Jack and Samuel said about the trachea, larynx, and vocal cords.
 - » If you could see inside your body, you would discover that inside your throat, at the top of your windpipe, or trachea, is your voice box. The voice box is also known as the larynx. Within your larynx are two bands of muscle called vocal cords. These vocal cords enable humans to make a wide range of sounds.
- Ask students to turn to the Table of Contents, locate Chapter 8, and then turn to the first page of the chapter.

TEKS 3.7.C Use text evidence to support an appropriate response.

PREVIEWING THE VOCABULARY

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the student reader.

trachea, a tube that air passes through going to and from the lungs; windpipe.

larynx, the organ in your throat that holds the vocal cords and makes it possible to speak; voice box.

automatically, operating on its own without direct control.

| Vocabulary Chart for “The Human Voice” | | |
|--|---------------------------------|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | trachea
larynx | automatically |
| Multiple Meaning | | |
| | | |
| Sayings and Phrases | | |

Chapter 8 The Human Voice

Have you ever noticed how well you know your mother or grandmother's voice? You have heard it so often that you can tell right away who it is. Each person has a distinct voice. It's a voice that can make many sounds with different pitch and intensity. It can make high- and low-pitched sounds, loud and soft sounds.



Do you recognize the voices of your friends and people in your family?

88

89

WHOLE GROUP READING: "THE HUMAN VOICE" (25 MIN.)

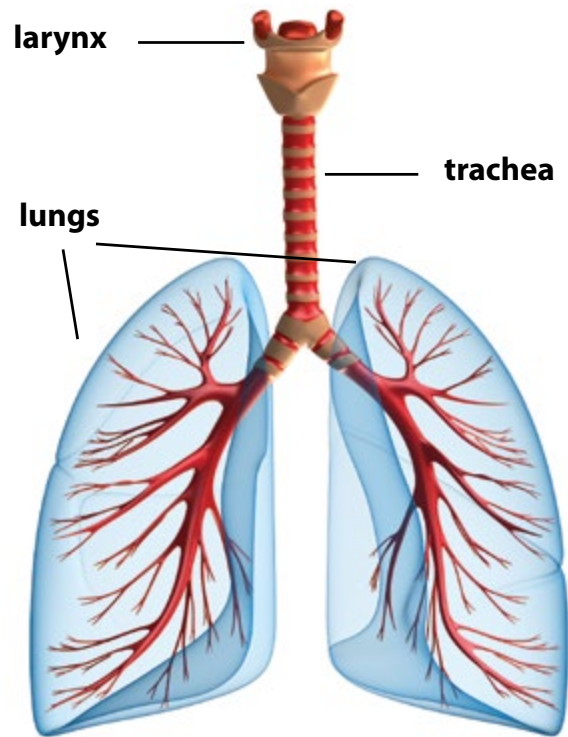
Pages 88–89

- Ask students to look at the image on **page 89**.
- Read the caption, "Do you recognize the voices of friends and people in your family?"
- Ask students, "If you had your eyes shut, would you know who was talking to you?"
- Give students a moment to think and then ask them to give you a thumbs-up if their answer is yes or a thumbs-down if their answer is no.
- Tell students they will conduct an experiment today. Have students read **page 88** silently. Then, call three students to the front of the room and have them bring their Readers. Have the rest of the class close their eyes (no peeking). The three students will take turns reading a sentence each from **page 88**. You will read the last two sentences on the page. After each sentence is read, the class should call out the student's name who read.

So how does your body make all of those different sounds? You already know that something needs to vibrate to create sound waves. You also know that sound needs a medium, like air, to travel through. Here's how it works in the human body.

Air passes in and out of your body all of the time when you breathe. Inside your chest, your **lungs** expand to take in air and then contract to let it out.

Leading out of your **lungs** is a long tube called the **trachea**, or "windpipe." At the top of your trachea is another part of your body called the **larynx**, or "voice box."

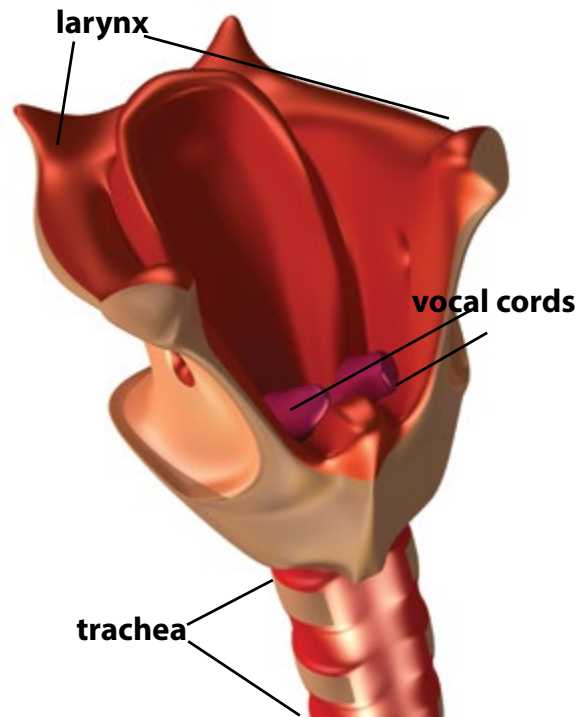


*Air passes in and out of your body through the **larynx**, **trachea**, and **lungs**.*

Pages 90–91

- Ask students to look at the image on **page 91** and read the caption together.
- Say to students, "I wonder how these parts of my body work to make sound. Let's read **page 90** to find out more."
- When students have finished reading, restate the question and have students answer.
 - » Answers may vary.
- Ask, "What is another name for the trachea?"
 - » windpipe
- Ask, "What is another name for the larynx?"
 - » voice box
- Restate the first question about how these body parts work to make sound and have students think about the other names for trachea and larynx.
- Let students pair up and share ideas with each other.
- Then, have students share with the class.

Inside the **larynx** are two bundles of muscle that are known as vocal cords. When you breathe in, the vocal cords relax so that air can move past them and into your lungs. When you speak, you force the air out of your **lungs** and over the vocal cords in your **larynx**. The vocal cords vibrate to make waves in the air that continue up your throat and out of your mouth.



*When you speak, air is forced from your **lungs** and **trachea** to your **larynx**. The vocal cords in your **larynx** vibrate to make waves in the air. These vibrations make sounds.*

Pages 92–93

- Have students read **page 92** to themselves to find the answer to the question “Which part vibrates in order to make sound: the lungs, the vocal cords, or the trachea?”
- When students have finished reading, restate the question and ask a student to read the sentence that answers the question.
 - » The vocal cords vibrate and make waves in the air that continue up your throat and out of your mouth.

When you were a baby, you did not need to learn how to breathe. Your **lungs** worked **automatically**, bringing air into and out of your body. You also did not need to learn how to use your vocal cords to make sounds. When you were a baby, you made lots of funny noises and grunts. Ask your parents!

You did, however, need to learn how to change those grunts and noises into words so you could talk. You did this by listening to the people who talked to you when you were a baby. You practiced saying the same sounds and words. You learned to speak whatever language all of those people were speaking to you. If your family spoke only English to you, you learned to speak English. If your family spoke only Spanish to you, you learned to speak Spanish. People can learn to speak more than one language. Maybe you or some of your classmates speak more than one language.



When you were a baby, you learned to speak the same language that the people around you were speaking.

Pages 94–95

- Draw students' attention to the images on **page 95** and ask them to predict how they learned to speak.
- Have several students share their predictions.
- If you have students who speak languages other than English, have them share some words in their native language with the class.
- Ask students to read **page 94** to themselves to find out how people learn to speak.
- When students have finished reading, restate the question and ask a student to answer.
 - » Babies practice what they hear and learn to speak whatever language they are hearing.

Your vocal cords grow as you grow. When you have shorter vocal cords, you tend to speak at a higher pitch. This is why small children have higher-pitched voices than adults. The pitch of your voice depends on the size of your vocal cords and **larynx**.

The volume of your voice, or how loudly you speak, depends on how much air is produced by your **lungs** and comes out of your mouth. When more air is pushed out of your mouth, your voice will be louder.



Who do you think has shorter vocal cords and speaks in a higher-pitched voice?

96

97

Pages 96–97

- Draw students' attention to the image on **page 97**, read the caption, and have students share how they think a little child's voice and an adult's voice might be different.
 - » Answers may vary.
- Ask students to read **page 96** to themselves to find the answer to the question "Why do children have higher-pitched voices than adults?"
- When students have finished reading, restate the question and ask a student to answer.
 - » Children have shorter vocal cords that make their voices higher-pitched.
- Ask, "What makes voices louder?"
 - » The more air you push out of your mouth, the louder your voice.



**ENGLISH
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Reading
Reading/Viewing Closely

Beginning

Provide questions with one-word answers, e.g., "A child's voice is ____-pitched than an adult's voice."

Intermediate

Have students read with a partner and discuss the main question before the question is asked again.

Advanced/Advanced High
Encourage students to answer in complete sentences.

ELPS 4.G



ENGLISH
LANGUAGE
LEARNERS



Writing
Writing

Beginning

Provide 1:1 prompting and support as students write their paragraphs.

Intermediate

Ask students to read each sentence to look for places to add descriptive and/or sensory words.

Advanced/Advanced High

Encourage students to use a variety of descriptive and sensory words, adding adverbs for effect.

ELPS 5.G

Support

Pull together a small group of students and work with them to generate descriptive and sensory words. Some students may benefit from brainstorming words for categories such as pitch, intensity, people's reactions, adjectives, adverbs, etc.

Challenge

Have students use a thesaurus, dictionary, or other resource to find descriptive words to describe sounds.

Lesson 11: The Human Voice

Writing



Primary Focus: Students will use vocabulary and concepts from the reading and Read-Aloud to write a descriptive paragraph about a particular sound.

TEKS 3.7.F; TEKS 3.12.A

DESCRIPTIVE WRITING (20 MIN.)

- Have students turn to Activity Page 11.1
- Tell students they will write a paragraph describing a sound without naming the sound, such as a telephone ringing or a bird singing. What is the sound like? What is its pitch and intensity? What kind of rhythm does it have? How do people respond when they hear the sound?
- Have students write for about 15 minutes. Tell them that you will be collecting the paragraphs so to make sure that they use the unit vocabulary words, descriptive and sensory words, and complete sentences. Remind them that adjectives and adverbs make their writing much more interesting.
- During the last 5 minutes of the lesson, have students read their paragraphs aloud so that other students can guess what the sound is.
- Collect Activity Page 11.1.

Lesson 11: The Human Voice

Language



Primary Focus: Students will read and write words using alternate spellings for the /ae/ sound. **TEKS 3.2.B.i**



SPELLING (20 MIN.)

- Tell students that this week, they will review the spellings of /ae/.



TEKS 3.7.F Respond using newly acquired vocabulary as appropriate; **TEKS 3.12.A** Compose literary texts, including personal narratives and poetry, using genre characteristics and craft; **TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

- As you introduce each of the spelling words, write them on the board, pronouncing each word as you write it.

| | |
|--------------|--------------------------------|
| 1. translate | 12. basic |
| 2. major | 13. refrigerate |
| 3. nation | 14. elevator |
| 4. famous | 15. spacious |
| 5. pancake | 16. earthquake |
| 6. danger | 17. hurricane |
| 7. cascade | 18. fragrant |
| 8. escape | Challenge Word: another |
| 9. invade | Challenge Word: finally |
| 10. inhale | Content Word: concave |
| 11. changes | |

- Go back through the list of words, having students read the words and tell you the spelling of the /ae/ sound to circle.
- Explain that Challenge Words are words that are used very often. They may not follow spelling patterns and need to be memorized.
- Tell students that the Content Word, *concave*, does follow the spelling patterns for this week as the 'a_e' is pronounced /ae/. *Concave* is a content-related word defined as curved inward, like a spoon and describes a mirror or a lens.
- Refer to the previously prepared table or display digital Projection DP.U5.L11.1:

➤ Projection DP.U5.L11.1

| 'a_e' > /ae/ | 'a' > /ae/ |
|--------------|------------|
| | |
| | |
| | |
| | |
| | |
| | |



Spelling
Foundational Skills

Beginning

Use an echo reading strategy by reading the word and having students repeat the words.

Intermediate

Have students act out the word meanings.

Advanced/Advanced High

Have students create their own sentences for the words.

ELPS 1.C

- Ask students to look at the /ae/ spellings on the third page of the Individual Code Chart. Ask students to tell you which words to list under the 'a_e' > /ae/ header. Briefly explain the meaning of each word.
- Ask students to identify any spelling words that include the 'a' > /ae/ sound. Write the words under the correct header. Briefly explain the meaning of each word.

| 'a_e' > /ae/ | 'a' > /ae/ |
|--------------|------------|
| translate | major |
| pancake | nation |
| cascade | famous |
| escape | dangerous |
| invade | changes |
| inhale | basic |
| refrigerate | elevator |
| earthquake | spacious |
| hurricane | fragrant |
| concave | |

- Ask students to look at the third page of the Individual Code Chart for all of the different spellings for /ae/. Ask, "Which is used most frequently?"
 - » a
- Remind students to look at the power bar under the spellings and the order in which they are sequenced to determine frequency.
- Ask students to locate the two spellings for /ae/ in this week's spelling words and determine whether they are frequently used spellings or not.
 - » 'a_e' is second to 'a' to spell the /ae/ sound.
- Practice the words as follows during the remaining time.
 - Call in a student to read a word on the chart and orally use the word in a meaningful sentence.
 - After the student says the sentence, ask students if the sentence makes sense.

- If the answer is “Yes”, put a check mark in front of the word.
- If the answer is “No”, either have the student try again or call on another student.
- Continue calling on different students until time runs out.
- Tell students that this table will remain on display until the assessment so that they may refer to it during the week.

~~~~~End Lesson~~~~~

### Lesson 11: The Human Voice

# Take-Home Materials

- Have students take home Activity Page 11.2 to share with a family member and Activity Page 11.3 to read to a family member.
- Have students read Chapter 9: Light and Photography to practice fluency.

Activity Pages  
11.2 and 11.3



## 12

# Alexander Graham Bell

## PRIMARY FOCUS OF LESSON

### Reading

Students will read text about Alexander Graham Bell and answer questions about the text. **TEKS 3.7.C**

Students will respond in writing to a prompt based on the word *inspiration* from the text. **TEKS 3.7.F**

### Writing

Students will categorize, define, and write sentences using new academic and domain-specific vocabulary words they learned from the text. **TEKS 3.7.F**

### Language

Students will use the conjunction *and* to create compound sentences. **TEKS 3.11.D.viii**

## FORMATIVE ASSESSMENT

**Activity Page 12.1** **What Inspires You?** Respond to a prompt based on the reading. **TEKS 3.7.F**

**Activity Page 12.2** **Comprehension Questions** Answer questions by finding evidence in the text. **TEKS 3.7.C**

**Activity Page 12.3** **Three New Words** Use new vocabulary words when writing sentences. **TEKS 3.7.F**

**TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.11.D.viii** Edit drafts using standard English conventions, including: coordinating conjunctions to form compound subjects, predicates, and sentences.

## LESSON AT A GLANCE

|                                                         | Grouping    | Time    | Materials                                                                                                                                                             |
|---------------------------------------------------------|-------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading (70 min.)                                       |             |         |                                                                                                                                                                       |
| Introducing the Chapter                                 | Whole Group | 5 min.  | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> Activity Pages 12.1, 12.2<br><input type="checkbox"/> blank sheets of paper |
| Whole Group Reading:<br>“Alexander Graham Bell, Part I” | Whole Group | 20 min. |                                                                                                                                                                       |
| Reading Response                                        | Independent | 10 min. |                                                                                                                                                                       |
| Partner Reading:<br>“Alexander Graham Bell, Part II”    | Partner     | 20 min. |                                                                                                                                                                       |
| Review: Invention Dash Game                             | Small Group | 15 min. |                                                                                                                                                                       |
| Writing (25 min.)                                       |             |         |                                                                                                                                                                       |
| Graphic Organizer: Three New Words                      | Independent | 25 min. | <input type="checkbox"/> Activity Page 12.3                                                                                                                           |
| Language (25 min.)                                      |             |         |                                                                                                                                                                       |
| Grammar: Introduce the Conjunction <i>and</i>           | Whole Group | 25 min. | <input type="checkbox"/> Activity Page 12.4                                                                                                                           |
| Take-Home Materials                                     |             |         |                                                                                                                                                                       |
| Practice Conjunction <i>and</i>                         |             |         | <input type="checkbox"/> Activity Page 12.5                                                                                                                           |

## ADVANCE PREPARATION

**Note:** Students will be conducting a short research project, which will be introduced in Lesson 13. If possible, students should spend at least one class session in a computer lab to find information on their topic. Additionally, you can coordinate with your school media specialist to find books on Alexander Graham Bell, Thomas Edison, and the invention of the telephone and the light bulb so that they may be used in your classroom during this writing project.

- The final writing task for the research project is to write a newspaper article about either the invention of the telephone or the invention of the incandescent light bulb. A part of the instruction will require students to look at and analyze parts of a newspaper, taking note of text features such as headlines, subtitles, graphics, captions, bold words, etc. Have several newspapers on hand for groups of students to review.

### Language

- Create and display a poster entitled “Conjunctions” for use during the grammar lesson.

#### Conjunctions

**Conjunctions** are words that connect other words or groups of words.

The conjunction **and** connects words or groups of words. It means plus, along with, or also.

- Write the following sentences on the board or chart paper to be used during the grammar lesson.

My grandmother loves ice cream.  
My grandfather loves pie.

Sandy eats hot dogs.  
Tyler eats hamburgers.

Jack finally learned to tie his shoes.  
His parents were thrilled.

Challenge Sentences:

José and Sam went to the baseball game yesterday.

The mother bird dug up worms and then fed them to its babies.

- **Universal Access**

- Provide additional resources like dictionaries and thesauruses for student reference while writing.

---

Start Lesson

## Lesson 12: Alexander Graham Bell

# Reading



**Primary Focus:** Students will read text about Alexander Graham Bell and answer questions about the text. **TEKS 3.7.C**

Students will respond in writing to a prompt based on the word *inspiration* from the text. **TEKS 3.7.F**

### INTRODUCING THE CHAPTER (5 MIN.)

- Tell students that the title of today's chapter (Chapter 10) is "Alexander Graham Bell, Part I."
- Ask students to turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.
- Ask students to share what they have heard about Alexander Graham Bell.
- Tell students that they'll be reading to find out more about him and his inventions.

### Previewing the Vocabulary

#### Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the Reader.

**hearing trumpet**, a cone-shaped tool that helps a person hear better by placing the small end in one ear

**Visible Speech**, a system of communication used by deaf people in which symbols represent sounds

**symbol**, an object or picture that stands for something

**inspiration**, something that gives a person an idea about what to do or create

**telegraph**, a tool for communicating by sending electrical signals by wire or radio

**TEKS 3.7.C** Use text evidence to support an appropriate response; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate.



**Morse code**, a way of communicating with dots and dashes using the telegraph

| Vocabulary Chart for “Alexander Graham Bell” Parts I and II |                                                              |                                  |
|-------------------------------------------------------------|--------------------------------------------------------------|----------------------------------|
| Type                                                        | Tier 3<br>Domain-Specific Words                              | Tier 2<br>General Academic Words |
| Vocabulary                                                  | hearing trumpet<br>Visible Speech<br>telegraph<br>Morse code | symbol<br>inspiration            |
| Multiple Meaning                                            |                                                              |                                  |
|                                                             |                                                              |                                  |
| Sayings and Phrases                                         |                                                              |                                  |

**WHOLE GROUP READING: “ALEXANDER GRAHAM BELL, PART I” (20 MIN.)**

- Read the title of the chapter together as a group: “Alexander Graham Bell, Part I.”

## Chapter 10 Alexander Graham Bell, Part I

What makes someone famous? Who would you think of if you were asked to name someone famous today? Would you name a famous athlete? An actor or musician? Maybe you would think of a president or famous leader. One of the most famous inventors of all time lived over 100 years ago. His name was Alexander Graham Bell.



*Alexander Graham Bell*

112

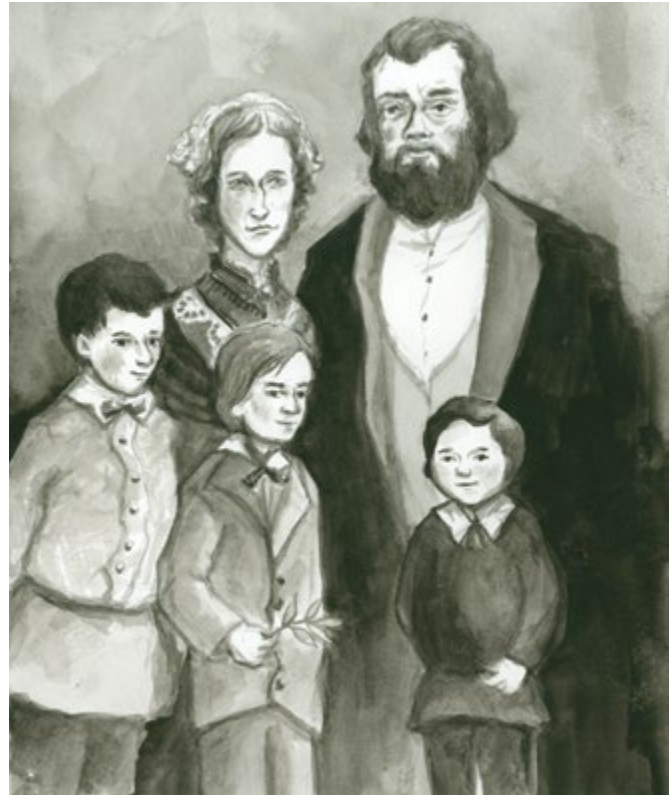
113

### Pages 112–113

- Ask students to read **page 112** to themselves and think of someone who is famous.
- When students have finished reading, restate the question and have students answer.
  - » Answers may vary.

Alexander Bell was born March 3, 1847. He was the middle of three sons born to Alexander and Eliza Bell of Edinburgh, Scotland. His parents nicknamed him “Aleck” as a young boy. Aleck’s childhood was happy. He lived the best of both worlds by spending time at his home in the city of Edinburgh and also in the country on the weekends. More than anything, Aleck loved to learn new things.

At Milton Cottage near Edinburgh, young Aleck enjoyed exploring nature. He collected plants and studied animals.



*Aleck as a child with his family*

### Pages 114–115

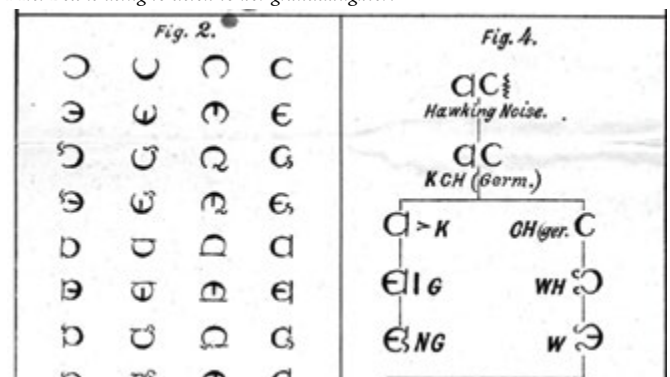
- Ask students to read **page 114** to themselves to find the answer to the question “What was Aleck’s favorite thing to do?”
- When students have finished reading, restate the question and have students answer.
  - » learn new things

In school, Aleck's best subjects were science and music, which he learned from his mother. Aleck's mother was nearly deaf, so she played music mostly by feel. To hear the music, she would put a **hearing trumpet** to the strings of the instrument. The **trumpet** magnified the sound.

Aleck's father was an important speech **professor**. He studied the sounds of the English language, similar to the phonics you studied to learn to read. He very much wanted to help his wife, Eliza, and other deaf people. In 1864, he invented a "sound alphabet" called **Visible Speech**. He spent years coming up with **symbols** to stand for any sound the human voice could make. The **symbols** that he used looked the way a person's mouth looked when making certain sounds. **Visible Speech** helped deaf people learn how to talk better so that they could communicate with others.



Aleck's parents, Alexander and Eliza Bell. Do you see the **hearing trumpet** that Mrs. Bell is using to listen to her granddaughter?



A **Visible Speech** poster showing the **symbols** invented by Aleck's father to help the deaf.

116

117

## Pages 116–117

- Ask students to read **page 116** to themselves to find the answer to the question "How does a hearing trumpet work?"
- When students have finished reading, restate the question and have students answer.
  - » The trumpet magnifies sound.
- Ask, "What is Visible Speech?"
  - » It is a sound alphabet using symbols to stand for any sound the human voice makes.

## Support

Explain to students that people who have a hearing loss are said to be *hearing impaired* or described as having a *hearing impairment*.

## Challenge

Have students research different inventions to help hearing-impaired people.

The example of both his mother and father was an **inspiration** for Aleck. He became interested in inventing things on his own. He especially wanted to invent things to help other people. Aleck and his brother actually made a “speaking machine.” The machine used the voice box (larynx) of a dead sheep. Part of the machine acted like a mouth and throat and could say the word “mama.”

As an adult, Aleck worked with deaf students. He later took a job as a **professor** at Boston University. Inventing things was a big part of Aleck’s life. After one invention, he set his mind on others, never satisfied with the past invention. The invention that he is most famous for, however, was yet to come.



*When he was young, Aleck and his brother invented a “speaking machine.”*

### Pages 118–119

- Ask students to read **page 118** to themselves to find the answer to the question “How did Aleck’s speaking machine work?”
- When students have finished reading, restate the question and have students answer.
  - » Using the voice box of a dead sheep, it acted like a mouth and throat and could say the word *mama*.

## READING RESPONSE (10 MIN.)

- Have students turn to page Activity 12.1. Read the directions on the top of the page: “The root word for *inspiration* is *inspire*. *Inspire* comes from the Latin word *inspirare*, which means “to breathe.” To *inspire* means to influence or produce a feeling or thought. Think about how our word *inspiration* is related to that original Latin word that means “to breathe.” In the space below, write about something that inspires you.”
- Have students complete Activity Page 12.1 individually.
- Collect Activity Page 12.1 when complete.

## PARTNER READING: “ALEXANDER GRAHAM BELL, PART II” (20 MIN.)

- Pair students to read and discuss the chapter. You may wish to use any or all of the following pairings: strong readers with readers who need more support, readers of similar skill levels, or English learners with native speakers.
- Explain to students that for this lesson, they will each read aloud to their partners. They will take turns reading each paragraph on the page aloud. Students can ask their partner for help with sounding out or defining words as necessary. They may also use the glossary to help with definitions.
- Have students read “Alexander Graham Bell, Part II.”
- After reading the chapter, the students will work independently to complete Activity Page 12.2.

### Activity Page 12.1



ENGLISH  
LANGUAGE  
LEARNERS

Reading  
Writing

#### Beginning

Ask students to list things they like to do. Next to each item, have them write one word to describe their inspiration, e.g., “singing—Grandma.”

#### Intermediate

Allow students to work with a partner when constructing their paragraphs.

#### Advanced/Advanced High

Review the directions of the activity and encourage students to write in complete sentences where applicable.

**ELPS 5.F**

#### Support

Work separately with students who have trouble getting started on their writing. Ask what type of things they like to do and why.

### Activity Page 12.2



## Chapter 11 Alexander Graham Bell, Part II

Aleck Bell loved thinking of new things to invent more than anything else in the world, especially to help other people. In 1837, another inventor, Samuel Morse, created a machine called the **telegraph**. The **telegraph** was a way to send messages long distances across wires. It was limited to dots and dashes and could not **transmit** human sounds. Aleck began to think about ways that he might improve upon this new invention. “I used to tell my friends that one day we should speak by **telegraph**,” said Bell. He devoted all his time to this new goal. So did many others and the race for a new invention was on.



*With the invention of the **telegraph** by Samuel Morse, people could send messages long distances. A system of dots and dashes called **Morse Code** was used to tap out the messages on the **telegraph**. Three dots, followed by three dashes, followed by three more dots stands for SOS, code for “Help!”*



Boston, Massachusetts became an important place for many inventors. The Massachusetts Institute of Technology (MIT) made space in one of its labs for Aleck to do his experiments. His days were filled with teaching and then trying over and over to make human sound travel across a wire. All of his energy was spent on this creative idea. He wrote that his idea of using **electric current** to carry a sound would likely make others think him “crazy.” So, he kept most of his ideas and experiments secret.

Aleck hired a young mechanic to help him. Thomas Watson knew how electricity worked. At first, their experiments failed more than they succeeded. Aleck thought they were getting closer to success. “I think the **transmission** of the human voice is much more nearly at hand than I thought.” On June 2, 1875, his dreams came true.



*Alexander Graham Bell and Thomas Watson worked together to try to **transmit** sound using electricity.*



Like many inventions, an accident led to an important **discovery**. With the electricity turned off, Watson sent a message to Aleck that Aleck could hear. He heard tones, not just one single-pitched sound. He knew instantly it was a huge step forward! “I have (by accident) made a **discovery** of the very greatest importance,” wrote Bell.

Three days later, the first telephone recorded, “Mr. Watson, come here, I want to see you.” To Bell’s great joy, Watson had heard and understood what Bell had said!

Fame and fortune came to Alexander Graham Bell and Thomas Watson. They soon formed the Bell Telephone Company to make and sell their new invention.



*Bell's first telephone*

124

125

**ENGLISH  
LANGUAGE  
LEARNERS**



Reading  
Reading/Viewing Closely

**Beginning**

Provide 1:1 prompting and support for students to complete Activity Page 12.2.

**Intermediate**

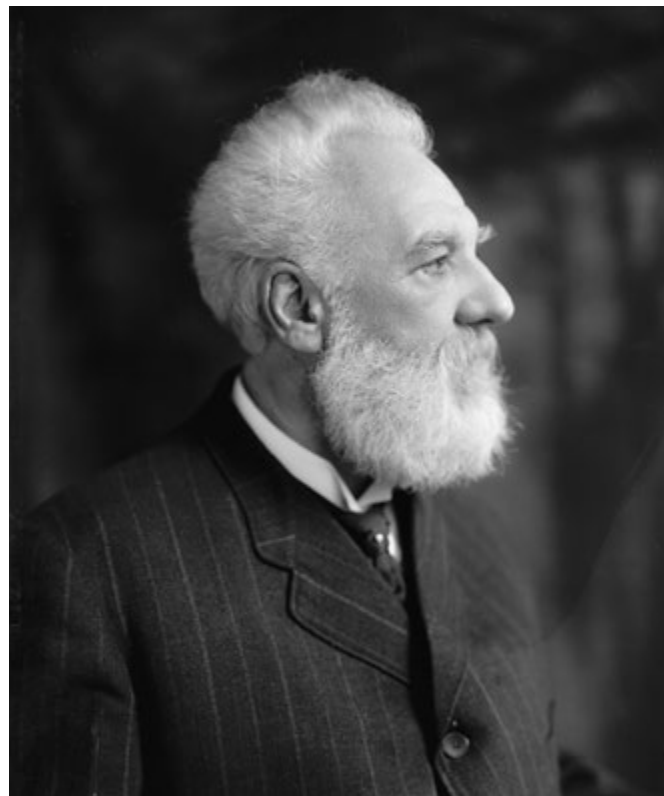
Have students complete the page with a partner.

**Advanced/Advanced High**

Have students compare notes with a partner before completing the writing portion.

**ELPS 4.D**

Bell continued to invent the rest of his life. “Self-education is a life-long affair,” said Bell. “There is no failed experiment,” he said to convince people to keep going with their ideas. He passed his love of learning on to his grandchildren and inspired a whole group of new inventors.



*“There is no failed experiment,” said Alexander Graham Bell.*

### Support

Pull together a small group to reread the chapter and complete the activity.



Writing  
Writing

**Beginning**

Provide 1:1 prompting and support, helping students choose words and having them verbally define them.

**Intermediate**

Allow students to work with a partner on Activity Page 12.3.

**Advanced/Advanced High**

Have students share their words with partners to check for accuracy.

**ELPS 5.B**

**Support**

If students have difficulty writing sentences using new vocabulary, have students list examples of the word, synonyms or antonyms of the word, or other words that they think of when they hear the new word.

**Activity Page 12.3**



**REVIEW: INVENTION DASH GAME (15 MIN.)**

- Arrange desks so that groups of four to five students each can easily pass a paper between themselves.
- Divide students into teams of four or five.
- Pass one blank sheet of paper to a person on each team.
- Instruct them to draw a vertical line down the center of the paper. Have them write *light* on one side of the line and *sound* on the other side.
- Tell them that they will be competing against each other to write down as many inventions that have to do with *light* as they can in one minute.
- Tell them that the way it works is that one person writes an invention and passes it to the next person who has to write a different invention.
- They will keep passing the paper to the next person until time is up.
- After one minute, one person from each team will read their answers.
- The teacher will keep score on the board and will be the decision maker as to whether it is an appropriate invention for that category or not.
- After *light* is completed, repeat the game for the word *sound*.
- The team that has the most inventions for each category is the winner.

**Lesson 12: Alexander Graham Bell**

**Writing**



**Primary Focus:** Students will categorize, define, and write sentences using new academic and domain-specific vocabulary words they learned from the text.



**TEKS 3.7.F**

**GRAPHIC ORGANIZER: THREE NEW WORDS (25 MIN.)**

- Have students turn to Activity Page 12.3.
- Tell students that they will choose three words from today's reading to put into the graphic organizers.
- Tell students that they must write the word, write a definition in their own words, tell what part of speech it is, draw a symbol for the word, and write an original sentence using the word.
- Tell students that they may choose any new word they learned, including any of the vocabulary words that were previewed for the reading.
- Collect Activity Page 12.3 when complete.



**TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate.

## Lesson 12: Alexander Graham Bell

# Language



**Primary Focus:** Students will use the conjunction *and* to create compound sentences. **TEKS 3.11.D.viii**

### **GRAMMAR: INTRODUCE THE CONJUNCTION AND (25 MIN.)** **TEKS 3.11.D.viii**

- Tell students they will learn more today about the part of speech called a conjunction; conjunctions will help them build and write more interesting sentences.
- Point to the conjunctions poster you prepared and displayed earlier.

#### **Conjunctions**

**Conjunctions** are words that **connect** other words or groups of words.

- The conjunction **and** connects words or groups of words. It means plus, along with, or also.
- Read the poster to students, emphasizing that the conjunction *and* joins words or groups of words together.
- Read the first two sentences you prepared in advance to students:

My grandmother loves ice cream.  
My grandfather loves pie.

- Look at the first simple sentence and ask, “Who or what is the sentence about?” (*my grandmother*)
- Write the letter *S* above *grandmother* to show that this is the subject.
- Ask, “What does my grandmother do?” (*loves ice cream*)
- Write the letter *P* above those words to show that this is the predicate. Draw a line between the subject and the predicate.

**S**      **P**

My grandmother | loves ice cream.

- Look at the second simple sentence and ask, “Who or what is the sentence about?” (*my grandfather*)
- Write the letter *S* above those words to show that this is the subject.

**TEKS 3.11.D.viii** Edit drafts using standard English conventions, including: coordinating conjunctions to form compound subjects, predicates, and sentences.

- Ask, “What is my grandfather doing?” (*loves pie*)
- Write the letter *P* above these words to show that it is the predicate. Draw a line between the subject and predicate.

|                                   |  |          |
|-----------------------------------|--|----------|
| <b>S</b>                          |  | <b>P</b> |
| My grandmother   loves ice cream. |  |          |
| <b>S</b>                          |  | <b>P</b> |
| My grandfather   loves pie.       |  |          |

- Point out that there are two complete sentences, each with its own subject and predicate.
- Ask the students if anyone can think of a way to connect the two sentences using the conjunction *and*; call on one student to say the new sentence aloud. If students seem unsure of where to place the *and*, tell them that they should keep all of the subjects and predicates in exactly the same order and just connect the two sentences.
- Write the new sentence on the board using appropriate capitalization and punctuation.

My grandmother loves ice cream, and my grandfather loves pie.

- Ask, “How many subjects are there in this sentence now?” (two) Label both subjects with the letter *S*. (*grandmother and grandfather*)
- Ask, “How many predicates are there in this sentence now?” (two) Label both predicates with the letter *P*. (*loves ice cream and loves pie*)
- Ask, “What word did you add to make this new sentence?” (*and*)
- Point out that the word *and* is the part of speech called a conjunction. Label the conjunction by drawing two lines underneath it.
- Ask, “What does the conjunction *and* connect or join?” (the original two sentences, which are now called independent clauses since they are combined into one compound sentence)

|                                                                      |  |          |  |          |  |          |
|----------------------------------------------------------------------|--|----------|--|----------|--|----------|
| <b>S</b>                                                             |  | <b>P</b> |  | <b>S</b> |  | <b>P</b> |
| My grandmother loves ice cream, <u>and</u> my grandfather loves pie. |  |          |  |          |  |          |

**Note to Teacher:** A sentence that combines two independent clauses with the conjunction *and* is called a compound sentence. In Unit 2, students learned to recognize compound sentences with the conjunction *and*; they learned to distinguish this type of compound sentence from other simple sentences in which *and* might be used as a conjunction, but in which there were not two independent clauses.

- Remind students that the sentence that they just created is called a compound sentence because it has two independent clauses, each with its own subject and predicate, joined by the conjunction *and*.
- Read the next two sentences to students:

Sandy eats hotdogs.  
Tyler eats hamburgers.

- Point out that each sentence has one subject (*Sandy, Tyler*). Label each subject with the letter *S*.
- Ask students to locate the verbs. (*eats, eats*) Point out that each sentence also has one predicate. (*eats hotdogs, eats hamburgers*) Label each predicate with the letter *P*.

**S**      **P**  
Sandy | eats hotdogs.  
**S**      **P**  
Tyler | eats hamburgers.

- Ask students to orally build a more interesting sentence by joining two clauses together, making a compound sentence; write the response on the board. Label the conjunction by underlining it twice.

Sandy eats hotdogs, and Tyler eats hamburgers.

- Ask, "What word did you add to make a compound sentence?" (*and*)
- Ask, "What does the conjunction *and* connect or join?" (two independent clauses, *Sandy eats hotdogs* and *Tyler eats hamburgers*)
- Read the next two sentences to students.

Jack finally learned to tie his shoes.  
His parents were thrilled.

- Proceed in the same manner as above in identifying the subject and predicate in each sentence.

**S**                      **P**  
Jack | finally learned to tie his shoes.  
**S**                      **P**  
His parents | were thrilled

- Point out that there are two complete sentences, each with its own subject and predicate.

## Activity Page 12.4



ENGLISH  
LANGUAGE  
LEARNERS



Grammar  
Connecting Ideas

### Beginning

Provide simple sentences with the subject and predicate labeled. Have students add the conjunction *and* to the sentences and then read aloud. Have students practice combining these sentences with the conjunction *and*.

### Intermediate

Have students work with a partner to create compound sentences.

### Advanced/Advanced High

Encourage students to write compound sentences independently.

**ELPS 5.F**

- Ask the students if anyone can think of a way to connect the two sentences using the conjunction *and*; call on one student to say the new sentence aloud. If students seem unsure of where to place the *and*, tell them that they should keep all of the subjects and predicates in exactly the same order and just connect the two sentences.
- Write the new sentence on the board using appropriate capitalization and punctuation. Draw two lines under the word *and* to show that it is a conjunction.

| S    | P                                 | S          | P                            |
|------|-----------------------------------|------------|------------------------------|
| Jack | finally learned to tie his shoes, | <u>and</u> | his parents   were thrilled. |

- Point out that the two simple sentences are joined with the conjunction *and*, making a compound sentence.
- Point out that the actual words in the two simple sentences didn't change, but were merely joined together as independent clauses to make a longer, more interesting sentence.
- **Challenge:** Ask students to identify the subject(s), predicate(s) and conjunction *and* in each of the Challenge Sentences and to then indicate whether the Challenge Sentence is or is not a compound sentence.

| S    | S          | P                                          |
|------|------------|--------------------------------------------|
| José | <u>and</u> | Sam   went to the baseball game yesterday. |

| S               | P            | P                                       |
|-----------------|--------------|-----------------------------------------|
| The mother bird | dug up worms | <u>and</u> then fed them to its babies. |

- (Neither Challenge Sentence is a compound sentence because it does not have two independent clauses, each with its own subject and predicate, that can stand alone.)
- Turn to Activity Page 12.4 and have students complete it as a teacher-guided activity, following the above guidelines to help students add parts (subjects and predicates) to sentences and join simple sentences to make compound sentences.
- For additional practice, see Pausing Point Activity Pages PP12 and PP13.

## Lesson 12: Alexander Graham Bell

# Take-Home Materials

- Have students complete Activity Page 12.5 at home.

Activity Page 12.5





## 13

# Thomas Edison: The Wizard of Menlo Park

## PRIMARY FOCUS OF LESSON

### Reading

Students will read text about Thomas Edison and then compare and contrast

✚ Alexander Graham Bell and Thomas Edison. **TEKS 3.6.H**

### Speaking and Listening

Students will work collaboratively and discuss ideas while analyzing a

✚ newspaper to identify informational text features. **TEKS 3.1.D; TEKS 3.9.D.ii**

### Writing

Students will begin planning, researching, and writing a newspaper article on the invention of the telephone or the incandescent light bulb.

✚ **TEKS 3.11.A; TEKS 3.13.A–G**

## FORMATIVE ASSESSMENT

### Activity Page 13.1

**Planning a Research Article and Notes** Create a plan for a research article.

✚ **TEKS 3.11.A; TEKS 3.13.A–G**

✚ **TEKS 3.6.H** Synthesize information to create new understanding; **TEKS 3.1.D** Work collaboratively with others by following agreed-upon rules, norms, and protocols; **TEKS 3.9.D.ii** Recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding; **TEKS 3.11.A** Plan a first draft by selecting a genre for a particular topic, purpose, and audience using a range of strategies such as brainstorming, freewriting, and mapping; **TEKS 3.13.A** Generate questions on a topic for formal and informal inquiry; **TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.C** Identify and gather relevant information from a variety of sources; **TEKS 3.13.D** Identify primary and secondary sources; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.13.F** Recognize the difference between paraphrasing and plagiarism when using source materials; **TEKS 3.13.G** Create a works cited page.

## LESSON AT A GLANCE

|                                                                | Grouping    | Time    | Materials                                                                                                      |
|----------------------------------------------------------------|-------------|---------|----------------------------------------------------------------------------------------------------------------|
| Reading (40 min.)                                              |             |         |                                                                                                                |
| Introducing the Chapter                                        | Whole Group | 5 min.  | <input type="checkbox"/> <i>Adventures in Light and Sound</i><br><input type="checkbox"/> chart paper or board |
| Whole Group Reading: “Thomas Edison: The Wizard of Menlo Park” | Whole Group | 20 min. |                                                                                                                |
| Compare and Contrast                                           | Whole Group | 15 min. |                                                                                                                |
| Speaking and Listening (40 min.)                               |             |         |                                                                                                                |
| Introduce Research Project                                     | Whole Group | 10 min. | <input type="checkbox"/> newspapers<br><input type="checkbox"/> sticky notes                                   |
| What Goes into a Newspaper Article?                            | Small Group | 30 min. |                                                                                                                |
| Writing (40 min.)                                              |             |         |                                                                                                                |
| Introduction: Research and Planning                            | Whole Group | 25 min. | <input type="checkbox"/> chart paper<br><input type="checkbox"/> Activity Pages 13.1, 13.2                     |
| Research Project Guidelines                                    | Independent | 15 min. |                                                                                                                |

## ADVANCE PREPARATION

**Note:** If possible, students should spend at least one class session in a computer lab to find information for their research writing project, preferably during Lesson 14 or 15. If you cannot secure computer time, students may find information in the Student Reader and in additional classroom resources and materials you can gather from your school library and other sources.

- An alternative to publishing the final copy in Activity Page 16.3 is for students to use computers to type and publish their final copies. This will require additional time in the computer lab so adjust the unit lessons accordingly.

### Writing

- Have several newspapers on hand for groups of students to review.
- Prepare a poster or use chart paper to show steps in the research and writing process. The process will be filled in as the project progresses. For today's lesson, make the following chart (See page 296 for a filled-in example of the chart.):

#### Write a Research Paper

##### Plan

- 1.
- 2.
- 3.
- 4.

### Universal Access

- This lesson is the introduction to the research-writing project. The process is structured to provide step-by-step support to all students. Additional support from the teacher should be provided as needed.

~~~~~ Start Lesson ~~~~~

Lesson 13: Thomas Edison: The Wizard of Menlo Park

Reading



Primary Focus: Students will read text about Thomas Edison and then compare and contrast Alexander Graham Bell and Thomas Edison. **TEKS 3.6.H**

TEKS 3.6.H Synthesize information to create new understanding.

INTRODUCING THE CHAPTER (5 MIN.)

- Tell students that the title of today's chapter (Chapter 12) is "Thomas Edison: The Wizard of Menlo Park."
- Thomas Edison and Alexander Graham Bell were both inventors who experimented with or investigated sound. As we read about Edison, think about what is similar and what is different about the two inventors.
- Ask students to turn to the table of contents, locate the chapter, and then turn to the first page of the chapter.

Previewing the Vocabulary

Academic Vocabulary

- The following are vocabulary words used in this lesson. Preview the words with the students before the lesson and refer back to them at appropriate times. The words also appear in the glossary in the back of the student reader.

scarlet fever, a disease that causes a fever, sore throat, and a red rash

patent, the rights to make and sell something

phonograph, an instrument that reproduces sounds that have been recorded on a grooved disk

incandescent, glowing

kinetoscope, an early machine for showing movies

Vocabulary Chart for "Thomas Edison: The Wizard of Menlo Park"

| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
|---------------------|--|----------------------------------|
| Vocabulary | scarlet fever
phonograph
kinetoscope | patent
incandescent |
| Multiple Meaning | | |
| | | |
| Sayings and Phrases | | |

WHOLE GROUP READING: "THOMAS EDISON: THE WIZARD OF MENLO PARK" (20 MIN.)

- Have a student read the title of the chapter, "Thomas Edison: The Wizard of Menlo Park."
- Ask students to make predictions as to why Thomas Edison was called the "Wizard of Menlo Park."
- Preview *scarlet fever* and discuss its definition.

12 Thomas Edison: The Wizard of Menlo Park

Have you figured out why inventors are so important? They have helped every person's life in one way or another. Shouldn't there be an inventors' "Hall of Fame?" If there were, then a man named Thomas Alva Edison would be quickly voted in.

Thomas Alva Edison was born February 11, 1847, in a small, northern Ohio town. He was the last of seven children born to Sam and Nancy Edison. Al, the nickname his friends gave him, was a sickly child. He didn't even attend school until he was eight years old. Because of **scarlet fever** as a child, Al was left more than partially deaf. His illnesses did not stop his interest in nature. He asked questions that teachers didn't know how to answer: "Why is the sky blue?" or "How does fire work?" He was curious about everything and liked to figure out things on his own.



A photograph of Thomas Edison

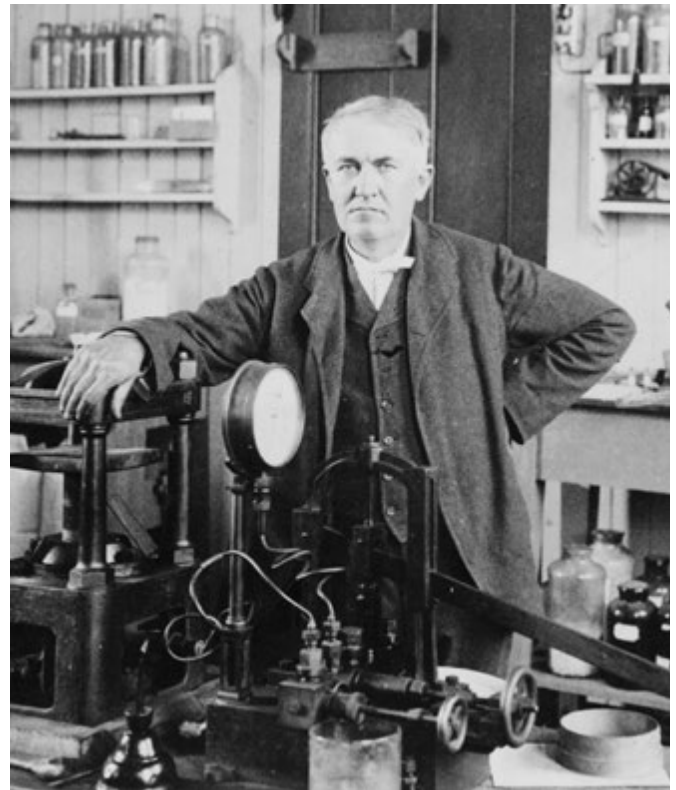
Pages 128–129

- Ask students to read **page 128** to themselves to fill in the blank in the sentence "Thomas Edison's interest in _____ never stopped, even after a bout with scarlet fever."
- When students have finished reading, reread the sentence and have students fill in the blank.
 - » nature

At the age of 12, he worked selling newspapers on the railroad near his home. On the train, he heard people talking about many new ideas and inventions. He learned by listening to their stories. At 15, Al landed a job working the telegraph machine. He became an expert telegraph operator over the next six years. Even though he was deaf, he could feel the vibration of the wire.

Al liked to work with electric machines. He found a way to make the telegraph faster and sold the idea to Western Union Telegraph Company for \$40,000. With the money he made from the sale, he set up his first lab to continue his experiments.

When the work Al was doing outgrew this lab, he built a bigger lab in Menlo Park, New Jersey. He hired some of the smartest scientists and engineers from around the world to work with him. Much of his early work was on sound. They called him the Wizard of Menlo Park because some of the inventions seemed magical.



Edison in his lab at Menlo Park

130

131

Pages 130–131

- Ask students to read **page 130** to themselves to find the answer to the question “What did Thomas Edison invent to earn the money to set up his first lab?”
- When students have finished reading, restate the question and have students answer.
 - » He found a way to make the telegraph work faster and sold it for \$40,000.
- Ask, “Why was Thomas Edison called the Wizard of Menlo Park?”
 - » Menlo Park was where his second lab was located. There, many people called him the Wizard of Menlo Park because some of his inventions seemed magical.
- Ask, “Was your prediction correct?”

In this new lab, he discovered a way to make Alexander Graham Bell's new telephone louder. He sold the **patent** for his new invention for \$100,000. That was a huge sum of money at the time.

His next invention was the **phonograph**. He was able to record sound on a cylinder wrapped in tinfoil. He played a version of "Mary Had a Little Lamb" to his fellow scientists. This was the first time anyone was able to listen to recorded music.



*Thomas Edison with a **phonograph**, 1878*

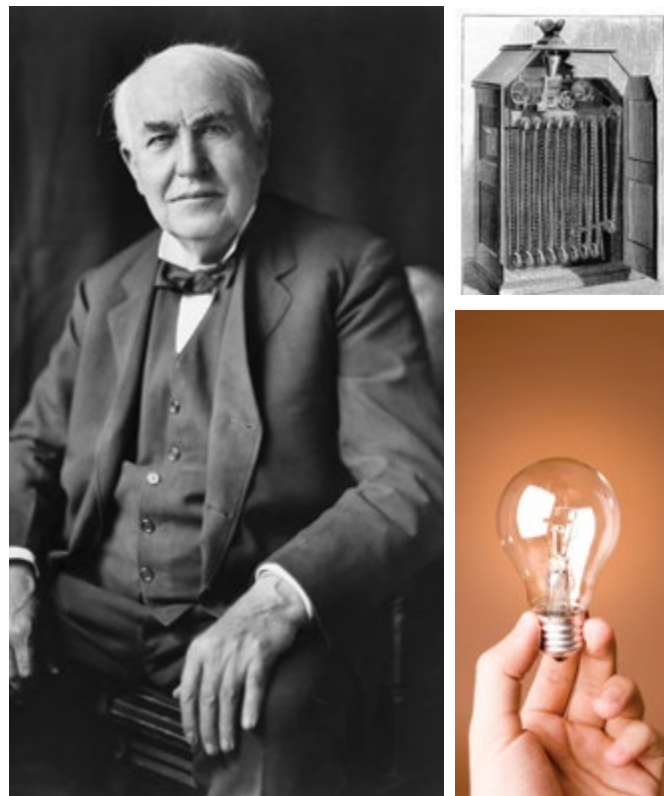
Pages 132–133

- Ask students to read **page 132** to themselves to find the answer to the question "What did Edison invent that earned \$100,000 for the patent?"
- When students have finished reading, restate the question and have students answer.
 - » He discovered a way to make Bell's new telephone louder.
- Ask, "What is a phonograph?"
 - » A phonograph is a device that records sound on a cylinder wrapped in tinfoil.
- Ask, "Why was this an important discovery?"
 - » It was the first time anyone was able to listen to recorded music.

The invention that Edison is best known for came next. In 1879, he invented the first **incandescent** (glowing) electric light bulb. Three years later, he lit up 85 homes at once in New York City and the age of electric light began.

By the time Edison “retired,” he had **patents** on over 1,000 inventions. They include the **kinetoscope**, which is a machine for showing movies, and the **microphone**.

What people sometimes forget is that many of Edison’s experiments “failed” at first. He caused explosions at his labs and was forced to start all over many times. However, he kept moving forward each time. He always had a positive attitude. He knew he was closer to his next success!



*Thomas Edison in 1928 and two of his inventions, the **kinetoscope** and the light bulb.*

134

135

Pages 134–135

- Ask students to read **pages 134–135** to themselves to find the answer to the question “What else did Edison invent and what were those inventions used for?”
- When students have finished reading, restate the question and have students answer.
 - » He invented the incandescent light bulb, which began the age of electric light; the kinetoscope, which shows movies; and the microphone, which amplifies sound.
- Ask, “Did Edison ever fail?”
 - » He failed many times, but with his positive attitude he kept moving forward, knowing he was closer to his next success.
- Ask, “What does the author want you to know about Thomas Edison?”
- Ask, “What was the central idea of this chapter?”



Reading Reading/Viewing Closely

Beginning

Ask yes-or-no questions,
e.g., “Did Edison
enjoy nature?”

Intermediate

Have students work
with a partner to make
a list of things that are
similar or different.

Advanced/Advanced High

Encourage students to
explain their answers.

ELPS 4.F; ELPS 4.I

Support

Have students list
information about each
inventor in a T-Chart. Next,
have them go back and
circle information in each
column that is the same.

Challenge

Have students research
to find the answer to the
question, “Did Alexander
Graham Bell and Thomas
Edison ever work together
on an invention or idea?”

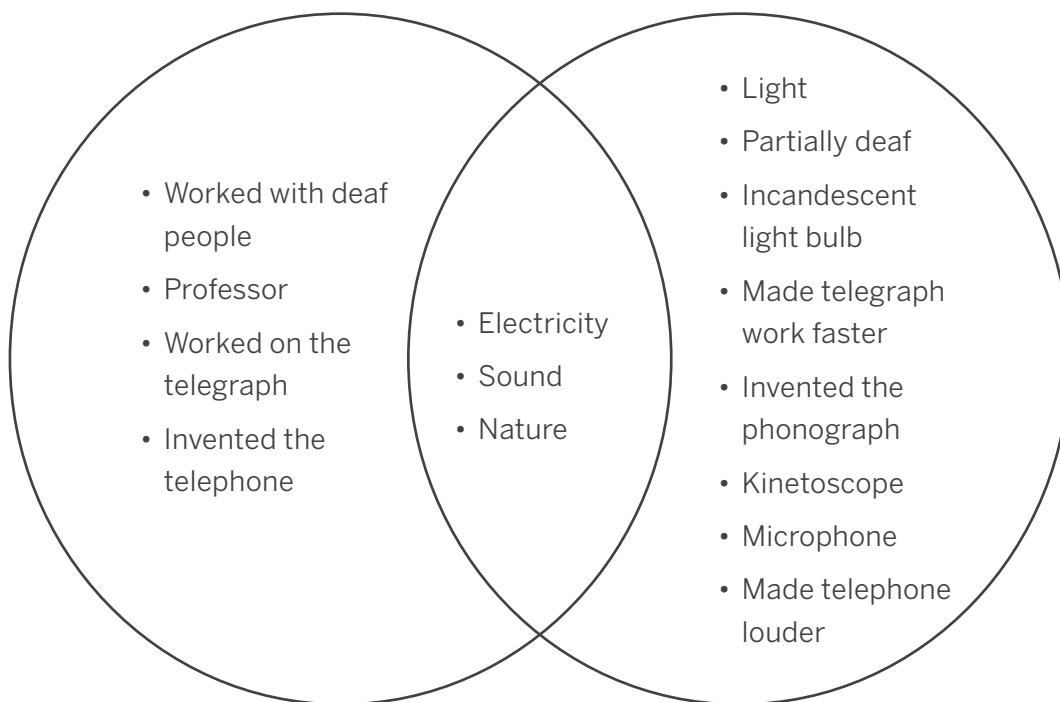
COMPARE AND CONTRAST (15 MIN.)

- Draw a Venn diagram on the board
- “We’ve read informational text about two famous inventors, Alexander Graham Bell and Thomas Edison.”
- “While they are both inventors, they also have some other things in common and some differences. Let’s compare and contrast the two inventors.”
- Work with students to compare and contrast the two inventors.
 - » Answers will vary, but diagram should include the information below.

Inventors

Alexander Graham Bell

Thomas Edison



Lesson 13: Thomas Edison: The Wizard of Menlo Park

Speaking and Listening



Primary Focus: Students will work collaboratively and discuss ideas while analyzing a newspaper to identify informational text features.


 **TEKS 3.1.D; TEKS 3.9.D.ii**

INTRODUCE RESEARCH PROJECT (10 MIN.) **TEKS 3.1.D**

- Tell students that we'll be switching our roles as scientists studying light and sound to become newspaper reporters.
- Ask students what newspaper reporters do.
 - » Answers may vary.
- Tell students that newspaper reporters write about the five Ws and the 1 H. Ask students if they know what the five Ws are.
 - » who, what, where, when, why
- Ask them if they know what the 1 H stands for.
 - » how
- Tell students that reporters have to make sure that what they write about is true and the facts are accurate. Tell them that reporters have to do research to make sure they have the right information.
- Tell students that they will be going back in time to the day when an amazing invention was first announced to the world.
- They will write a newspaper article about the invention, who invented it, and how it works.
- Tell students they have a choice of two inventions: either the telephone or the incandescent light bulb.
- Tell students to think for a while about which invention they would like to report on and that they will make their decision before the end of the lesson.

WHAT GOES INTO A NEWSPAPER ARTICLE? (30 MIN.)

- Divide students into groups of three to four students each.
- Pass newspapers and sticky notes around to the groups.
- Tell students to look for text features in the newspaper.

 **TEKS 3.1.D** Work collaboratively with others by following agreed-upon rules, norms, and protocols; **TEKS 3.9.D.ii** Recognize characteristics and structures of informational text, including: features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding.



Speaking and Listening
Exchanging Information
and Ideas

Beginning

Point to text features and ask yes-or-no questions, e.g., "Is this a headline?"

Intermediate

Create small groups strategically for peer support.

Advanced/Advanced High

Encourage group participation.

ELPS 3.E

- Recall the text features they've already learned about and write them on the board.
 - » headings, bold print, graphics, photos and captions, maps, charts, etc.
- One text feature they may not have discussed is headlines. Explain that a *headline* is a heading at the top of an article or page that gives a brief idea of what article is about. Explain that headlines are supposed to capture the interest of the reader to make them want to read more.
- Have students work together to find text features in the newspaper. Have them write the name of the text feature on the sticky note and place it on the paper.
- Have a discussion about the text features that they found.
- Ask if anyone found a text feature that they haven't learned about before (e.g., italics, subheadings).

Lesson 13: Thomas Edison: The Wizard of Menlo Park

Writing



Primary Focus: Students will begin planning, researching, and writing a newspaper article on the invention of the telephone or the incandescent light bulb.



TEKS 3.11.A; TEKS 3.13.A–G

INTRODUCTION: RESEARCH AND PLANNING (25 MIN.)



TEKS 3.11.A; TEKS 3.13.A–G

- Tell students that in order to research information to use in writing their newspaper articles, they'll need to follow a series of steps.
- Show the chart for the research writing process you prepared for the lesson.

Write a Research Paper

Plan

-
-
-
-



TEKS 3.11.A Plan a first draft by selecting a genre for a particular topic, purpose, and audience using a range of strategies such as brainstorming, freewriting, and mapping; **TEKS 3.13.A** Generate questions on a topic for formal and informal inquiry; **TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.C** Identify and gather relevant information from a variety of sources; **TEKS 3.13.D** Identify primary and secondary sources; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.13.F** Recognize the difference between paraphrasing and plagiarism when using source materials; **TEKS 3.13.G** Create a works cited page.

- Explain to students that the first step is planning, and that there are four substeps to planning.
- Have students turn to Activity Page 13.1. (Note that you will be using this Activity Page again in Lesson 14.)
- Tell them that this graphic organizer will help them plan their research. They can use it to write notes and to categorize their information.
- Tell them that first they identify their topic. Write *identify topic* on the chart next to number 1.

Write a Research Paper

Plan

1. Identify topic

2.

3.

4.

- Have them decide which invention they will write about and write it in the “What” box on Activity Page 13.1.
- Have students write the inventor’s name for their topic in the “Who” box on the page.
- Next, write *gather information* next to number 2 on the chart. Have a discussion about where they can gather information for their topic. If they will be using the computer lab for this project, include that in the discussion.

Write a Research Paper

Plan

1. Identify topic

2. Gather information

3.

4.

Activity Page 13.1





Beginning

Provide 1:1 prompting and support when needed.

Intermediate

Allow students to work with partners.

Advanced/Advanced High

Provide support if needed.

ELPS 5.G

- Have them look at the other boxes on their page. Ask what other information they will be looking for.
 - » where, when, why it is important, how it works, and other interesting facts about the inventor
- Write *Listen or read and take notes* next to number 3 on the chart.
- Ask students what it means to take notes.
 - » just key ideas, not complete sentences, facts, details, etc.
- Explain that good reporters keep track of where they find their information. Tell them that they will make a list of resources while they are taking their notes. Explain that using information or quotations from sources without citing the original authors is called plagiarism, and it is a serious academic offense. Keeping good notes throughout research is one way to avoid plagiarism.
- Discuss with students that the last step in planning is to organize their notes. Write *organize notes* on the chart:

Write a Research Paper

Plan

1. Identify topic
 2. Gather information
 3. Listen or read and take notes
 4. Organize notes
- Tell them that Activity Page 13.1 is the place where they will write and organize their notes for the newspaper article.
 - Do not collect Activity Page 13.1 as they will be using it for the next few lessons.

RESEARCH PROJECT GUIDELINES (15 MIN.)

- Have the students turn to Activity Page 13.2.
- Explain that it's always important to know the criteria for what makes a research-writing project successful.
- Go through all the criteria of the rubric with the students so they understand each category. Give examples if needed.

~~~~~End Lesson~~~~~

## Activity Page 13.2



## 14

# Research Writing: Newspaper Article

## PRIMARY FOCUS OF LESSON

### Reading

Students will demonstrate reading comprehension, grammar, and morphology skills.

✚ **TEKS 3.3.A; TEKS 3.3.C; TEKS 3.4; TEKS 3.7.F; TEKS 3.8.C; TEKS 3.11.D.ii; TEKS 3.11.D.v**

### Writing

Students will conduct research on their topic, taking notes and categorizing the information in a graphic organizer.

✚ **TEKS 3.13.B; TEKS 3.13.C; TEKS 3.13.E**

Students will write their first draft of their research project.

✚ **TEKS 3.11.B.i-ii; TEKS 3.12.B**

## FORMATIVE ASSESSMENT

### Activity Page 14.1

**Unit Assessment** Demonstrate reading comprehension, grammar, and morphology skills.

✚ **TEKS 3.3.A; TEKS 3.3.C; TEKS 3.7.F; TEKS 3.8.C; TEKS 3.11.D.ii; TEKS 3.11.D.v**

### Activity Page 13.1

**Planning a Research Article and Notes** Research and take notes on an invention and inventor.

✚ **TEKS 3.13.C; TEKS 3.13.E**

### Activity Page 14.2

**First Draft** A first draft of the research-writing project will be written.

✚ **TEKS 3.11.B.i-ii; TEKS 3.12.B**

### Activity Page 14.3

**Optional Fluency Assessment:** Demonstrate reading fluency (optional)

✚ **TEKS 3.2.A; TEKS 3.4**

✚ **TEKS 3.3.A** Use print or digital resources to determine meaning, syllabication, and pronunciation; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful; **TEKS 3.4** Use appropriate fluency (rate, accuracy, and prosody) when reading grade-level text; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.8.C** Analyze plot elements, including the sequence of events, the conflict, and the resolution; **TEKS 3.11.D** edit drafts using standard English conventions, including (ii) past, present, and future verb tense; (v) adverbs that convey time and adverbs that convey manner; **TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.C** Identify and gather relevant information from a variety of sources; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.11.B** Develop drafts into a focused, structured, and coherent piece of writing by (i) organizing with purposeful structure including an introduction and conclusion; (ii) developing an engaging idea with relevant details; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.

## LESSON AT A GLANCE

|                               | Grouping                    | Time    | Materials                                                      |
|-------------------------------|-----------------------------|---------|----------------------------------------------------------------|
| <b>Reading (50 min.)</b>      |                             |         |                                                                |
| Unit Assessment               | Independent                 | 50 min. | ☐ Activity Page 14.1                                           |
| <b>Reading</b>                |                             |         |                                                                |
| Fluency Assessment (Optional) | Independent                 |         | ☐ Teacher Guide<br>☐ Activity Page 14.3                        |
| <b>Writing (70 min.)</b>      |                             |         |                                                                |
| Research and Taking Notes     | Independent                 | 40 min. | ☐ Activity Pages 13.1, 13.2, 14.2<br>☐ “The Invention Gazette” |
| Next Step: Drafting           | Whole Group/<br>Independent | 30 min. |                                                                |



## ADVANCE PREPARATION

**Note:** If possible, students should spend at least one class session in a computer lab to find information for their research writing project, preferably during Lesson 14 or 15. If you cannot secure computer time, students may find information in *Adventures in Light and Sound* and in additional classroom resources and materials you gathered from your school library.

- The first part of Lesson 14 is the Unit Assessment. If your computer time is scheduled for this day, change the “Drafting” portion of the lesson to Lesson 15, leaving the whole writing time for researching on computers.

## Writing

- Prepare a poster or use chart paper to show steps in the research and writing process. The process will be filled in as the project progresses. For this lesson, make the following chart.

### Write a Research Paper

#### Draft

1. Write drafts of paragraphs
  2. Lead (topic) sentence in your first paragraph.
  3. Last paragraph is a conclusion
  4. Include details from your notes in your writing.
- Prepare a copy of the “The Invention Gazette” to display. You may wish to project this so the whole class can see more clearly.

## Universal Access:

- Students will continue to work on their research-writing project, so provide support as needed.

Start Lesson

## Lesson 14: Research Writing: Newspaper Article

# Reading



**Primary Focus:** Students will demonstrate reading comprehension, grammar, and morphology skills.



**TEKS 3.3.A; TEKS 3.3.C; TEKS 3.4; TEKS 3.7.F; TEKS 3.8.C; TEKS 3.11.D.ii; TEKS 3.11.D.v**

## UNIT ASSESSMENT (50 MIN.)

- Have students tear out Activity Page 14.1 Unit Assessment.



**TEKS 3.3.A** Use print or digital resources to determine meaning, syllabication, and pronunciation; **TEKS 3.3.C** Identify the meaning of and use words with affixes such as im- (into), non-, dis-, in- (not, non), pre-, -ness, -y, and -ful; **TEKS 3.4** Use appropriate fluency (rate, accuracy, and prosody) when reading grade-level text; **TEKS 3.7.F** Respond using newly acquired vocabulary as appropriate; **TEKS 3.8.C** Analyze plot elements, including the sequence of events, the conflict, and the resolution; **TEKS 3.11.D** edit drafts using standard English conventions, including (ii) past, present, and future verb tense; (v) adverbs that convey time and adverbs that convey manner.

Unit 5

## Activity Page 14.1



- Tell students they will read two selections printed on the pages and answer comprehension questions about each. In the next section, they will answer grammar and morphology questions evaluating the skills they have practiced in this unit.
- Tell students to remember to:
  - Relax.
  - Take a break if you need to, but stay seated and don't disturb others.
  - Read all of the questions carefully.
  - Stay focused.
  - Check your answers.
  - Do your best.
- Students should go right on to the second selection once they have finished the first. If they finish before the time is up, they may read quietly at their desk.
- There is an optional Fluency Assessment included. Assessing fluency requires that you work one-on-one with individual students to administer the assessment.

### FLUENCY ASSESSMENT (OPTIONAL)

- Turn to the Student Copy of “Pupils” at the end of this lesson. This is the text the student will read aloud. You may prepare a copy and reuse it for each assessment.
- Tell student to tear out Activity Page 14.3 “Pupils” and the W.C.P.M Calculation Worksheet for you to create a running record as you listen to each student read orally.
- Begin timing when the student reads the first word of the selection. As student reads aloud, make a running record on the Recording Copy using the following guidelines:

|                               |                                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Words Read Correctly</b>   | No mark is required                                                                                              |
| <b>Omissions</b>              | Draw a long dash above the word omitted.                                                                         |
| <b>Insertions</b>             | Write a caret (^) at the point where the insertion was made. If you have time, write the word that was inserted. |
| <b>Words read incorrectly</b> | Write an 'x' above the word.                                                                                     |
| <b>Substitutions</b>          | Write the substitution word above the word.                                                                      |
| <b>Self-corrected errors</b>  | Replace the original error mark with an 'SC'.                                                                    |
| <b>Teacher-supplied words</b> | Write a 'T' above the word (counts as an error).                                                                 |

### Activity Page 14.3



- When one minute has elapsed, draw a vertical line on the Recording Copy to mark where the student was in the text at that point. Allow the student to finish reading the selection aloud.
- Write down the student's reading time in minutes and seconds. Record whether the time was Elapsed Time (student did not finish) or Finished Time.
- You may also assess comprehension by asking students to answer the following questions:

1. **Literal.** What did Mr. Brown ask his students to do?
  - » to look into their partner's eyes
2. **Literal.** How did the students' eyes respond when the room became dark?
  - » Their pupils opened wider.
3. **Literal.** How did the students' eyes respond when the light was turned on?
  - » Their pupils shrunk.
4. **Literal.** What is the job of the pupil in an eye?
  - » The pupil is the gatekeeper that allows more or less light to enter the eye.
5. **Literal.** What about the job of the pupil in an eye makes it a reflex?
  - » The widening and shrinking of the pupil is done involuntarily.
6. **Literal.** Did all of the students' pupils behave in the same manner?
  - » Yes

### Challenge

Ask students to gather information from each of these different types of sources: a book, a website, a magazine, and so forth.

### Activity Page 13.1



## Lesson 14: Research Writing: Newspaper Article Writing



**Primary Focus:** Students will conduct research on their topic, taking notes and categorizing the information in a graphic organizer. **TEKS 3.13.B; TEKS 3.13.C; TEKS 3.13.E**

Students will write their first draft of their research project.

**TEKS 3.11.B.i-ii; TEKS 3.12.B**

### RESEARCHING AND TAKING NOTES (40 MIN.)

- Tell students to turn to Activity Page 13.1
- Tell students that they will conduct their research.

**TEKS 3.13.B** Develop and follow a research plan with adult assistance; **TEKS 3.13.C** Identify and gather relevant information from a variety of sources; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.11.B** Develop drafts into a focused, structured, and coherent piece of writing by (i) organizing with purposeful structure including an introduction and conclusion; (ii) developing an engaging idea with relevant details; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.

- Review the categories of information they will look for on Activity Page 13.1.
- Remind students of the resources that they may use to conduct their research (*Adventures in Light and Sound*, classroom books, books gathered from the library, any additional resources you may have gathered).
- Tell students that they should keep a list of where they found the information they used and include it when they publish the article.

**Note:** If students will be using the computer lab, you may need to review the rules of the computer lab. They may need assistance with searching on the Internet. If they are using the lab on this day, omit the rest of the lesson.



## NEXT STEP: DRAFTING (30 MIN.)

TEKS 3.11.B.i–ii; TEKS 3.12.B

- Remind students of what they did in the planning stages by showing the chart you created.

### Write a Research Paper

#### Plan

1. Identify topic.
  2. Gather information.
  3. Listen or read and take notes.
  4. Organize notes.
- Go through each and put a check mark beside each step to show that they have completed the planning stages.
  - Display your new chart for drafting:

### Write a Research Paper

#### Draft

1. Write drafts of paragraphs.
  2. Lead (topic) sentence in your first paragraph.
  3. Last paragraph is a conclusion.
  4. Include details from your notes in your writing.
- Go through each of these items with the students. Tell them you'll be adding more steps.



**TEKS 3.11.B** Develop drafts into a focused, structured, and coherent piece of writing by (i) organizing with purposeful structure including an introduction and conclusion; (ii) developing an engaging idea with relevant details; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft.

## Activity Page 14.2



## Activity Page 13.2



**ENGLISH  
LANGUAGE  
LEARNERS**



Writing  
Writing

### Beginning

Provide 1:1 prompting and support where needed.

### Intermediate

Allow students to work with partners.

### Advanced/Advanced High

Provide support if needed.

**ELPS 5.G**

### Support

Work with students individually or in small groups based on need. Some students have difficulty finding information and taking notes. Some have difficulty turning notes into sentences and paragraphs. Adjust your assistance as needed.

- Tell students that a lead paragraph, in news writing, is the most important paragraph in the whole article. It has to be interesting to encourage the reader to keep reading. It should include most of the 5Ws, but does not have to have all of them.
- Tell them that lead paragraphs are usually not very long, just enough to get the reader to want to know more. They grab attention by using active verbs and descriptive language.
- Have students turn to Activity Page 14.2. Tell them that this is where they will draft, revise and edit their writing.
- Tell the students to begin writing their drafts. Tell them to use the notes on Activity Page 13.1 to write their paragraphs and that they can use the rubric on Activity Page 13.2 as a guide for their writing.
- Before ending the lesson, display the template for “The Invention Gazette” so they can see how their newspaper article will look. Briefly show them the place for the headline, a place for a picture or drawing and caption, and where they will write their final copies of their article.

End Lesson

## Lesson 14: Research Writing: Newspaper Article

# Take-Home Material

- Have students work on their drafts at home. Make sure they bring all the materials back for Lesson 15.

### GUIDELINES FOR CALCULATING W.C.P.M SCORES

- If the reading was fairly accurate (fewer than 10 uncorrected errors), you can get a rough (and easy) estimate of a student's W.C.P.M. score simply by noting the time and looking at the chart on Activity Page 14.3.
- To calculate a student's exact W.C.P.M. score, use the information you wrote down on the record sheet and follow the steps described below. The steps are also shown in graphic form on Activity Page 14.3. You will probably find it helpful to have a calculator available.

1. Complete the Words section of Activity Page 14.3.

2. Count Words Read. This is the total number of words that the student read or attempted to read, up to the point where he or she stopped. It includes words that the student read correctly as well as words that the student read incorrectly or skipped over. If the student attempted to read the whole selection, use 400 words total. If the student did not finish the selection, you will need to count the number of words that the student actually attempted to read. Write the count for Words Read in the matching box on Activity Page 14.3.
3. Count the Uncorrected Mistakes noted in your running record. This includes words read incorrectly, omissions, substitutions, and words that you had to supply. Write the total in the box labeled Uncorrected Mistakes on Activity Page 14.3. (A mistake that is corrected by the student is not counted as a mistake. The student is penalized for the time he or she lost making the correction, but not for the initial mistake.)
4. Subtract Uncorrected Mistakes from Words Read to get Words Correct.
5. Next, complete the Time section of the worksheet.
6. Calculate Elapsed Time in minutes and seconds. (If you used a stopwatch, this should already be done for you. Skip to the next step.) If you used a watch and recorded start and stop times, you will need to subtract the Start Time from the Finish Time to calculate the Elapsed Time. Subtract seconds from seconds and then minutes from minutes. Calculate Time in Seconds. Multiply the number of minutes by 60 to convert minutes to seconds, and then add the number of seconds.
7. Complete the W.C.P.M. section of the worksheet.
8. Divide Words Correct by Time in Seconds. Then multiply by 60 to get Words Correct Per Minute (W.C.P.M.).
  - As you evaluate W.C.P.M. scores, here are some factors to consider:
    - It is normal for students to show a wide range in fluency and in W.C.P.M. scores. A major goal for Grade 3 students, however, is to read with sufficient fluency to ensure comprehension and independent reading of school assignments in subsequent grades. Exact fluency targets vary from state to state. The national mean calculated by Hasbrouck and Tindal in 2006 for Winter of Grade 3 is 92 W.C.P.M.
    - A student's W.C.P.M. score can be compared with the score of other students in the classroom (or grade level) and also with the national fluency norms for Winter of Grade 3 obtained by Hasbrouck and Tindal. Students whose scores are below the 25th percentile (62 W.C.P.M) are experiencing serious problems in reading fluently.

## Pupils

### Student Copy

“Class,” said Mr. Brown, “Today we are going to learn some more about how our eyes work. James, would you please turn out the lights?”

James walked to the door and switched off the lights. Mr. Brown closed the blinds. It got darker in the classroom. It was not completely black. Some light came through the blinds, but not very much. The children giggled in the dimly lit room.

“Now,” said Mr. Brown. “I’d like all 22 of you to turn and look at the person who sits next to you. Sally, you look at Mick. Jen, you look at Stan. That’s it! Lean close and look your partner right in the eyes. Can you see your partner’s pupils? Remember: the pupil is the black part in the center of the eye. It’s the part that lets in light from the outside world.”

Mr. Brown walked over to the door. “Can you all see your partner’s pupils?”

“Yes!” said the students.

“Keep looking at your partner’s pupils!” said Mr. Brown. Then, he turned on the lights. In an instant, the room went from dim to bright.

Sally was staring at Mick’s pupils. She watched them shrink.

“Cool!” she called out. “Mick’s pupils got smaller when you turned on the lights!”

“Sally’s did, too!” said Mick.

All around the room, students noticed the same thing. When the lights came on, their partner’s pupils got smaller.

Mr. Brown explained: “The pupil’s job is to let light into the eye and to keep it out. If it’s dark, your pupil opens wide to let in a lot of light. If it’s bright, your pupil shrinks to let in less light. This is a reflex. You don’t have to think, ‘I believe I shall open my pupil a bit wider.’ Your pupils work all by themselves, without you even thinking about it. The pupil is like the gatekeeper of the eye. It decides what gets in and what has to stay out.”

“Do it again!” shouted Mick. “Shut off the lights!”

“Okay,” said Mr. Brown. “Keep your eyes on your partner’s pupils.”

He threw the switch. Forty-four pupils grew larger in the dimness.

Mr. Brown waited a few seconds. Then he turned the lights back on. Forty-four pupils shrank in the bright light.

“So,” said Mr. Brown. “Do we understand what the pupils do?”

The students nodded their heads in agreement.



## 15

# Drafting: Newspaper Article

## PRIMARY FOCUS OF LESSON

### Language

Students will demonstrate and apply phonetic knowledge by spelling words using alternate spellings for the sound /ae/. **TEKS 3.2.B.i**

### Writing

Students will complete drafts of their newspaper articles and revise based on feedback and criteria on a checklist. **TEKS 3.11.C**

## FORMATIVE ASSESSMENT

### Activity Page 15.1

**Spelling Assessment** Use alternate spellings for the sound /ae/ to spell words correctly. **TEKS 3.2.B.i**

### Activity Page 15.4

**Revision and Second Draft** Revise and write second drafts. **TEKS 3.11.C**

**TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables; **TEKS 3.11.C** Revise drafts to improve sentence structure and word choice by adding, deleting, combining, and rearranging ideas for coherence and clarity.

## LESSON AT A GLANCE

|                           | Grouping    | Time    | Materials                                                                                                                        |
|---------------------------|-------------|---------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Language (25 min.)</b> |             |         |                                                                                                                                  |
| Spelling Assessment       | Independent | 25 min. | ☐ Activity Page 15.1                                                                                                             |
| <b>Writing (95 min.)</b>  |             |         |                                                                                                                                  |
| Linking Words and Phrases | Whole Group | 10 min. | ☐ board/chart paper<br>☐ Activity Pages 15.2–15.4<br>☐ <i>Adventures in Light and Sound</i><br>☐ Chart: Writing a Research Paper |
| Revision Checklist        | Whole Group | 10 min. |                                                                                                                                  |
| Sharing and Feedback      | Partners    | 15 min. |                                                                                                                                  |
| Revision and Second Draft | Independent | 60 min. |                                                                                                                                  |

## ADVANCE PREPARATION

**Note:** The first part of Lesson 15 is the Spelling Assessment. If your computer time is scheduled for this day, you can change the Writing portion of this lesson to Lesson 16.

### Writing

- Use the chart from Lesson 14 and add numbers 5 and 6 to the list.

#### Write a Research Paper

##### Draft

1. Write drafts of paragraphs.
2. Include lead (topic) sentence in your first paragraph.
3. Last paragraph is a conclusion.
4. Include details from your notes in your writing.
5. Use a revision checklist.
6. Draft a second copy with revisions.

### Universal Access

- Students will continue to work on their research writing project, so continue to provide support as needed.

Start Lesson

## Lesson 15: Drafting: Newspaper Article

# Language



**Primary Focus:** Students will demonstrate and apply phonetic knowledge by spelling words using alternate spellings for the sound /ae/. **TEKS 3.2.B.i**



### SPELLING ASSESSMENT (25 MIN.)

**TEKS 3.2.B.i**

Activity Page 15.1



- Have students turn to Activity Page 15.1 for the spelling assessment.
- Tell students that for this assessment, they will write their words under the header to which they belong. For example, if you call out the word *cake*, they would write that word under the header 'a\_e' >/ae/.
- Tell students that should a spelling word fit under more than one header, they should only write the word under one.
- Using the list below, call out the word using the following format: say the word, use it in a sentence, and say the word once more.



**TEKS 3.2.B.i** Demonstrate and apply spelling knowledge by: spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables.

- After you have called out all the words, go back through the list slowly, reading each word just once more.

|                |                                       |
|----------------|---------------------------------------|
| 1. refrigerate | 12. invade                            |
| 2. translate   | 13. inhale                            |
| 3. changes     | 14. elevator                          |
| 4. major       | 15. earthquake                        |
| 5. basic       | 16. cascade                           |
| 6. nation      | 17. fragrant                          |
| 7. hurricane   | 18. pancake                           |
| 8. famous      | <b>Challenge Word:</b> <i>another</i> |
| 9. dangers     | <b>Challenge Word:</b> <i>finally</i> |
| 10. spacious   | <b>Content Word:</b> <i>concave</i>   |
| 11. escape     |                                       |

- Ask students to write the following sentences as you dictate them:
  - Our teacher said, “A decade is a period of time that is 10 years.”
  - “We are all capable of spelling our list of words,” said Mrs. Smith’s class.
- You may find it helpful to use the Spelling Analysis Chart found at the end of this lesson to analyze students’ mistakes. This will help you understand any patterns that are beginning to develop, or that are persistent among individual students.

## Lesson 15: Drafting: Newspaper Article

# Writing



**Primary Focus:** Students will complete drafts of their newspaper articles and revise based on feedback and criteria on a checklist. **TEKS 3.11.C**



### LINKING WORDS AND PHRASES (10 MIN.)

**TEKS 3.11.C**

- Explain to students that they will be revising their writing. They will also give and receive feedback, and they may use digital tools (if available) to revise and comment on the articles.



**TEKS 3.11.C** Revise drafts to improve sentence structure and word choice by adding, deleting, combining, and rearranging ideas for coherence and clarity.

Sound, like light, is a form of energy. Also like light, sound moves in waves. **Sound waves** move out from a vibrating object, making the air move back and forth in a way that we can't see.

Two things must happen to create a sound. First, something needs to vibrate and create **sound waves**. Then, something like air or another **medium** needs to carry the **sound waves**. You hear sounds more clearly if you are close to whatever is vibrating and making the **sound waves**. The farther away that the **sound waves** spread out, the weaker they get. That is why you can hear a friend standing right next to you better than if they are calling to you from across the street.

70

- Tell students that linking words are words that help to make their paragraphs flow smoothly. Without linking words, paragraphs can read like a choppy list of facts, making it difficult for the reader to read smoothly. Linking words help students to connect their ideas.
- Have students turn to page 70 of *Adventures in Light and Sound*. Read the first paragraph aloud while the students follow along.

- Tell students that there is an example of a linking word that helps tie sentences and ideas together. Can someone find the word?

» also

- Have students scan the rest of the text to find more linking words and phrases (first, then).
- Take some time to brainstorm linking words they can use in their articles and write them on the board or on chart paper so students can reference the list. Words and phrases should include:

- |               |                 |
|---------------|-----------------|
| ◦ also        | ◦ first         |
| ◦ another     | ◦ second        |
| ◦ and         | ◦ then          |
| ◦ but         | ◦ next          |
| ◦ more        | ◦ in conclusion |
| ◦ in addition |                 |

- Tell students that as they are finishing their drafts and beginning their revising, they should look for places where they've added more information and ask themselves if they can help the reader to know that by starting the sentence with a linking word or phrase.
- Using the Write a Research Paper-Draft from yesterday, add numbers 5 and 6 to the list, if not previously prepared.

### **Write a Research Paper**

#### **Draft**

1. Write drafts of paragraphs.
2. Include lead (topic) sentence in your first paragraph.
3. The last paragraph is a conclusion.
4. Include details from your notes in your writing.
5. Use a revision checklist.
6. Draft a second copy with revisions.

### **Challenge**

Ask students to turn and talk with a partner to practice joining sentences with linking words.

## Activity Pages 15.2–15.3



## Activity Page 15.4



### ENGLISH LANGUAGE LEARNERS



### Writing Writing

#### Beginning

Provide 1:1 prompting and support where needed.

#### Intermediate

Allow students to work with partners.

#### Advanced/Advanced High

Provide support if needed.

#### ELPS 5.G

### Support

Work individually or in small groups with students to develop appropriate feedback.

- Review each step and put a check mark beside each one to show that students have completed the drafting stages.
- Explain to students that they will be moving on to the next two steps, “use a revision checklist” and “draft a second copy with revisions.”

### REVISION CHECKLIST (10 MIN.)

- Have students turn to Activity Page 15.2 Revision Checklist.
- Review the checklist with students and ask if there are any questions.
- Tell students that they will also be sharing their writing with a partner for feedback, and that the partners will be looking for the same things.

### SHARING AND FEEDBACK (15 MIN.)

- Divide students into partners.
- Have students tear out Activity Page 15.3.
- Review the page and tell students that this will be how they will give feedback to their partner.
- If students are using digital tools to write and revise, show them how to leave comments in the file.
- After students have finished their feedback, have students give the drafts and feedback back to their writers.

### REVISION AND SECOND DRAFT (60 MIN.)

- Students will spend the remaining time in the lesson revising their writing and completing a second draft on Activity Page 15.4.

~~~~~End Lesson~~~~~

Lesson 15: Drafting: Newspaper Article

Take-Home Materials

- Have students take home their writing to complete their revisions and second drafts and remind them to bring all materials for Lesson 16.

Spelling Assessment Analysis Chart

Name

1. refrigerate

2. translate

3. changes

4. major

5. basic

6. nation

7. hurricane

8. famous

9. danger

10. spacious

11. escape

12. invade

13. inhale

14. elevator

15. earthquake

16. cascade

17. fragrant

18. pancake

Challenge Word: *another*

Challenge Word: *finally*

Content Word: *concave*

SPELLING ANALYSIS DIRECTIONS

Unit 5, Lesson 10

- Students are likely to make the following errors
 - For 'a_e', students may write 'a'
 - For 'a', students may write 'a_e'
- While either of the above student-error scenarios may occur, you should still be aware that misspellings may be due to many other factors. You may find it helpful to record the actual spelling errors that the student makes in the analysis chart. For example:
 - Is the student consistently making errors on specific vowels? Which ones?
 - Is the student consistently making errors on double consonants?
 - Is the student consistently making errors at the end of the words?
 - Is the student consistently making errors on particular beginning consonants?
- Did the student write words for each feature correctly?
- Also, examine the dictated sentences for errors in capitalization and punctuation.

16

Editing and Publishing: Newspaper Article

PRIMARY FOCUS OF LESSON

Writing

Students will use digital tools to edit and publish their final newspaper articles on either the invention of the telephone or the invention of the incandescent light bulb.

✚ **TEKS 3.11.B.i; TEKS 3.11.B.ii; TEKS 3.11.D.i-xi; TEKS 3.11.E; TEKS 3.12.B; TEKS 3.13.G**

Students will produce and publish writing using technology (optional).

✚ **TEKS 3.13.H**

FORMATIVE ASSESSMENT

Activity Page 16.3

Invention Gazette Finish the final copy of a research writing project.

✚ **TEKS 3.11.B.i-ii; TEKS 3.11.D.i-xi; TEKS 3.11.E; TEKS 3.12.B**

✚ **TEKS 3.11.B** Develop drafts into a focused, structured, and coherent piece of writing by: (i) organizing with purposeful structure including an introduction and conclusion, (ii) developing an engaging idea with relevant details; **TEKS 3.11.D** Edit drafts using standard English conventions, including (i) complete simple and compound sentences with subject-verb agreement; (ii) past, present, and future verb tense; (iii) singular, plural, common, and proper nouns; (iv) adjectives, including their comparative and superlative forms; (v) adverbs that convey time and adverbs that convey manner; (vi) prepositions and prepositional phrases; (vii) pronouns, including subjective, objective, and possessive cases; (viii) coordinating conjunctions to form compound subjects, predicates, and sentences; (ix) capitalization of official titles of people, holidays, and geographical names and places; (x) punctuation marks, including apostrophes in contractions and possessives and commas in compound sentences and items in a series; and (xi) correct spelling of words with grade-appropriate orthographic patterns and rules and high-frequency words; **TEKS 3.11.E** Publish written work for appropriate audiences; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft; **TEKS 3.13.G** Create a works cited page; **TEKS 3.13.H** Use an appropriate mode of delivery, whether written, oral, or multimodal, to present results.

LESSON AT A GLANCE

| | Grouping | Time | Materials |
|---------------------------|-------------|---------|--|
| Writing (120 min.) | | | |
| Editing Checklist | Whole Group | 20 min. | <input type="checkbox"/> Activity Pages 16.1, 16.2, 16.3
<input type="checkbox"/> Write a Research Paper Chart from Lesson 15
<input type="checkbox"/> Edit and Publish a Research Paper Chart
<input type="checkbox"/> Activity Pages 13.2, 15.4, 13.1 |
| Editing | Independent | 35 min. | |
| Publishing | Independent | 65 min. | |

ADVANCE PREPARATION

Writing

- Use chart paper to create a new chart for this lesson:

Edit and Publish a Research Paper

Edit

1. List references.
2. Use an editing checklist.
3. Use digital tools to edit and revise.

Publish

1. Write the final copy.
2. Add illustrations and captions.
3. Organize components.

Note: An alternative to publishing the final copy in the Activity Page 16.3 Newspaper Template is for students to use computers to type and publish their final copies. This will require additional time in the computer lab, so adjust the unit lessons accordingly.

- You may wish to write on the board or create a chart to show students how to list their references. Create the chart below and display it for student reference.

For Student Readers:

- *Adventures in Light and Sound*, "Alexander Graham Bell, Part I"
- *Adventures in Light and Sound*, "Alexander Graham Bell, Part II"
- *Adventures in Light and Sound*, "Thomas Edison: The Wizard of Menlo Park"

For books:

- name of author (last name, first name), title of book (underlined)

For Internet articles:

- name of author (last name, first name), title of article (in quotation marks)

OR

- title of web page, title of article (in quotation marks), date, and website

Lesson 16: Editing and Publishing: Newspaper Article

Writing



Primary Focus: Students will use digital tools to edit and publish their final newspaper articles on either the invention of the telephone or the invention of the incandescent light bulb.

TEKS 3.11.B.i; TEKS 3.11.B.ii; TEKS 3.11.Di-xi; TEKS 3.11.E; TEKS 3.12.B; TEKS 3.13.G

Students will produce and publish writing using technology (optional).

TEKS 3.11.E; TEKS 3.13.H

EDITING CHECKLIST (20 MIN.) **TEKS 3.11.D.i-xi**

- Go through the last chart from Lesson 15, checking off the steps students have completed so far:

Write a Research Paper

Draft

1. Write drafts of paragraphs.
 2. Lead (topic) sentence is in your first paragraph.
 3. Last paragraph is a conclusion.
 4. Include details from your notes in your writing.
 5. Use a revision checklist.
 6. Draft a second copy with revisions.
- Show students the new chart for the last steps in the writing process:

Edit and Publish a Research Paper

Edit

1. List references.
2. Use an editing checklist.
3. Use digital tools to edit and revise.

TEKS 3.11.B Develop drafts into a focused, structured, and coherent piece of writing by: (i) organizing with purposeful structure including an introduction and conclusion, (ii) developing an engaging idea with relevant details; **TEKS 3.11.D** Edit drafts using standard English conventions, including (i) complete simple and compound sentences with subject-verb agreement; (ii) past, present, and future verb tense; (iii) singular, plural, common, and proper nouns; (iv) adjectives, including their comparative and superlative forms; (v) adverbs that convey time and adverbs that convey manner; (vi) prepositions and prepositional phrases; (vii) pronouns, including subjective, objective, and possessive cases; (viii) coordinating conjunctions to form compound subjects, predicates, and sentences; (ix) capitalization of official titles of people, holidays, and geographical names and places; (x) punctuation marks, including apostrophes in contractions and possessives and commas in compound sentences and items in a series; and (xi) correct spelling of words with grade-appropriate orthographic patterns and rules and high-frequency words; **TEKS 3.11.E** Publish written work for appropriate audiences; **TEKS 3.12.B** Compose literary texts, including personal narratives and poetry, using genre characteristics and craft; **TEKS 3.13.G** Create a works cited page; **TEKS 3.13.H** Use an appropriate mode of delivery, whether written, oral, or multimodal, to present results.

Publish

1. Write the final copy.
 2. Add illustrations and captions.
 3. Organize components.
- Go through the list with the students.
 - Tell students that the word *references* means the materials used to gather information. These materials could include the Student Reader—*Adventures in Light and Sound*—Internet articles, information from books in the classroom or library books, etc.
 - Have students turn to Activity Page 16.1: List of References.
 - On this page, students will list the references they used for their article. Tell them that they should have this information in their notes.
 - Show them the chart you prepared previously and discuss how the references should look on their list.

- *Adventures in Light and Sound*, “Alexander Graham Bell, Part I”
- *Adventures in Light and Sound*, “Alexander Graham Bell, Part II”
- *Adventures in Light and Sound*, “Thomas Edison: The Wizard of Menlo Park”

For books:

- name of author (last name, first name), title of book (underlined)

For Internet articles:

- name of author (last name, first name), title of article (in quotation marks)
or
 - title of web page, title of article (in quotation marks), date, and website
- Go through the checklist with students and ask if there are any questions.
 - Ask them to list resources they can use to check spelling. (Answers will vary.)
 - Give students a few minutes to complete their lists of references.
 - Have students turn to Activity Page 16.2: Editing Checklist.
 - Tell students that this is the last step in the process before their final publishing.
 - If students are using technology to publish, they will do their editing on the computer.
 - Quickly go over the editing checklist and ask if there are any questions.

Activity Page 16.1



Activity Page 16.2



EDITING (35 MIN.)

- Students will spend this time editing their drafts to prepare them for the final copy.



PUBLISHING (65 MIN.)

TEKS 3.11.E

- Draw students' attention back to the Write a Research Paper chart:

Edit and Publish a Research Paper

Edit

1. List references.
2. Use an editing checklist.
3. Use digital tools to edit and revise.

Publish

1. Write the final copy.
 2. Add illustrations and captions.
 3. Organize components.
- Check off "List references," "Use an editing checklist," and "Use digital tools to edit and revise."
 - Discuss "Write the final copy" and "Add illustrations and captions" on the chart.
 - Tell students that they will use Activity Page 16.3 to write their final copy (unless they are publishing on computers).
 - Explain that they will need an attention-grabbing headline to announce the invention. The headline will go in the top box.
 - Show students that there is a place for a drawing and a caption. The drawing could be of the invention or the inventor. They will need to write an appropriate caption. Explain that they will be creating the illustration and caption after they finish writing the final copy.
 - Have students spend until about 10 minutes from the end of the lesson writing their final copy.
 - Go back to the Edit and Publish a Research Paper chart and check off "Write the final copy" and "Add illustrations and captions."



TEKS 3.11.E Publish written work for appropriate audiences.

Activity Page 16.3



Support

Give examples of headlines or show examples from the newspapers used earlier in the unit.

Activity Pages 13.1, 13.2, and 15.4



Challenge

Have students consider two or more possible illustrations, then select the best one. Students should give a reason that explains why their choice is the best illustration for their writing.



Writing
Writing

Beginning

Provide 1:1 prompting and support when needed.

Intermediate

Allow students to work with partners.

Advanced/Advanced High

Provide support if needed.

ELPS 5.D

Support

Work individually or in small groups with students based on need.

- Tell students that the last step is to “organize the components.”
- For this step they will need to gather together the following materials and put them in this order:
 - Activity Page 16.3: Final Copy
 - Activity Page 16.1: List of References
 - Activity Page 13.2: Writing Rubric
 - Activity Page 15.4: Second Draft
 - Activity Page 13.1: Planning a Research Article and Notes
- They will staple these together.
- These will be collected during Lesson 17.

~~~~~  
End Lesson  
~~~~~


17

Presenting: Newspaper Article

PRIMARY FOCUS OF LESSON

Speaking and Listening

Students will present their newspaper articles in a group setting, speaking clearly and at an appropriate pace, and then answer questions from group

members. **TEKS 3.1.C; TEKS 3.13.E; TEKS 3.13.H**

Students will follow the rules of discussion, pose questions to the speaker, and

make comments appropriate to the discussion. **TEKS 3.1.A; TEKS 3.1.D; TEKS 3.1.E**

Reading

Students will reread favorite texts aloud and share their opinions with others.

TEKS 3.5

FORMATIVE ASSESSMENT

Speaking and Listening Checklist

Speaking and Listening Checklist Share in groups, asking and answering questions and explaining ideas.



TEKS 3.1.A; TEKS 3.1.D; TEKS 3.1.E; TEKS 3.13.H



TEKS 3.1.C Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.13.H** Use an appropriate mode of delivery, whether written, oral, or multimodal, to present results; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.1.D** Work collaboratively with others by following agreed-upon rules, norms, and protocols; **TEKS 3.1.E** Develop social communication such as conversing politely in all situations; **TEKS 3.5** Self-select text and read independently for a sustained period of time.

LESSON AT A GLANCE

| | Grouping | Time | Materials |
|---|-------------|---------|---|
| Speaking and Listening (60 min.) | | | |
| Sharing Articles and Discussion | Small Group | 60 min. | <input type="checkbox"/> Final Copies of Newspaper Articles
<input type="checkbox"/> Speaking and Listening Checklist
<input type="checkbox"/> Discussion Chart (Digital Projections) |
| Reading (60 min.) | | | |
| Light and Sound Rewind | Partners | 60 min. | <input type="checkbox"/> <i>Adventures in Light and Sound</i> |

ADVANCE PREPARATION

- On chart paper, create the following chart or prepare digital Projection DP.U5.L17.1

Have a Great Conversation!

Here's how to get started:

I wondered about _____.

Could you say more about that?

I really liked _____.

Why did you _____?

I noticed that _____.

I have a question about _____.

I'm not sure about _____. Could you explain more?

Do you think that _____?

- Print out multiple copies of the Speaking and Listening Checklist to use during small group discussions.

Universal Access

- Create groups strategically before sharing articles.
- Create partners strategically in advance of the lesson.

Start Lesson

Lesson 17: Presenting: Newspaper Article

Speaking and Listening



Primary Focus: Students will present their newspaper articles in a group setting, speaking clearly and at an appropriate pace, and then answer questions from group members. **TEKS 3.1.C; TEKS 3.13.E; TEKS 3.13.H**

Students will follow the rules of discussion, pose questions to the speaker, and make comments appropriate to the discussion. **TEKS 3.1.A; TEKS 3.1.D; TEKS 3.1.E**

SHARING ARTICLES AND DISCUSSION (60 MIN.)

TEKS 3.1.A; TEKS 3.1.C

- Students will need their completed newspaper articles.
- Divide students into groups of four or five.

TEKS 3.1.C Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively; **TEKS 3.13.E** Demonstrate understanding of information gathered; **TEKS 3.13.H** Use an appropriate mode of delivery, whether written, oral, or multimodal, to present results; **TEKS 3.1.A** Listen actively, ask relevant questions to clarify information, and make pertinent comments; **TEKS 3.1.D** Work collaboratively with others by following agreed-upon rules, norms, and protocols; **TEKS 3.1.E** Develop social communication such as conversing politely in all situations.

- Have students arrange their desks in their groups so that they can have a discussion easily.
- Tell students that they will be presenting parts of their reports to their group members.
- Explain that to be successful in a group discussion they must do the following things:
 - Listen attentively to others.
 - Only one person at a time should be speaking.
 - When you are the speaker, speak clearly and at an appropriate pace.
 - Ask relevant questions and make comments that are on topic.
- Show students the How to Have a Great Discussion Chart you prepared previously or display DP.U5.L17.1. Explain that these are ideas and they won't always fit with all conversations. Have the students brainstorm more ways to start a conversation and add to the chart.

➤ **DP.U5.L17.1: Have a Great Conversation!** **TEKS 3.1.E**

Have a Great Conversation!

Here's how to get started:

I wondered about _____.

Could you say more about that?

I really liked _____.

Why did you _____?

I noticed that _____.

I have a question about _____.

I'm not sure about _____. Could you explain more?

Do you think that _____?

- Tell students that for the first round of discussion, each student will read their headline. After each student reads their headline, other group members may ask questions or make comments.
- Remind students to use the prompts on the Have a Great Conversation! Chart if they get stuck.
- During the discussions, the teacher can use the Speaking and Listening Checklist to keep track of when students demonstrate the standards. This checklist can keep kept and used for other class discussions and presentations throughout the year.
- Once the students have finished discussing their headlines, they will then each read their lead paragraph to the group, followed by discussion of each.

Challenge

Ask students to suggest other conversation starters to add to the chart.



Speaking and Listening
Exchanging
Information and Ideas

Beginning

Provide 1:1 prompting and support as necessary.

Intermediate

Create small groups strategically for peer support.

Advanced/Advanced High

Encourage group participation.

ELPS 3.G

Support

For students having difficulty speaking in a group, create smaller groups of two to three students. Encourage students to take notes, then write questions out before asking aloud. Refer to question prompts as a guide.



Reading
Exchanging
Information and Ideas

Beginning

Provide 1:1 prompting and support as necessary.

Intermediate

Create small groups strategically for peer support.

Advanced/Advanced High

Encourage group participation.

ELPS 4.F

- After students have presented and discussed their lead paragraphs, they will next read to the group their paragraph on why the invention is important, followed by discussion.
- Have a brief whole class discussion after all students have completed their presentations. Ask what went well and what needs to be improved.
- Collect all the Newspaper Articles and drafts that have been stapled together in this order:
 - Activity Page 16.3 Final Copy
 - Activity Page 16.1 List of References
 - Activity Page 13.2 Newspaper Article Rubric
 - Activity Page 15.4 Second Draft
 - Activity Page 13.1 Planning a Research Article and Notes
- Score according to Newspaper Article Rubric found at the end of this lesson.

Lesson 17: Presenting: Newspaper Article

Reading



Primary Focus: Students will reread favorite texts aloud and share their opinions with others. **TEKS 3.5**

LIGHT AND SOUND REWIND (60 MIN.)

- Have students get their Student Readers.
- Have them go through their readers and choose their favorite chapter.
- Tell students to stand up, put their hand up, and then move around the room to search for a partner to read with.
- Tell students to keep their hands up until they find a partner.
- Once they have a partner, each student will read their favorite chapter to their partner.
- After reading their chapter, the student will explain why the chapter is their favorite.
- After partners have finished reading, have students stand up and put their hand up again and search for a new partner to read to.
- Continue to have partners read and share until time is up.

TEKS 3.5 Self-select text and read independently for a sustained period of time.



SPEAKING AND LISTENING OBSERVATIONAL CHECKLIST

TEKS 3.1.A; TEKS 3.1.C; TEKS 3.1.D; TEKS 3.1.E

| Student | Engages in discussions | Follows rules for discussions | Asks questions to clarify or about information from the speaker | Explains ideas | Reports on topics | Demonstrates command of language and usage conventions for speaking |
|---------|------------------------|-------------------------------|---|----------------|-------------------|---|
| | | | | | | |
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Newspaper Article



Standards that may be assessed with this rubric: **TEKS 3.7.F; TEKS 3.11.B.i;**

TEKS 3.11.B.ii; TEKS 3.11.C; TEKS 3.11.D; TEKS 3.11.E; TEKS 3.12.B; TEKS 3.13.B; TEKS 3.13.E

| Research and Writing Rubric | | | | |
|-----------------------------|--|--|--|---|
| | 4 | 3 | 2 | 1 |
| Research | There are accurate facts for each of the 5Ws and 1H. | Facts and details for five of the 5Ws and 1H. | Facts and details for only three to four of the 5Ws and 1H. May have some inaccuracies. | Facts and details for less than two of the 5Ws and 1H. Some inaccuracy. |
| Organization | Writing is organized logically, with a strong lead sentence, several details, and a conclusion. Headlines and text features enhance the article. | Writing is organized logically, with a lead sentence, some details, and a conclusion. Headlines and text features match the article. | Writing is organized logically, but may be missing a lead sentence, some details, or a conclusion. Headline or other text features do not enhance the article. | Writing is not organized logically, and may be missing a lead sentence, details, and a conclusion. Headlines and text features match the article. |
| Writing | Article is clear and interesting to read, with many descriptive words and details. There are at least three paragraphs with appropriate linking words. | Article is clear and easy to read, with some descriptive words and details. There are at least two paragraphs with some linking words. | Article is written unclearly or without supporting details. Paragraphs are incomplete or unclear. Few linking words to tie ideas together. | Article is difficult to read because of missing words, sentences, or incomplete ideas, and contains no paragraphs. Lack of linking words. |
| Conventions | Correct sentence structure, grammar, punctuation, and capitalization. | Mostly correct sentence structure, grammar, punctuation, and capitalization with one to two errors. | Mostly correct sentence structure, grammar, punctuation, and capitalization with three to four errors. | Sentence structure, grammar, punctuation, and/or capitalization are incorrect with more than five errors. |
| Spelling | There are zero to two spelling errors. | There are three to four spelling errors. | There are four to five spelling errors. | There are more than six spelling errors. |



TEKS 3.7.F Respond using newly required vocabulary as appropriate; **TEKS 3.11.B** Develop drafts into a focused, structured, and coherent piece of writing by: (i) organizing with purposeful structure including an introduction and conclusion, (ii) developing an engaging idea with relevant details; **TEKS 3.11.C** Revise drafts to improve sentence structure and word choice by adding, deleting, combining, and rearranging ideas for coherence and clarity; **TEKS 3.11.D** Edit drafts using standard English conventions; **TEKS 3.11.E** Publish written work for appropriate audiences; **TEKS 3.12.B** Compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristic and craft; **TEKS 3.13.B** Develop a research plan with adult assistance; **TEKS 3.13.E** Demonstrate understanding of information gathered.

Pausing Point 2

Note to Teacher

It is recommended that you select specific Pausing Point activities for individuals and/or groups of students on the basis of their performance on the Unit Assessment.

You may do the activities in any order or combination, using whole class or small groups to meet the needs of the students.

READING

Chapter 9: Light and Photography

Introducing the Chapter

- Tell students that the title of today's chapter is "Light and Photography."
- Ask students to turn to the Table of Contents, locate the chapter, and then turn to the first page of the chapter.

Previewing the Vocabulary

photograph, a picture made with a camera

Aristotle, a Greek philosopher who made notes about how light acts. His notes later helped inventors make cameras

heliograph, a type of early photograph made by mixing coal and other natural elements that are then left in the sun to make images. They took a long time to appear and then disappeared

invent, to make something new that no one else has ever made

daguerreotype, a type of early photograph invented by Daguerre. It appeared in less than 30 minutes and did not disappear as quickly as a heliograph

| Vocabulary Chart for “Light and Photography” | | |
|--|--|----------------------------------|
| Type | Tier 3
Domain-Specific Words | Tier 2
General Academic Words |
| Vocabulary | Aristotle
heliograph
daguerreotype | photograph
invent |
| Multiple Meaning | | |
| | | |
| Sayings and Phrases | | |

Note: The Guided Reading Supports that follow are intended for use while you work with students in Small Group 1.

Small Group 1: Ask these students to come to the reading table and read the chapter with you. This is an excellent time for you to make notes in your anecdotal records. Follow the Guided Reading Supports below as you guide students through the chapter.

Small Group 2: Ask these students to read the chapter individually to find out what light has to do with photography. Remind them that the bolded words in the chapter are found in the glossary and match the words you previewed. Some words may appear in different forms in the chapter. Then, tell them to complete Activity Page PP1.

Guided Reading Supports

Pages 98–99

- Read the title of the chapter as a group, “Light and Photography.”
- Ask students to read Pages 98–99 to themselves, to find the answer to the question, “What is a pinhole camera?”
- When students have finished reading, restate the question and have students answer.
 - » A pinhole camera is a box with a hole on one side. Light comes from the outside through this little hole and projects an image on the opposite side of the box.

Pages 100–101

- Ask students to read Pages 100–101 to themselves, to find the answer to the question, “What is a heliograph?”

- When students have finished reading, restate the question and have students answer.
 - » A heliograph is a type of photograph where sunlight mixes with a form of coal and other chemicals on a square, glass plate to create an image.

Pages 102–103

- Ask students to read Pages 102–103 to themselves to find the answer to the question: “What is a daguerreotype?”
- When students have finished reading, restate the question and have students answer.
 - » A daguerreotype is a type of photography that uses light-sensitive chemicals like silver and iodine to make an image on a metal plate.

GRAMMAR

Adverbs That Tell *How*

- Activity Page PP.2
- Identify adverbs that fit in sentences; change adjectives to adverbs that end in *-ly*.

Adverbs That Tell *When* and *Where*

- Activity Page PP.3
- Apply adverbs in context; write sentences using adverbs.

Conjunction *and*

- Activity Page PP.4
- Write compound subjects/predicates and compound sentences using *and*; join and write simple sentences as compound sentences.

Practice Conjunction *and*

- Activity Page PP.5
- Identify subject/predicate, compound subjects/predicates, and compound sentences.

Conjunction *but*

- Activity Page PP.6
- Create compound sentences with conjunction *but*.

Conjunction *and*

- Activity Pages PP.12 and PP.13
- Create compound sentences with the conjunction *and*.

MORPHOLOGY

Review Suffixes –er, –or, –ist , and –ian

- Activity Pages PP.7 and PP.8
- Answer questions using words with suffixes.

Suffixes –y and –al

- Activity Page PP.9
- Add the correct suffix to root words and write the meaning of the affixed word; determine the correct word using word meaning.

Suffixes –ous and –ly

- Activity Page PP.10
- Select suffixed word to complete sentence, identify part of speech; apply knowledge of suffixes to determine correct word using word meaning.

SPELLING

Practice Dictionary Skills

- Activity Page PP.11
- Identify guide words, alphabetize words, and identify definitions of entry words that match the usages in sentences and create sentences.

Teacher Resources

In this section, you will find:

- Glossary
- Activity Book Answer Key
- Texas Essential Knowledge and Skills Correlation Chart
- English Language Proficiency Standards Correlation Chart

Glossary

A

absorb—to take in or soak up (**absorbed**)

angle—a slant; the space or shape formed when two lines or two surfaces meet in one place; the corner of something with straight sides

Aristotle—a Greek philosopher who made notes about how light acts; his notes later helped inventors make cameras

audiologist—a doctor who studies hearing and how to help people with hearing loss

automatically—operating on its own without direct control

C

cacophony—a harsh, unpleasant noise

camera—an instrument for taking photographs (**cameras**)

composing—creating or writing; arranging

concave—curving inward; shaped like the inside of a bowl

convex—rounded or curving outward; shaped like the outside of a bowl

curve—to bend (**curved**, **curves**)

D

daguerreotype—a type of early photograph invented by Daguerre; it appeared in less than 30 minutes and did not disappear as quickly as a heliograph (**daguerreotypes**)

damage—hurt, harm

dense—thick, heavy (**denser**)

diaphragm—the sheet of muscle that separates the lungs from the lower part of the torso and allows air to be breathed into the lungs

discovery—an event in which someone finds or learns something for the first time

distort—to twist out of normal shape (**distorted**)

E

electric current—the flow of electricity

electricity—energy carried over wires (**electric**)

energy—a supply of power

F

frequency—the rate at which sound waves are produced; the number of times something happens within a particular period of time

H

hearing trumpet—a cone-shaped tool that helps a person hear better by placing the small end in one ear

heliograph—a type of early photograph made by mixing coal and other natural elements that are then left in the sun to make the images; they took a long time to appear and disappeared quickly (**heliographs**)

I

illuminates—provides light; brightens; makes something clearer or easier to see or understand

incandescent—glowing

indigo—a dark purplish-blue color

infrared—long light waves, beyond red on the spectrum, that can only be seen with special instruments

instruments—mechanical or electronic tools designed and used for specific purposes

inspiration—something that gives a person an idea about what to do or create

intense—strong

intensity—the measured strength of light and sound; the amount of energy or power something has

invent—to make something new that no one else has ever made (**invented, inventor, inventors, invention**)

K

kaleidoscope—a tube with plane mirrors and pieces of colored glass that you hold up to the light and rotate to make colorful patterns

kinetoscope—an early machine for showing movies

L

larynx—the organ in your throat that holds the vocal cords and makes it possible to speak; voice box

lens—a clear piece of curved glass or plastic that is used to make things look clearer, larger, or smaller (**lenses**)

light waves—the invisible rays that carry energy in straight paths

lung—one of a pair of organs that allows animals to breathe by filling with air (**lungs**)

M

magnify—to make something look larger or sound louder (**magnified, magnifies**)

magnifying glass—a convex lens that makes things look larger when they are held close to the lens

material—cloth or fabric

medium—a substance that light or sound can travel through, like a solid, a liquid, or a gas (**mediums**)

microphone—an instrument for recording sound or making sound louder

mirror—a shiny surface that reflects light (**mirrors**)

Morse Code—a way of communicating with dots and dashes using the telegraph

O

opaque—not clear, blocking all light so that none gets through

optometrist—a doctor who examines people's eyes to check if their vision needs to be corrected in any way by wearing glasses or contact lenses, or by medical treatment

P

patent—the rights to make and sell something (**patents**)

particles—tiny or very small bits of something

phonograph—an instrument that reproduces sounds that have been recorded on a grooved disk

photograph—a picture made with a camera (**photography, photographs, photos, photo**)

pitch—how high or low a sound is (**pitched**)

plane—a more or less flat surface

prism—a wedge-shaped piece of transparent glass that breaks up light into all the colors of the spectrum

professor—a college teacher

R

rays—lines of light that travel in a straight path from a bright object

reflect—to throw back light, heat, or sound from a surface (**reflections, reflects, reflected, reflection**)

refract—the appearance of light bending when it moves from one medium to another (**refraction, refracting, refracts**)

remote control—a device that uses infrared waves to operate equipment, such as a TV, from a distance

S

scarlet fever—a disease that causes a fever, sore throat, and a red rash

security—protection from danger

shadow—an area of darkness created when light is blocked by something (**shadows**)

silvery—shiny or silver in color

skylight—a window in a ceiling or roof that lets in light

sound—vibrations that are produced that travel through particles and are heard by our ears

sound wave—a series of vibrations that can be heard (**sound waves**)

source—a starting place; where something comes from (**sources**)

spectrum—the distribution of all the colors that make up the light we see

speed—how fast or slow something moves

surface—the outside layer of something

symbol—an object or picture that stands for something (**symbols**)

T

telegraph—a tool for communicating by sending electrical signals by wire or radio

trachea—a tube that air passes through going to and from the lungs; windpipe

transmit—sent, passed along, or spread through a material (**transmission, transmitted**)

translucent—describes an object that allows some light to pass through, so that you are able to see the form of an object but not a clear image

transparent—clear, see-through so that light gets through

U

ultraviolet—short, invisible light waves, beyond violet on the spectrum, that cause sunburn

V

vacuum—emptiness

variations—changes in amount, form, or level of something

vibration—rapid movement back and forth

Visible Speech—a system of communication used by deaf people in which symbols represent sounds

voice box—the larynx

vocal cords—muscles that produce sound when air passes over them

volume—the loudness or intensity of a sound

W

wave—an amount of energy that moves in a rippling pattern like a wave (**waves**)

wavelength—how long a wave is, the distance from the top of one wave to the top of the next wave (**wavelengths**)

white light—light that is made up of waves with different wavelengths and includes all the colors we can see

X

x-ray—a powerful invisible ray of energy that can pass through an object and make it possible to see inside of it; a picture that shows what makes up the inside of something, such as the bones of the skeleton

Digital Exit Ticket Suggested Answers

| QUESTION | ANSWER |
|---|---|
| Lesson 1 | |
| What does light have to do with wavelengths? Use evidence from the text to support your response. | Answers will vary but should include that light can be measured in wavelengths, wavelengths can be different sizes, some wavelengths are visible and some are not, depending on the size. Students can use both the text and the illustrations to explain their answers. |
| Lesson 2 | |
| How do the characters in this narrative use their five senses and sensory organs to experience the world around them? What was the author's purpose in writing this narrative? | <p>Answers may vary, but could include: they see the roses, garden, sun, Alfie, etc., with their eyes; they taste the lemonade and their lunch with their taste buds; they smell the bread with their noses; they feel the sun and cool shade, glasses, etc., with their skin; they hear each other talking, Alfie barking, the buzzing bee, etc., with their ears.</p> <p>The author's purpose in writing this narrative is to inform and entertain.</p> |
| Lesson 3 | |
| Are people's bodies transparent or opaque? How do you know? | People's bodies are opaque. Light cannot pass through them so shadows are formed. |
| Lesson 4 | |
| Based on the information in the story so far, why do you think Samuel wants to visit the House of Mirrors? | Answers may vary, but could include that Samuel is interested in the extraordinary science of light and the important part it plays in his art. He has already explained what causes light to reflect off smooth, shiny surfaces. By visiting the House of Mirrors, he will be able to demonstrate to Jack and the children the different ways that mirrors of various designs reflect light. |
| Lesson 5 | |
| What is the purpose of a magnifying glass? How does a magnifying glass make things look different? | The purpose of a magnifying glass is to make something look larger. A magnifying glass, as a simple convex lens, helps people more clearly see the details of something small. |
| Lesson 6 | |
| The word microscope comes from two ancient Greek words: micro, meaning "small," and scope, meaning "to see or to look." Do you think that it's a good word to describe the instrument? Why or why not? Use evidence from the text to support your answer. | Answers may vary. |
| Lesson 7 | |
| Describe the spectrum of colors and how it is formed. | The spectrum is all the colors of the rainbow. When the waves of white light are refracted through in just the right way by something transparent, a band of colors appears. |
| Lesson 8 | |
| How do we sense the vibrations of sound waves? Use evidence from the text to support your answer. | Our ears receive the sound waves and help us to hear. We can also feel vibrations through solid objects. |

| | |
|---|---|
| Lesson 9 | |
| Today you learned more information about sound and light. Compare and contrast light and sound. Use evidence from the text to support your response. | Answers will vary, and are represented by student work in AB 9.2. |
| Lesson 10 | |
| How would school be different if all sounds were the same pitch and volume? | Answers may vary but should include content vocabulary. |
| Lesson 11 | |
| Why do adults have lower-pitched voices than children? Use evidence from the text to support your response. | Children have shorter vocal cords that make their voices higher-pitched. |
| Lesson 12 | |
| How did Aleck's mother and father inspire him? What did they inspire him to create? Use evidence from the text to support your response. | Answers may vary, but should include reference to being inspired by his parents because his mother was nearly deaf, but still loved to play music, and his father was a speech professor who invented ways to help deaf people communicate more clearly. He began to imagine and create many devices, such as a speaking machine. |
| Lesson 13 | |
| You have read informational text about two famous inventors, Alexander Graham Bell and Thomas Edison. Compare and contrast the two inventors. | Answers may vary but should include content vocabulary. |
| Lesson 14 | |
| | |
| Lesson 15 | |
| What was the most important thing you learned from your partner's feedback on your writing? What are some of the improvements you made to your writing? | Answers will vary but should include academic vocabulary. |
| Lesson 16 | |
| What attention-grabbing headline do you plan to use to announce your invention? What made you pick that headline? | Answers will vary. |
| Lesson 17 | |
| Which chapter in the Reader did you select as your favorite? Explain why it is your favorite chapter. | Answers will vary. |

ACTIVITY BOOK ANSWER KEY

Activities with widely variable or subjective responses may not be reprinted in this Appendix.

NAME: _____ DATE: _____

1.1 ACTIVITY PAGE

What Is Light?

1. **Before Reading:**
Think-Draw-Share: Draw a picture in the space below that shows the answer to the question “What is light?” Share with a partner and explain why you drew the picture.

Answers may vary.

Grade 3 Activity Book | Unit 5 1

2. **After Reading:**
Responding to Text: Finish the sentence and list the page number where you found the answer.

Light is important because Answers may vary, but students may say that light is important because without it we would not be able to see.

page 10

2 Unit 5 | Activity Book Grade 3

NAME: _____ DATE: _____

1.2 ACTIVITY PAGE

Lab Notes

| Light | | |
|--|---|--|
| What is it? | energy | |
| How do we get it?
What is the source? | the Sun
stars
lightbulbs
candles | flashlights
monitors/screens
fires |
| How fast does it travel? | 186,000 miles per second in a vacuum | |
| How does it travel? | in waves of different wavelengths | |

Grade 3 Activity Book | Unit 5 3

NAME: _____ DATE: _____

1.4 ACTIVITY PAGE

Suffixes: -er, -or, -ist, and -ian

Answer the following questions using the words on Activity Page 1.3.

- Which word on the chart names a doctor who specializes in taking care of babies and children? pediatrician
- Which word on the chart names someone who can help you find good books to read at the library? librarian
- You might be one of these if you like to play on sports teams.
player
- If you don't eat any meat, you are a vegetarian.
- If you like to tell jokes and make people laugh, you are a comedian.
- If you have done extensive research on ancient Rome, you are probably a historian.
- If your job is to study animals and their habitats, you are probably a zoologist.
- List the words that name people who play musical instruments.
guitarist organist violinist
- If you like to draw, you could be either one of these. artist
cartoonist

Grade 3 Activity Book | Unit 5 7

10. If you want to be a person who makes or writes fictional books, you want to be a novelist.
11. If you go to a new city to explore for a few days, you may be either one of these. visitor tourist
12. If you understand how to put wires for electricity in a new house, you might be an electrician.

NAME: _____
DATE: _____

2.1 ACTIVITY PAGE

What Is Light?

Answer each question below. Write in complete sentences with correct capitalization and punctuation. List the page number where you found the answer.

1. What determines whether or not you see light waves?

The length of the wave determines whether you
can see light.

page 4

2. Describe white light.

White light includes light of different wavelengths,
including all the color we can see.

page 6

3. What is the central idea of this chapter?

Answers may vary, but they could include: Light travels in
different waves. Wavelengths differ in length. There are many
different light sources.

NAME: _____
DATE: _____

2.3 ACTIVITY PAGE

Comparing and Contrasting Organizer

Text 1: What Is Light? (Reader)

informational
facts
details
graphics
figures
glossary
bold words
captions
light
energy
vacuum
waves
186,000 miles per second
moon

Text 2: What Is Light? (Excerpts)

narrative
dialogue
characters
events
sensory language
descriptive
186,000 miles per second
rays
light
energy
vacuum
waves
wavelengths
white light
moon

Differences:

Answers may vary, but students should note that the Reader text “What Is Light?” is an informational text, while the excerpt from the Read-Aloud is a narrative.

NAME: _____
DATE: _____

2.3A ACTIVITY PAGE

Contrasting Organizer

| Text 1: What is Light? (Reader) | Text 2: What is Light? (Excerpts) |
|---------------------------------|-----------------------------------|
| informational | narrative |
| facts | dialogue |
| details | characters |
| graphics | events |
| figures | sensory language |
| glossary | descriptive |
| bold words | 186,000 miles per second |
| captions | second |
| light | rays |
| energy | light |
| vacuum | energy |
| waves | vacuum |
| 186,000 miles per second | waves |
| moon | wavelengths |
| | white light |
| | moon |

Differences:

The main difference between Text 1 and Text 2 is that Text 1 is a narrative text and Text 2 is informational text.

Text 1 has Answers may vary.

Text 2 has Answers may vary.

NAME: _____
DATE: _____

2.4 ACTIVITY PAGE

Making Adverbs with the Suffix -ly

- Draw a wiggly line under the verb.
- Then, change the adjective under the blank to an adverb by adding -ly to complete the sentence.
- Draw a triangle around the adverb and an arrow from the adverb to the verb. Then, answer the question after the sentence.

1. We waited patiently for our turn to look through the telescope.
(patient)

How did we wait? patiently

2. People were riding in the car illegally because they weren't wearing their seatbelts.
(illegal)

How were the people riding? illegally

3. Our teacher drew lines vertically on the paper so we would know where to write each separate part.
(vertical)

How did our teacher draw lines? vertically

4. I neatly arranged my books on the shelves when I cleaned my room.
(neat)

How did I arrange my books? neatly

5. A woman at a table near us in the restaurant politely (polite) asked the waiter for more water.

How did the woman ask? politely

6. The new medicine the doctor gave me smoothly (smooth) went down when I swallowed it compared to what I took last year when I was sick.

How did the medicine go down? smoothly

Write a sentence using each adverb. Remember, the adverb should describe the verb.

1. *slowly*

Answers may vary.

2. *loudly*

Answers may vary.

NAME: _____
DATE: _____

2.6 TAKE-HOME

Make Adverbs with the Suffix -ly

- Draw a wiggly line under the verb.
- Then, change the adjective under the blank to an adverb by adding -ly to complete the sentence.
- Draw a triangle around the adverb and an arrow from the adverb to the verb. Then, answer the question after the sentence.

Example:

Tom answered honestly (honest) that he did not know how the vase got broken.

Tom answered how? honestly

1. The man on the subway kindly (kind) offered his seat to the older woman.

How did the man offer his seat? kindly

2. The little boy walked quickly (quick) down the stairs.

How did the little boy walk? quickly

3. The mayor officially (official) announced that he would retire.

How did the mayor announce he would retire? officially

4. Our teacher clearly (clear) explained what we were to do for homework.

How did our teacher explain the homework? clearly

5. My sister carelessly (careless) dropped her jacket on the floor.

How did my sister drop her jacket? carelessly

Write a sentence using each adverb. Remember, the adverb should describe the verb.

1. *softly*

Answers may vary.

2. *tightly*

Answers may vary.

NAME: _____
DATE: _____

3.2 ACTIVITY PAGE

Lab Notes

| Object | What do I think will happen? | What happened? |
|--------------------|------------------------------|---|
| Clear plastic wrap | Answers may vary. | Answers may vary, but they should include that light shone through clearly. |
| Wax paper | Answers may vary. | Answers may vary, but they should include that diffused light shone through. |
| Cardboard | Answers may vary. | Answers may vary, but they should include that little light shone through. |
| Aluminum foil | Answers may vary. | Answers may vary, but they should include that light reflected off of the foil. |

Light Experiment Reflection

Based on your experiment, what predictions can you make about what happens to light when it hits a parked car? Think about all the surfaces that you see on a car.

Answers may vary, but they could consider how light affects

surfaces such as glass, metal, upholstery, and rubber.

NAME: _____

3.3

ACTIVITY PAGE

DATE: _____

Lab Notes

Cause and Effect: When Light Hits Different Types of Objects

| | | |
|---|---|--|
| Transparent
Examples:

window, etc. | What does it mean?

clear | What happens?
passes through

Draw a picture. |
| Opaque
Examples:

wood, cardboard, etc. | What does it mean?

blocks light | What happens?
makes shadows

Draw a picture. |

Evidence on page 14

Evidence on page 16

NAME: _____

3.4

ACTIVITY PAGE

DATE: _____

Use Adjectives and Adverbs Correctly

Fill in the blank with an adjective or an adverb, depending on whether a noun or verb is described.

| | | | | | |
|--------|-----------|---------|--------|--------|----------|
| loud | careful | tight | slow | glad | silent |
| loudly | carefully | tightly | slowly | gladly | silently |

- The turtle walked slowly across the sidewalk toward the pond.
- The tight belt pinched my waist.
- The loud sound hurt my ears.
- Our teacher asked us to read silently instead of with a partner.
- The father tightly buckled his seat belt.
- She carefully put the baby down in his crib so she would not wake him up.
- My brother carefully fastened his shoelaces so he would not trip.
- People cheered loudly as the soccer team scored a goal to break the tie.

Bonus: Mark the adjectives with a box and the adverbs with a triangle, and then draw an arrow to the word they describe.

NAME: _____

3.5

ACTIVITY PAGE

DATE: _____

Blank Busters

| | | | |
|------------|---------|--------|-----------|
| succeeded | money | enemy | centipede |
| experience | believe | secret | increase |
| chimney | tedious | fancy | degree |
| athlete | chief | grease | scenic |
| chariot | stadium | | |

Challenge Word: almost
Challenge Word: really
Content Word: electricity

Fill in the blanks in the sentences below with one of the spelling words in the chart. Only if needed, add a suffix to the end of a word in order for the sentence to make sense: -s, -ed, -ing, or -ly.

- The hiker trudged along tediously up the mountain.
- She enjoyed watching the sprinters and other talented athletes race around the enormous stadium.
- It seemed that the chimney on the rooftop was almost as tall as a skyscraper.
- The scenic overlook on the mountain road was breathtaking!
- Can you believe that the amount of homework will be increased in January?
- It was a secret that the many-legged centipede in the story had pockets full of money.

7. The chief of police has a fancy office with a beautiful view of the city.
8. The fire on the stove was caused by grease that spilled from the pan.
9. You have succeeded in making me laugh for hours!
10. Do you understand how electricity works to make an oven heat up?

Write three sentences using spelling words of your choice that were not used in the first ten sentences. Make sure to use correct capitalization and punctuation. You may use the Challenge Words or the Content Word in your sentences.

1. Answers may vary.
2. Answers may vary.
3. Answers may vary.

NAME: _____
DATE: _____

3.7 TAKE-HOME

How Are Shadows Made?

Read the examples below carefully. If the light source causes a shadow, write "shadow" on the blank. If the light source does not cause a shadow, write "no shadow" on the blank.

1. The sunlight is streaming through a window hitting a rocking chair.
shadow
2. It is a rainy, cloudy day and you are standing outside under an umbrella.
no shadow
3. It is midnight and there are no lights on anywhere. no shadow
4. It is a bright, sunny day at the beach and you are sitting under a beach umbrella. shadow
5. You are swinging outside on a sunny, but cold day. shadow
6. What is the central idea of this chapter?

Shadows are made when a light source hits an opaque object.
The closer an object is to a light source, the bigger the shadow will be.

1. What is similar about the two reflections?
Answers may vary, but they should include that both reflections revealed some details of the student's face.
2. What is different about the two reflections?
Answers may vary, but they should include that the reflections were distorted in different ways.

NAME: _____
DATE: _____

4.2 ACTIVITY PAGE

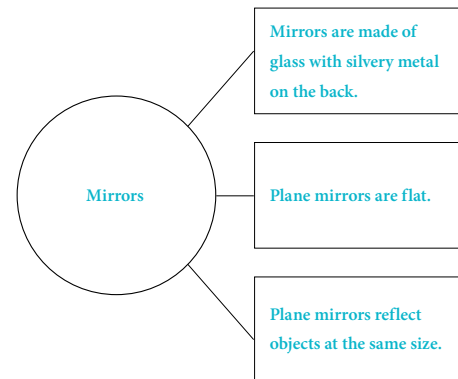
Lab Notes

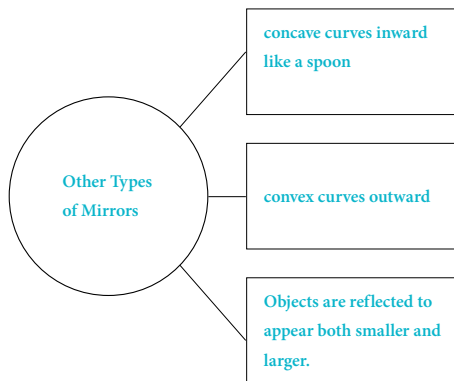
Central Idea and Details

Pages 30–31

Central Idea

Details





there are different kinds of mirrors

The central idea of both texts is that reflect images in different ways.

Adverbs that Tell *how*, *when*, and *where*

There is one adverb in each sentence. Draw a triangle around each adverb and a wiggly line under the verb it describes. Then, draw an arrow from the adverb to the verb. On the blank line after the sentence, write whether the adverb tells how, when, or where.

- I am going to a birthday party tomorrow. when
- The dog slept outside. where
- I always ride the bus to school. when
- John has never taken the train. when
- Mary left her coat here. where
- Dad clapped loudly. how
- It snowed everywhere. where
- He picked up the baby carefully. how
- I ate my peas last because I don't like them. when
- The squirrel quickly gathered some acorns. how
- Please stack the books there. where
- I read my book silently. how

Word Sort

Identify the headers. Read the words in the box and circle the vowels that have the /ee/ sound. Write the words under each header that match the header's spelling pattern.

'y' > /ee/ 'e' > /ee/ 'i' > /ee/ 'ea' > /ee/

funny recess radiant wheat

handy recipe piano seaside

early

'ee' > /ee/ 'ie' > /ee/ 'ey' > /ee/ 'e_e' > /ee/

greeting skied valley Chinese

sweet honey

| | | | | |
|-------|---------|----------|---------|---------|
| skied | debate | greeting | piano | recess |
| early | handy | wheat | honey | sweat |
| funny | element | sweet | seaside | recipe |
| cope | valley | head | Chinese | yellow |
| great | fly | bedding | fried | radiant |

Adverbs that Tell *how*, *when*, and *where*

There is one adverb in each sentence. Draw a triangle around each adverb and a wiggly line under the verb it describes and draw an arrow from the adverb to the verb. On the blank line after the sentence, write whether the adverb tells how, when, or where.

- Example: The nurse gently cleaned my cut finger. how
- I carried the newspaper inside. where
 - I will wash the dishes later. when
 - The people folded the laundry there. where
 - Sam ripped his pants today. when
 - The boys whispered quietly. how
 - Beth has never met her aunt. when
 - The boy pounded his fists madly. how
 - My dog always wags his tail. when
 - Sometimes I walk home from school. when


NAME: _____ 5.2 ACTIVITY PAGE

DATE: _____

Lab Notes

Refraction

Directions: Look at the image below. What is causing the straw to look like this? Fill in the boxes for both the cause and the effect.



| | |
|--|---|
| Cause: Why does it happen?
Light rays slow down when they go through the glass and the water and then bend or change direction. This is called refraction. | Effect: What happens?
The straw appears to be separated and also magnified. |
|--|---|

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NAME: _____ 5.3 ACTIVITY PAGE

DATE: _____

Lab Notes

Refraction and Lenses

| Central Idea and Details | |
|---|---|
| What is the central idea? | The central idea is that when light goes through a transparent substance, it slows down and bends or changes direction. This is called refraction. Transparent lenses can change the angle of the refraction because of their shape. |
| List three key facts or details. | Answers may vary but could include: light slows down when it travels through substances; the denser or heavier something is the slower it goes; the angle of the rays change and appear to bend; concave lenses spread light rays apart; convex lenses bend the rays closer together. |
| List three new words you learned and what they mean. | Answers may include definitions for some of the following terms:
<div style="display: flex; justify-content: space-between;"><div>refraction
denser
angle
lens</div><div>refracts
magnified
magnifying glass</div></div> |

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| | |
|--|-------------------|
| What is the most interesting thing you learned? | Answers may vary. |
| Write three questions you still have. | Answers may vary. |

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NAME: _____ 5.4 ACTIVITY PAGE

DATE: _____

Words with Suffixes -y and -al

Add the correct suffix to the root word provided. Write the new word in a sentence.

- Root word: *mess*
Add -y or -al to make: messy
Answers may vary.
- Root word: *magic*
Add -y or -al to make: magical
Answers may vary.
- Root word: *culture*
Add -y or -al to make: cultural
Answers may vary.

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4. Root word: *dirt*

Add -y or -al to make: dirty

Answers may vary.

5. Root word: *rust*

Add -y or -al to make: rusty

Answers may vary.

Circle the word that matches the meaning.

1. Meaning: related to sounds made by voices or instruments and arranged in a way that is pleasing to hear

Word: music musical

2. Meaning: the unplanned occurrence of good events

Word: luck lucky

NAME: _____

DATE: _____

5.4
CONTINUED

ACTIVITY PAGE

3. Meaning: related to stories about things that are not real

Word: fictional fiction

4. Meaning: full of a natural white substance used to flavor and preserve food

Word: salt salty

5. Meaning: the process of eating the right kind of food so you can be healthy and grow properly

Word: nutritional nutrition

6. Meaning: full of spirals or winding shapes

Word: curly curl

NAME: _____

DATE: _____

5.5

TAKE-HOME

Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

| | |
|---|--------|
| chest | chisel |
| chief 1. <i>noun</i> A leader of a group. 2. <i>adjective</i> Most important or main. | |
| chimney <i>noun</i> A pipe that carries smoke out of a building, usually through the roof. | |

1. What are the two guide words on the page?

chest chisel

2. What are the two entry words on the page?

chief chimney

3. How many definitions are there for *chief*? 2

4. Would the word *choir* be on this page? no

5. Circle the word(s) that would come before **chest** from the following list:
choke, cherry, chestnut.

NAME: _____

DATE: _____

7.1

ACTIVITY PAGE

Lab Notes

White Light Experiment Research

| Key ideas from the text | |
|-------------------------|--|
| Pages 56–57 | Answers may vary but should include information about a prism. |
| Pages 58–59 | Answers may vary but should include information about prisms. |
| Pages 60–61 | Answers may vary but should include information about the spectrum. |
| Pages 62–63 | Answers may vary but should include information about how colors are related to wavelengths. |
| Pages 64–65 | Answers may vary but should include information about invisible light waves. |
| Pages 66–67 | Answers may vary but should include information about infrared waves. |

NAME: _____

DATE: _____

7.2ACTIVITY PAGE

Lab Notes

White Light Experiment Research

| Experiment #1 | Experiment #2 |
|---|---|
| Prediction:

Answers may vary. | Prediction:

Answers may vary. |
| Observations:

Answers may vary. | Observations:

Answers may vary. |
| Draw a picture. | Draw a picture. |

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NAME: _____

DATE: _____

7.3ACTIVITY PAGE

Lab Notes

White Light Research Summary

Use the information you found in "Color and Light" and the observations you made from the two experiments to complete the following sentences below. Make sure you use academic vocabulary words and write in complete sentences with correct capitalization and punctuation.

1. White light is sunlight.

2. Chapter 5 explains how a prism works. It says prisms are made of transparent material and are made in a special shape that refracts light. When you put white light into a prism it will refract into all the colors of the rainbow.

3. The colors in the light spectrum are red, orange, yellow, green, blue, indigo, and violet.

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4. I saw this myself in the two experiments! What I saw was Answers may vary.

5. If I were to tell someone else to try one of the experiments, I would tell them to gather the following materials: sunlight or a strong source of light, paper, and a prism.

6. The type of light I did not see in the experiments was invisible light. Three types of invisible light are ultraviolet, x-ray, and infrared.

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7.3A ACTIVITY PAGE

Lab Notes

White Light Research Summary

Use the information you found in "Color and Light" and the observations you made from the two experiments to complete the sentences below. Make sure you use academic vocabulary words and write in complete sentences with correct capitalization and punctuation.

1. White light is sunlight.

2. Where does the text explain what a prism is? page number 56.

3. Draw a diagram of a prism. Draw arrows to show where the light enters and then draw lines to show what happens when it refracts.

Answers may vary.

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4. What does the white light do when it leaves the prism?

White light refracts into all the colors of the rainbow or spectrum.

5. List the colors in the light spectrum in order:

Red, Orange, Yellow, Green, Blue, Indigo, Violet

6. The first experiment showed Answers may vary.

7. The second experiment showed Answers may vary.

8. List three types of invisible light. List the page numbers where you found the answer.

ultraviolet, x-ray, and infrared

Pages 64 and 66.

Word Shelf

The left-hand side of the table contains words that use the suffix you have been studying. Use the blanks on the right side to record additional words that use the same suffix. Then write those words and their definitions on the table on the following page.

| Suffix -ous
means full of or having | |
|--|---|
| joyous | Answers may vary but should be a word with the suffix -ous. |
| dangerous | Answers may vary but should be a word with the suffix -ous. |
| mountainous | Answers may vary but should be a word with the suffix -ous. |
| poisonous | Answers may vary but should be a word with the suffix -ous. |

-ous: Suffix Meaning "full of"

| | |
|---|-------------------|
| joyous—(adjective) full of a feeling of great happiness | Answers may vary. |
| dangerous—(adjective) full of the chance that something bad will happen | Answers may vary. |
| mountainous—(adjective) full of land that rises very high above its surroundings | Answers may vary. |
| poisonous—(adjective) full of a substance that can hurt or kill people or animals if touched, swallowed, or inhaled | Answers may vary. |

Write the correct word to complete each sentence.

famous poisonous mysterious furious dangerous humorous

- The humorous ending to the movie had everyone in the theater laughing.
- When I got to school, there was a mysterious smell in our classroom, and I couldn't figure out what it was coming from.
- My furious brother could not believe our little sister had scribbled all over his history paper with crayons.
- A famous basketball player is said to be coming to our community fair next week but nobody knows who it is.

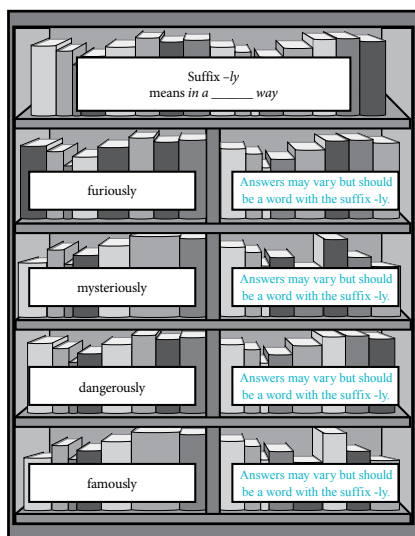
5. Some farmers put poisonous chemicals on their crops to keep the bugs from eating them, but the chemicals can be harmful to people who eat the food.

Write your own sentence using the one word left in the box.

6. Answers may vary, but they should include the word dangerous.

Word Shelf

The left-hand side of the table contains words that use the suffix you have been studying. Use the blanks on the right side to record additional words that use the same suffix. Then write those words and their definitions on the table on the following page.



-ly: Suffix Meaning “in a ____ way”

| | |
|---|-------------------|
| furiously —(adverb) in a furious way | Answers may vary. |
| mysteriously —(adverb) in a mysterious way | Answers may vary. |
| dangerously —(adverb) in a dangerous way | Answers may vary. |
| famously —(adverb) in a famous way | Answers may vary. |

Write the correct word to complete each sentence.

dangerously furiously mysteriously famously humorously

- My cell phone mysteriously turned itself off when I put it down on the table.
- My uncle famously asked his girlfriend to marry him at the family reunion in a way that nobody will forget.
- My sister humorously wore a small hat for a baby as part of her costume for the party.
- A little boy in the subway station walked dangerously near the edge of the passenger platform above the tracks.

Write your own sentence using the one word left in the box.

5. Answers may vary, but they should include the word furiously.

Blank Busters

| | | | |
|--|----------|----------|-------------|
| subway | payment | awaited | ballplayers |
| yesterday | great | crayons | explain |
| mermaid | obtain | breaker | daydreams |
| daisies | dainty | trainees | betrayed |
| beefsteak | giveaway | | |
| Challenge Word: family
Challenge Word: young
Content Word: straight | | | |

Fill in the blanks in the sentences below with one of the spelling words in the chart. Only if needed, add a suffix to the end of a word in order for the sentence to make sense: -s, -ed, -ing, or -ier.

- At the end of their meal, the waitress obtained change from the cashier for her customers.
- The butcher offered many giveaways of free beefsteak.
- The talented artist puts her crayons aside and uses oil paint on these portraits.
- Our beautiful, yellow daisies finally bloomed yesterday.
- The smallest mermaid was the only one who could wear the dainty seashell necklace.
- The ride on the subway car was very scary because the lights went out.

7. Our family is made up of two adults and five young children.
8. The ballplayers were lost in their daydreams and didn't pay attention to the game, so they lost.
9. My teacher is explaining multiplication, so I better pay attention!
10. Our long awaited Spring Break is approaching!

Write three sentences using spelling words of your choice that were not used in the first ten sentences. Make sure to use correct capitalization and punctuation. You may use the Challenge Words or Content Word in your sentences.

1. Answers may vary.
2. Answers may vary.
3. Answers may vary.

NAME: _____
DATE: _____

7.9 TAKE-HOME

Build Sentences

Read each simple sentence. Then, brainstorm adjectives, adverbs, and synonyms that you might add to the sentence, and write these words in the boxes provided. You do not need to write words in every box, but try your best. Write a new, more interesting sentence in the blank space provided, using some of the adjectives and adverbs.

| Starter Sentence: The lion made a loud noise. | | | |
|---|---|--|---|
| Adjectives to describe the lion | Adverbs to describe how the lion made a loud noise | Adverbs to describe when the lion made a loud noise | Adverbs to describe where the lion made a loud noise |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for made a loud noise
<u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

| Starter Sentence: The gladiator walked. | | | |
|--|--|--|---|
| Adjectives to describe the gladiator | Adverbs to describe how he walked | Adverbs to describe where he walked | Adverbs to describe when he walked |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for walked
<u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

| Starter Sentence: The children played. | | | |
|--|--|--|---|
| Adjectives to describe the children | Adverbs to describe how they played | Adverbs to describe where they played | Adverbs to describe when they played |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for played
<u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

NAME: _____
DATE: _____

8.1 ACTIVITY PAGE

Triangle Connections

Using your Lab Notes and the glossary in your Student Reader, select three words we've studied in the unit so far and arrange them in a triangle shape. Then, connect the first word to the second word with a line and write on the line how the two words are connected. Next, draw a line from the second word to the third word and write on the line how those two words are connected. Finally, draw a line from the third word to the first word and write the connection.

First word: Answers may vary.

Second word: Answers may vary. Third word: Answers may vary.

NAME: _____

DATE: _____

8.2

ACTIVITY PAGE

Write a paragraph that describes how sound is created and how it travels. Be sure to use sequencing words and use correct spelling, capitalization, and punctuation.

Answers may vary.

[illegible]

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DATE: _____

8.2A

ACTIVITY PAGE

Write each of the steps for how sound is created and travels below in the correct sequence. Choose an appropriate sequence word for each of the steps.

| Sequence Word Bank | |
|--------------------|---------|
| First | Then |
| Second | After |
| Third | Finally |
| Next | Lastly |

1. Answers may vary, but they should include that something needs to vibrate to create a sound wave.

Sequence word First

2. Answers may vary, but they should include that the sound wave needs a medium, like air, to travel through.

Sequence word Second, next, or then

3. Answers may vary, but they should include that the sound waves travel across distances and spread out the farther they travel.

Sequence word Third, next, then, or after

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Activity Book | Unit 5 93

4. Answers may vary, but they should include that the vibrations are received by something, like the human ear.

Sequence word Next, then, or after

5. Answers may vary, but they should include that the ear hears the sound.

Sequence word Finally or lastly

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- DATE: _____

8.3

ACTIVITY PAGE

Exit Ticket

Visualizing Vibrations

Do you think you can hear a tuning fork under water? Why or why not? State your opinion and list the reasons why. Draw a picture to illustrate your claim.

I think that Answers may vary.

One reason I think that this is true is Answers may vary.

Grade 3

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NAME: _____ DATE: _____ **8.4** ACTIVITY PAGE

Practice Using Suffixes -ous and -ly

Choose the correct word to complete each sentence. Write the word and its part of speech below the sentence.

- We attended the joyous party to celebrate Michael's graduation.
(joyous, joyously)
Word: joyous Part of Speech: adjective
- My new pen mysteriously appeared on my desk after dinner even though it was not there before we ate.
(mysteriously, mysterious)
Word: mysteriously Part of Speech: adverb
- For a history project, we had to write a biography of a famous person from the American Revolution.
(famously, famous)
Word: famous Part of Speech: adjective
- The furious troll shouted at the Billy Goats Gruff.
(furiously, furious)
Word: furious Part of Speech: adjective
- The crane at the construction site sways dangerously when there is a thunderstorm with lots of wind.
(dangerous, dangerously)
Word: dangerously Part of Speech: adverb
- The actor in the play humorously sang while dressed in a ridiculous costume.
(humorous, humorously)
Word: humorously Part of Speech: adverb

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NAME: _____ DATE: _____ **9.1** ACTIVITY PAGE

- Our neighbor joyously announced that his son was admitted to the college he likes the most.
(joyous, joyously)
Word: joyously Part of Speech: adverb
- The governor had a humorous response to a serious question during the interview.
(humorously, humorous)
Word: humorous Part of Speech: adjective

Bonus: Circle the correct answer and write the part of speech.

- Which of the following words means "full of care to avoid danger or mistakes"?
cautious cautiously
Part of Speech: adjective
- Which of the following words means "in a curious way"?
curiously curious
Part of Speech: adverb
- Which of the following words means "full of something wonderful"?
fabulously fabulous
Part of Speech: adjective

Grade 3 Unit 5 | Activity Book 98

NAME: _____ DATE: _____ **8.5** ACTIVITY PAGE

Word Sort

Identify the headers. Read the words in the box and circle the vowels that have the /ae/ sound. Write the words under each header that match the header's spelling pattern.

| | | |
|--------------------|----------------|------------------|
| 'ay' > /ae/ | 'ai' > /ae/ | 'ea' > /ae/ |
| <u>bluejay</u> | <u>paid</u> | <u>breakneck</u> |
| <u>waylay</u> | <u>maids</u> | <u>greatest</u> |
| <u>bricklaying</u> | <u>raisins</u> | |
| <u>maybe</u> | <u>waiter</u> | |
| <u>always</u> | <u>sailing</u> | |
| | <u>mailman</u> | |
| | <u>prepaid</u> | |


| | | | | |
|----------------|------------------|--------------------|---------------|----------------|
| <u>paid</u> | <u>breakneck</u> | headers | <u>maybe</u> | <u>sailing</u> |
| monkey | <u>waylay</u> | read | prairie | <u>mailman</u> |
| <u>maids</u> | aisle | <u>bricklaying</u> | <u>waiter</u> | <u>always</u> |
| <u>bluejay</u> | <u>raisins</u> | <u>greatest</u> | despair | <u>prepaid</u> |

Grade 3 Activity Book | Unit 5 99

NAME: _____ DATE: _____ **9.1** ACTIVITY PAGE

Lab Notes

What Is Sound?

| | | | | |
|---|--|--|----------------------------------|---|
| What is it? | vibration | | | |
| How do we get it? | 
vibrating waves
medium | | | |
| How does it travel? | fastest
solid
Example:
door | fastest
liquid
Example:
water | fast
gases
Example:
air | cannot
travel
vacuum
Example:
space |
| The speed of sound vs. the speed of light | sound
750 miles per hour
light
186,000 miles per second | | | |

Grade 3 Activity Book | Unit 5 105

NAME: _____
DATE: _____

9.2

ACTIVITY PAGE

Lab Notes

Compare and Contrast: Light and Sound

| | |
|---|--|
| <p>light
energy
carries light and heat
sensed by the eyes
travels in waves
travels through
transparent objects
reflects or is absorbed by
objects
travels fastest through a
vacuum
(various others generated)</p> | <p>sound
energy
carried through vibrations
sensed by the ears
travels in waves
travels through a medium
travels through solids,
liquids, and gases
cannot travel in a vacuum</p> |
|---|--|

Light and sound are similar because _____

Both are forms of energy. Both travel in waves.

Light and sound are different because Answers will vary but should

include that light travels faster, sound travels through different

mediums, sound cannot travel through a vacuum but light can.

Grade 3

Activity Book | Unit 5 107

NAME: _____
DATE: _____

9.3

ACTIVITY PAGE

Question Wall

Rewrite the questions you chose below. Then, write an answer for each question. Make sure that you use content vocabulary words to explain your answer.

1. Answers will vary.

2. Answers will vary.

3. Answers will vary.

Grade 3

Activity Book | Unit 5 109

NAME: _____
DATE: _____

9.4

ACTIVITY PAGE

Building Sentences

Read each simple sentence. Then, brainstorm adjectives, adverbs, and synonyms that you might add to the sentence, and write these words in the boxes provided. You do not need to write words in every box, but try your best. Write a new, more interesting sentence in the blank space provided, using some of the adjectives and adverbs.

| Starter Sentence: The baby slept. | | | |
|--|---|--|---|
| Adjectives to describe the baby | Adverbs to describe how the baby slept | Adverbs to describe when the baby slept | Adverbs to describe where the baby slept |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for slept | | | |
| <u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

Grade 3

Activity Book | Unit 5 111

| Starter Sentence: The general rode his horse. | | | |
|---|--|--|---|
| Adjectives to describe the general | Adverbs to describe how he rode his horse | Adverbs to describe where he rode his horse | Adverbs to describe when he rode his horse |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for rode | | | |
| <u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

| Starter Sentence: The boys laughed. | | | |
|--|---|---|--|
| Adjectives to describe the boys | Adverbs to describe how they laughed | Adverbs to describe where they laughed | Adverbs to describe when they laughed |
| <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> | <u>Answers may vary.</u> |
| Synonyms for laughed | | | |
| <u>Answers may vary.</u> | | | |

New sentence: Answers may vary.

112 Unit 5 | Activity Book

Grade 3

NAME: _____
DATE: _____

9.5

ACTIVITY PAGE

Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

| part | pickle |
|---|--------|
| pay 1. <i>verb</i> To give money to buy something. 2. <i>verb</i> To be worthwhile.
3. <i>noun</i> Money earned from working at a job. | |
| peck 1. <i>verb</i> To pick up something with a beak. 2. <i>verb</i> To eat something in small bites with no enjoyment. 3. <i>noun</i> A light kiss. | |

- What are the two guide words on the page?
_____ part _____ pickle _____
- What are the two entry words on the page?
_____ pay _____ peck _____
- Would the word *pill* be on this page? _____ no _____
- Circle the word(s) that would come before *part* in the following list:
pattern, peace, pack
- Which definition of *pay* matches the use of the word in the sentence:
It *pays* to be an honest person. _____ 2 _____
What part of speech is *pay* in this sentence? _____ verb _____

Grade 3

Activity Book | Unit 5 113

- Which definition of *pay* matches the use of the word in the sentence:

My mother receives her *pay* on Fridays. _____ 3 _____

What part of speech is *pay* in this sentence? _____ noun _____

- Write a sentence using the definition of *pay* not already used in the sentences above.

Answers may vary but should use the definition that means

“to buy something.”

- Which definition of *peck* matches the use of the word in the sentence:

The child *pecked* at her food without eating much. _____ 2 _____

What part of speech is *peck* in this sentence? _____ verb _____

- Which definition of *peck* matches the use of the word in the sentence:

My grandmother gives me a *peck* on my cheek each time I see her. _____ 3 _____

What part of speech is *peck* in this sentence? _____ noun _____

- Write a sentence using the definition of *peck* not already used in the sentences above.

Answers may vary but should use the definition that means

“to pick up something with a beak.”

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Grade 3

NAME: _____
DATE: _____

10.2

ACTIVITY PAGE

Lab Notes

Characteristics of Sound

- What is pitch?
A. Pitch is how loud or soft a sound is.
B. Pitch is how high or low a sound is.
C. Pitch is how fast sound travels through a medium.
D. Pitch is the intensity of a sound.
- What is volume?
A. Volume is how high or low a sound is.
B. Volume is the intensity of a sound.
C. Volume is how long or short a sound wave is.
D. Volume is how fast sound travels through a medium.
- Describe how the length of sound waves affects pitch.

Longer wavelengths make lower pitches.

- List three sources of a low-pitched sound.

tuba

cow mooing

adult voice

Grade 3

Activity Book | Unit 5 119

- Which of these books would be the best to find out more facts about the characteristics of sound?

- A. *Adventures in Light*
- B. *Can You Hear Me Now?*
- C. *All About Animals*
- D. *Experiments with Food*

- Read this sentence from the selection: *Very loud sounds can damage your hearing.* Based on the sentence, which phrase best describes what loud sounds can do?

- A. They can make you hear well.
- B. They can hurt your hearing.
- C. They can make you able to hear from great distances.
- D. They can make you able to hear a whisper better.

- How would the world be different if all sounds were the same pitch and volume?

Answers may vary.

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Grade 3

NAME: _____

DATE: _____

10.3

ACTIVITY PAGE

3-2-1 Reflection

Write a sentence for each of the categories below:

Write three things you learned from reading the chapter, "Characteristics of Sound."

1.

Answers may vary.

2.

Answers may vary.

3.

Answers may vary.

Write two things you learned from the Read-Aloud “Qualities of Sound.”

1.

Answers may vary.

2.

Answers may vary.

Grade 3

Activity Book | Unit 5 121

Write one question you have about sound.

1.

Answers may vary.

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Grade 3

NAME: _____

DATE: _____

11.1

ACTIVITY PAGE

Can You Guess My Sound?

Answers may vary.

[illegible]

Grade 3

Activity Book | Unit 5 125

NAME: _____

DATE: _____

12.1

ACTIVITY PAGE

What Inspires You?

The root word for inspiration is inspire. To inspire means to influence or produce a feeling or thought.

In the space below, write about something that inspires you.

Answers may vary.

[illegible]

Grade 3

Activity Book | Unit 5 131

NAME: _____

DATE: _____

12.2

ACTIVITY PAGE

Comprehension Questions

Answer the questions below. Write the page number where you found the answer.

1. What is a telegraph?

A telegraph is a machine that allows people to send dots and dashes across wires.

page 120

2. Why was the Massachusetts Institute of Technology so important to Aleck Bell?

The Massachusetts Institute of Technology made space in one of its labs for Aleck to do his experiments.

page 122

3. Aleck Bell said that electric current could be used to carry sound. Why do you think people thought he was crazy?

Answers may vary.

page 122

Grade 3

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4. Describe how an accident led to the invention of the first telephone.

The electricity was turned off but Aleck could hear the message Watson sent him.

page 124

5. Alexander Graham Bell felt that "self-education is a lifelong affair." What does that mean to you as a student who is learning new things every day?

Answers may vary.

134

Unit 5 | Activity Book

Grade 3

NAME: _____

DATE: _____

12.3

ACTIVITY PAGE

New Words Graphic Organizer

| | |
|---|--|
| My word:
Answers may vary. | My definition:
Answers may vary. |
| Part of speech:
Answers may vary. | My symbol:
Answers may vary. |
| My sentence:
Answers may vary. | |

| | |
|---|--|
| My word:
Answers may vary. | My definition:
Answers may vary. |
| Part of speech:
Answers may vary. | My symbol:
Answers may vary. |
| My sentence:
Answers may vary. | |

Grade 3

Activity Book | Unit 5

135

| | |
|---|--|
| My word:
Answers may vary. | My definition:
Answers may vary. |
| Part of speech:
Answers may vary. | My symbol:
Answers may vary. |
| My sentence:
Answers may vary. | |

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Unit 5 | Activity Book

Grade 3

NAME: _____
DATE: _____

12.4

ACTIVITY PAGE

Conjunction and

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

Example: The beautiful fish swim in the bowl. They watch me carefully!

S P S P

The beautiful fish | swim in the bowl, and they | watch me carefully!

1. Sally went to the circus to see the clowns. Her friends joined her there.

S P S P
Sally | went to the circus to see the clowns, and her
S P
friends | joined her there.

2. The sports car roared down the street. The police car with a siren was right behind it.

S P S P
The sports car | roared down the street, and the
S P
police car with a siren | was right behind it.

3. The goldfish swims around in its bowl. The children love to watch it swim in circles.

S P S P
The goldfish | swims around in its bowl, and the
S P
children | love to watch it swim in circles.

Grade 3

Activity Book | Unit 5 137

NAME: _____
DATE: _____

12.5

TAKE-HOME

Practice the Conjunction and

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P
Example: Alan | entertained all of us, Eli | served snacks.
Alan entertained all of us, and Eli served snacks.

1. Alan | sings wacky songs. Eli | juggles apples.

S P S P
Alan | sings wacky songs, and Eli | juggles apples.

2. Alan | throws lots of parties. The neighbors | always come.

S P S P
Alan | throws lots of parties, and the neighbors | always come.

3. Eli | makes brownies. The neighbors | enjoy them.

S P S P
Eli | makes brownies, and the neighbors | enjoy them.

Grade 3

Activity Book | Unit 5 139

4. Alan | likes to entertain. Eli | likes to cook.

S P S P
Alan | likes to entertain, and Eli | likes to cook.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P
Example: Steve | wore a coat and gloves. _____ No _____

1. Allen and John | rode their bikes to the park. _____ No _____

2. Derek | read a book and watched TV last night. _____ No _____

3. My mother | cooked dinner, and my sister | made dessert. _____ Yes _____

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Grade 3

NAME: _____
DATE: _____

14.1

ASSESSMENT

Directions: Read the questions carefully before answering.

1. What is the selection mainly about?
A. Doctors use tuning forks to test hearing.
B. Playing a guitar is difficult.
C. Tuning forks are useful tools.
D. Musical instruments have different pitches.

2. What does the word *pure* mean in the following sentence from the selection?

"Tuning forks make a very pure kind of sound."

- A. mixed with other sounds
B. not mixed with other sounds
C. beautiful sounds
D. not beautiful sounds
3. What determines the pitch of the sound a tuning fork makes?
A. the speed of vibration
B. the frequency of vibration
C. the length of the prongs
D. all of the above
4. Write *true* or *false* on the line following the sentence.

The shorter the prongs on a tuning fork, the higher the pitch. true

Grade 3

Activity Book | Unit 5 147

5. What is the central idea of this paragraph?

"Musicians use tuning forks to tune their instruments. A guitar player can play a note on her guitar. Then, she can compare that note with the note made by a tuning fork. If the note from the guitar sounds too high, she can loosen the string. If the note sounds too low, she can tighten the string. Then, she can try it again."

Musicians can use tuning forks to tune their instruments.

Go on to the selection on the next page.

Directions: Read the questions carefully before answering.

6. What does the word *loyally* mean in the following sentence from the selection?

"This horse served you *loyally* for many years."

- A. with respect
B. faithfully
C. correctly
D. with speed

7. What happened when someone rang the bell in Atri's town square?

A judge would come to the town square to investigate.

8. What might have happened if the farmer had not fixed the rope that hung from the bell?

The horse might never have been given justice.

NAME: _____
DATE: _____

141
CONTINUED

ASSESSMENT

9. Why wasn't the old knight sorry for his actions toward his horse?

- A. He felt he owned the horse and could treat it as he wished.
B. He didn't like the judge who ruled that he should take the horse home and care for him.
C. He thought justice for a horse was silly.
D. He was deaf and could not hear the bell.

10. What happened in the selection to show that the whole town approved of the judge's ruling in favor of the old knight's horse?

The crowd cheered.

Continue to Grammar and Morphology Section.

Grammar and Morphology

11. The selection, "Tuning Forks," mentions that a guitar player can use a tuning fork. What is another name for a person who plays the guitar that includes the suffix *-ist*? guitarist

12. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

Dad set the hammer on the table there. where

13. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

Sometimes I ride my bike to school. when

14. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

The girl screamed loudly. how

NAME: _____
DATE: _____

14.1
CONTINUED ASSESSMENT

15. Which of the following words would be on a dictionary page with the following guide words?

ballroom bingo

- A. bell
B. brush
C. bunch
D. baby

16. Write adjectives, adverbs, and synonyms in the appropriate boxes. Then write a new, more interesting sentence in the space provided using some of the words from the boxes.

| Starter Sentence: The child spoke. | | | |
|---|--|---|--|
| Adjectives to describe the child
Answers may vary. | Adverbs to describe how the child spoke
Answers may vary. | Adverbs to describe when the child spoke
Answers may vary. | Adverbs to describe where the child spoke
Answers may vary. |
| Synonyms for spoke | | | |

New sentence: Answers may vary.

Grade 3

Activity Book | Unit 5 155

17. Circle the two words in the following sentences from the selection that have the suffix *-er*. Write their meanings on the lines.

"While the farmer was mending the rope, an old knight was limping out of his stable. In his youth, this knight had been an avid hunter."

Word: farmer

Meaning: a person who farms

Word: hunter

Meaning: a person who hunts

18. Write adjectives, adverbs, and synonyms in the appropriate boxes. Then write a new, more interesting sentence in the space provided using some of the words from the boxes.

| Starter Sentence: The puppy slept. | | | |
|---|--|---|--|
| Adjectives to describe the puppy
Answers may vary. | Adverbs to describe how the puppy slept
Answers may vary. | Adverbs to describe when the puppy slept
Answers may vary. | Adverbs to describe where the puppy slept
Answers may vary. |
| Synonyms for slept | | | |

New sentence: Answers may vary.

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Grade 3

NAME: _____
DATE: _____

14.2
ACTIVITY PAGE

Newspaper Article Draft

Lead Paragraph: What?

Answers may vary.

Paragraph 2: Who? When? Where?

Answers may vary.

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Paragraph 3: How does it work?

Answers may vary.

Paragraph 4: Why is it important?

Answers may vary.

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NAME: _____ 14.2 ACTIVITY PAGE
DATE: _____ CONTINUED

Conclusion:
Answers may vary.

Additional interesting facts about the inventor:
Answers may vary.

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NAME: _____ 15.3 ACTIVITY PAGE
DATE: _____

Sharing and Feedback

Three things I liked about your article

1. Answers may vary.

2. Answers may vary.

3. Answers may vary.

Two things I think you can improve

1. Answers may vary.

2. Answers may vary.

Grade 3 Activity Book | Unit 5 169

NAME: _____ 15.4 ACTIVITY PAGE
DATE: _____

Newspaper Article

Second Draft

Lead Paragraph: What?
Answers may vary.

Paragraph 2: Who? When? Where?
Answers may vary.

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Paragraph 3: How does it work?
Answers may vary.

Paragraph 4: Why is it important?
Answers may vary.

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6. Describe how you would get your photos using a box camera.

You would send the camera to Eastman's company to
print the photos. They would send both the camera
and the photos back to you.

page 106

7. Why were instant film cameras so popular?

Instant film cameras were so popular because they
were instant — one minute after you took the picture,
you had a fully-developed photograph in your hand.

page 108

8. Today's digital cameras don't use film but rather a
computer chip.

page 110

9. Write the central idea of this chapter.

Photography has changed and developed over time
because of new inventions.

NAME: _____
DATE: _____

PP2 ACTIVITY PAGE

Adverbs that Tell *how*

Write an adverb to describe the verb in the sentence. Do not use the same adverb more than once.

We ran quickly to the car when the storm started.

Adverb: quickly Verb described by adverb: ran

1. The referee blew his whistle Answers may vary. after the play.

Adverb: _____ Verb described by adverb: _____

2. Our dog Answers may vary. sits in the doorway at night.

Adverb: _____ Verb described by adverb: _____

3. He searched Answers may vary. for his math homework.

Adverb: _____ Verb described by adverb: _____

4. We walked Answers may vary. into the kitchen for dinner.

Adverb: _____ Verb described by adverb: _____

5. The posters on the wall were placed Answers may vary.

Adverb: _____ Verb described by adverb: _____

Change the adjective under the blank to an adverb by adding -ly to complete the sentence. Answer the question after the sentence.

1. The storm badly damaged the car.
(bad)

How was the car damaged? badly

2. The big baseball uniform hung loosely on Devon.
(loose)

How did the baseball uniform hang? loosely

3. Dad proudly clapped when I scored a goal.
(proud)

How did Dad clap? proudly

4. The music played loudly through the speakers.
(loud)

How did the music play? loudly

5. She shyly walked into her new classroom.
(shy)

How did she walk? shyly

NAME: _____
DATE: _____

PP3 ACTIVITY PAGE

Adverbs that Tell *when* and *where*

Choose the adverb that best fits in each blank and write it in.

weekly always last after sometimes

We visit my grandfather weekly. We always go on Sunday afternoon. I like to bring books sometimes and read them to him. When I do bring books, he asks me to read my favorite book last. He knows I will be excited about it and read it well at the end. After I read my books to him, we have dinner.

Write a sentence using each adverb.

1. recently

Answers may vary.

2. tomorrow

Answers may vary.

Choose the adverb that best fits in each blank and write it in.

| | | | |
|------|---------|------|---------|
| here | already | home | outside |
|------|---------|------|---------|

My brother and I ran outside to look for our friends. We did not see anyone so we walked home. When we got here we saw a note on the door. It was from David and said "Meet at my house, and we'll go to the park together!" We got to David's house and another note said he had already gone to the park. We found him at the park and played until it got dark!

Write a sentence using each adverb.

1. *never*

Answers may vary.

2. *inside*

Answers may vary.

3. The famous musician plays the piano.

Answers may vary.

4. Our class made shadows on the wall.

Answers may vary.

NAME: _____
DATE: _____

PP4 ACTIVITY PAGE

Conjunction and

Begin with the simple sentence and first add another subject to it to make a compound subject. Write the letter A next to that sentence.

Next, begin again with the same simple sentence and add another predicate (remember another verb as well) to make a different compound predicate. Write the letter B next to that sentence.

Example: Connie sings a song.

- A. Connie and Carla sing a song. (compound subject)
B. Connie sings a song and dances a jig. (compound predicate)

1. Matthew loves basketball.

Answers may vary.

2. The rusty bucket leaks on my foot.

Answers may vary.

NAME: _____
DATE: _____

PP4 ACTIVITY PAGE
CONTINUED

Write the letter 'S' over the subject and the letter 'P' over the predicate in each simple sentence. Draw a line to separate subject and predicate in each simple sentence. Then join the two simple sentences together using the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

Example: The silly kitten paws at the string. He plays joyfully!

S P S P

The silly kitten | paws at the string, and he | plays joyfully.

1. The dentist uses a mirror to check my teeth. She is very gentle with me.

The dentist^Suses a mirror to check my teeth,^P
and^Sshe^Pis very gentle with me.

2. The "House of Mirrors" was so much fun to see. I hope I can go back to see it again.

The "House of Mirrors"^Swas so much fun to see,^P
and^SI^Phope I can go back to see it again.

3. The straw in the glass of water looks broken. I think that's very strange!

The straw in the glass of water^Slooks broken,^P
and^SI^Pthink that's very strange.

NAME: _____ PP5 ACTIVITY PAGE
DATE: _____

Practice Conjunction and

Draw two lines under the conjunction and. Write the letter 'S' over the subject(s) and the letter 'P' over the predicate(s), and draw a line between the subjects and predicates. Then, circle whether the sentence has a compound subject or a compound predicate or is a compound sentence made up of two simple sentences. Answer the question that follows each sentence showing that the conjunction joined two subjects, two predicates, or two simple sentences.

S P P
Example: The playful beavers | splash one another with their flat tails | and look so joyous.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two predicates

S S P
1. The playful beavers | and their babies | splash around in the lake.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two subjects

S P S P
2. The baby beavers | splashed each other in the lake, | and we | secretly took pictures with our cameras.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two simple sentences

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S P S P
3. The puffy, white clouds | float across the sky, | and they | make me feel good.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two simple sentences

S S P
4. The white clouds | and the dark clouds | float by in the sky.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two subjects

S P S P
5. Clouds | are beautiful, | and the whole class | loves to watch them.
compound subject compound predicate compound sentence

What does the conjunction join in this sentence? two simple sentences

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NAME: _____ PP6 ACTIVITY PAGE
DATE: _____

Conjunction but

Create compound sentences by connecting the two simple sentences with the conjunction but and inserting a comma. Draw two lines under the conjunction, and label the subjects with the letter 'S' and the predicates with the letter 'P'.

S P S P
1. Marshmallows are fun to melt. They can make a mess.
Marshmallows are fun to melt, but they can make
a mess.

S P S P
2. The day is sunny and beautiful. The sky is getting dark off in the distance.
The day is sunny and beautiful, but the sky is
getting dark off in the distance.

S P S P
3. My new kitten is very naughty. I laugh at her so often.
My new kitten is very naughty, but I laugh at her
so often.

S P
4. This grammar homework seems very easy tonight. I'm going to do my best and not hurry.
This grammar homework seems very easy tonight,
but I'm going to do my best and not hurry.

Grade 3 Activity Book | Unit 5 195

S P S
5. The salesman knocked on our door. We were out of town.
The salesman knocked on our door, but we
were out of town.

Create the second part of a compound sentence using the conjunction but.

1. David likes peanut butter and jelly sandwiches, but
Answers may vary.

(Hint: Think about a family member who likes a different kind of sandwich.)

2. Lulu loved the book she just read, but
Answers may vary.

(Hint: Think about a friend who read the same book but who had a different idea about it.)

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NAME: _____
DATE: _____

PP8

ACTIVITY PAGE

Use the chart on Worksheet PP7 to fill in the blanks.

- Which words on the chart are people who play musical instruments?
cellist organist musician
guitarist pianist
- Which word on the chart is what Julius Caesar had himself appointed for life?
dictator
- Which word on the chart names someone who can help you pick out books at the library?
librarian
- Which words on the chart name people that might work together while they are on a boat?
sailor navigator
- Which word on the chart names someone who writes lyrics, or words to songs, for a vocalist to sing?
lyricist
- Which words on the chart name people who might work together to build a house?
builder designer electrician
inspector

Grade 3

Activity Book | Unit 5 199

- Which word on the chart names someone that every team needs as someone to guide, or lead them?
leader
- Which words on the chart name people who might work at a school?
teacher counselor librarian
- Which words on the chart name people who do things outside?
builder farmer sailor
climber hunter player
navigator
- Which words on the chart name people who might work together to help someone look their best?
stylist cosmetician optician

BONUS:

- Alphabetize the words that begin with 'c'.
cellist
climber
cosmetician
counselor
- Count the number of words on the chart for each suffix and write the number here. Circle the suffix that has the most words.
-er 10 -or: 9 -ist: 9 -ian: 8

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Grade 3

NAME: _____
DATE: _____

PP9

ACTIVITY PAGE

Words with Suffixes -y and -al

Add the correct suffix to the root word provided. Write the new word in a sentence.

- Root word: *nutrition*
Add -y or -al to make: nutritional
Answers may vary.
- Root word: *leak*
Add -y or -al to make: leaky
Answers may vary.
- Root word: *curl*
Add -y or -al to make: curly
Answers may vary.
- Root word: *tradition*
Add -y or -al to make: traditional
Answers may vary.
- Root word: *music*
Add -y or -al to make: musical
Answers may vary.

Grade 3

Activity Book | Unit 5 201

Circle the word that matches the meaning.

- Meaning: full of soil
Word: dirty dirt
- Meaning: the traditions, beliefs, and arts of a group of people
Word: culture cultural
- Meaning: something that is untidy and dirty
Word: mess messy
- Meaning: a power that allows people to do impossible things by saying special words or performing special actions
Word: magical magic
- Meaning: full of a reddish brown substance that forms on certain metals when they are exposed to moisture
Word: rusty rust
- Meaning: related to the land near the sea or ocean
Word: coast coastal

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Grade 3

NAME: _____ PP10 ACTIVITY PAGE
DATE: _____

Practice Using Suffixes -ous and -ly

Choose the correct word to complete each sentence. Write the word and its part of speech below the sentence.

- The mayor famously denied he did anything wrong, but an investigation proved otherwise.
(famous, famously)
Word: famously Part of Speech: adverb
- Marcus drew a humorous representation of the animal he wrote about for his report.
(humorous, humorously)
Word: humorous Part of Speech: adjective
- The road curved dangerously when you got near the top of the mountain.
(dangerous, dangerously)
Word: dangerously Part of Speech: adverb
- I heard a mysteriously sound coming from somewhere by the window, but I couldn't figure out what it was.
(mysteriously, mysterious)
Word: mysteriously Part of Speech: adjective
- The crew who worked to clean up hazardous materials kept the poisonous items in a special container when they collected them.
(poisonous, mountainous)
Word: poisonous Part of Speech: adjective
- The passenger furiously ran through the terminal, upset that the security line had been so long and worried he would miss his flight.
(furious, furiously)
Word: furiously Part of Speech: adverb

Grade 3

Activity Book | Unit 5 203

- The class responded joyously when they found out they had won the attendance prize for the month.
(joyous, joyously)
Word: joyously Part of Speech: adverb

- If you are outside and have no shelter when a thunderstorm hits, you are in a dangerous situation.
(dangerous, humorous)
Word: dangerous Part of Speech: adjective

Bonus: Circle the correct answer and write the part of speech

- Which of the following words means "full of danger and excitement"?

adventurously adventurous

Part of Speech: adjective

- Which of the following words means "in a courteous way"?

courteously courteous

Part of Speech: adverb

- Which of the following words means "full of the feeling of wanting what someone else has"?

enviously enviously

Part of Speech: adjective

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Grade 3

NAME: _____ PP11 ACTIVITY PAGE
DATE: _____

Practice Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

| | |
|---|-------------|
| preschool | prod |
| 1. <i>verb</i> To give a gift. 2. <i>verb</i> To introduce a person. | |
| 3. <i>adjective</i> To be in a place. | |
| private 1. <i>noun</i> A soldier of a low rank. 2. <i>adjective</i> Not for sharing. | |
| 3. <i>adjective</i> Belonging to one person and no one else. | |

- What are the two guide words on the page?
preschool prod
- What are the two entry words on the page?
present private
- Would the word *presentation* be on this page? yes
- Circle the word(s) that would come before the word *preschool* in the following list: presently, prescribe, prepare
- Which definition of *present* matches the use of the word in the sentence:
May I *present* the governor of our state? 2
What part of speech is *present* in this sentence? verb

Grade 3

Activity Book | Unit 5 205

- Which definition of *present* matches the use of the word in the sentence:
Every student is *present* today. 3
What part of speech is *present* in this sentence? adjective

- Write a sentence using the definition of *present* not already used in the sentences above. Answers may vary but should use the word to mean "to give a gift."

- Which definition of *private* matches the use of the word in the sentence:
My diary is *private* property and should not be read by anyone else.

2

What part of speech is *private* in this sentence? adjective

- Which definition of *private* matches the use of the word in the sentence:
The *private* saluted the general when he walked by. 1
What part of speech is *private* in this sentence? noun

- Write a sentence using the definition of *private* not already used in the sentences above.
Answers may vary but should use the word to mean "belonging to one person and no one else."

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Grade 3

NAME: _____
DATE: _____

PP12 ACTIVITY PAGE

Conjunction and

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using a comma and the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P
Example: Carla | sings a song. Connie | dances a jig.
Carla sings a song, and Connie dances a jig.

1. Matthew | loves basketball. Tina | enjoys tennis.
Matthew loves basketball, and Tina enjoys tennis.

2. The bucket | is rusty. It | leaks on my foot.
The bucket is rusty, and it leaks on my foot.

3. The silly kitten | paws at the string. He | plays joyfully!
The silly kitten paws at the string, and he plays joyfully!

Grade 3

Activity Book | Unit 5 207

4. The dentist | uses a mirror to check my teeth. She | is very gentle with me.

The dentist uses a mirror to check my teeth, and
she is very gentle with me.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P
Example: Tom | fixed breakfast and dinner for his family. _____ No _____

1. Lindsay and Tony | walked to the library. _____ No _____
2. Linda | jumped rope and played soccer yesterday. _____ No _____
3. Tina | chose the movie, and Jeff | picked out the candy. _____ Yes _____

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Grade 3

NAME: _____
DATE: _____

PP13 ACTIVITY PAGE

Conjunction and

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using a comma and the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P
Example: The straw | is broken. I | can't drink out of it.
The straw is broken, and I can't drink out of it.

1. The beavers | are playful. Their babies | splash around in the lake.
The beavers are playful, and their babies splash
around in the lake.

2. We | watched the beavers. We | took pictures of them.
We watched the beavers, and we took pictures of them.

3. The white clouds | float across the sky. They | make me feel good.
The white clouds float across the sky, and they
make me feel good.

Grade 3

Activity Book | Unit 5 209

4. Clouds | are beautiful. The whole class | loves to watch them.

Clouds are beautiful, and the whole class loves to watch them.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P
Example: Steve | wore a coat and gloves. _____ No _____

1. Emma and Ryan | visited the zoo. _____ No _____
2. Amy | painted a picture and read a book on Saturday. _____ No _____
3. Kate | washed the dishes, and Sam | cleaned the sink. _____ Yes _____

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Grade 3

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher's Guide

| | | |
|---|---|--|
| (1) Developing and sustaining foundational language skills: listening, speaking, discussion, and thinking—oral language. The student develops oral language through listening, speaking, and discussion. The student is expected to: | | |
| TEKS 3.1.A | listen actively, ask relevant questions to clarify information, and make pertinent comments | U5: p. 24; U5: p. 37; U5: p. 58; U5: p. 61; U5: p. 88; U5: p. 91; U5: p. 140; U5: p. 152; U5: p. 176; U5: p. 180; U5: p. 216; U5: p. 226; U5: p. 240; U5: p. 242; U5: p. 326; U5: p. 328; U5: p. 331 |
| TEKS 3.1.B | follow, restate, and give oral instructions that involve a series of related sequences of action | |
| TEKS 3.1.C | speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively | U5: p. 198; U5: p. 212; U5: p. 326; U5: p. 328; U5: p. 331 |
| TEKS 3.1.D | work collaboratively with others by following agreed-upon rules, norms, and protocols | U5: p. 42; U5: p. 46; U5: p. 284; U5: p. 293; U5: p. 326; U5: p. 328; U5: p. 331 |
| TEKS 3.1.E | develop social communication such as conversing politely in all situations | U5: p. 326; U5: p. 328; U5: p. 329; U5: p. 331 |
| (2) Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—beginning reading and writing. The student develops word structure knowledge through phonological awareness, print concepts, phonics, and morphology to communicate, decode, and spell. The student is expected to: | | |
| (A) demonstrate and apply phonetic knowledge by: | | |
| TEKS 3.2.A.i | decoding multisyllabic words with multiple sound-spelling patterns, such as eigh, ough, and en | |
| TEKS 3.2.A.ii | decoding multisyllabic words with closed syllables, open syllables, VCe syllables, vowel teams, including digraphs and diphthongs, r-controlled syllables, and final stable syllables | |
| TEKS 3.2.A.iii | decoding compound words, contractions, and abbreviations | |
| TEKS 3.2.A.iv | decoding words using knowledge of syllable division such as VCCV, VCV, and VCCCV with accent shifts | |
| TEKS 3.2.A.v | decoding words using knowledge of prefixes | |
| TEKS 3.2.A.vi | decoding words using knowledge of suffixes, including how they can change base words such as dropping e, changing y to i, and doubling final consonants | U5: p. 8; U5: p. 20; U5: p. 22 |
| TEKS 3.2.A.vii | identifying and reading high-frequency words from a research-based list | U5: p. 8; U5: p. 11; U5: p. 24; U5: p. 37; U5: p. 42; U5: p. 47; U5: p. 58; U5: p. 74; U5: p. 88; U5: p. 104; U5: p. 140; U5: p. 143 |

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher's Guide

| | | |
|---|---|---|
| (B) demonstrate and apply spelling knowledge by: | | |
| TEKS 3.2.B.i | spelling multisyllabic words with closed syllables; open syllables; VCe syllables; vowel teams, including digraphs and diphthongs; r-controlled syllables; and final stable syllables | U5: p. 8; U5: p. 20; U5: p. 88; U5: p. 90; U5: p. 120; U5: p. 134; U5: p. 216; U5: p. 218; U5: p. 240; U5: p. 260; U5: p. 308; U5: p. 310 |
| TEKS 3.2.B.ii | spelling homophones | |
| TEKS 3.2.B.iii | spelling compound words, contractions, and abbreviations | U5: p. 140; U5: p. 152; U5: p. 162 |
| TEKS 3.2.B.iv | spelling multisyllabic words with multiple sound-spelling patterns | U5: p. 8; U5: p. 20 |
| TEKS 3.2.B.v | spelling words using knowledge of syllable division such as VCCV, VCV, and VCCCV | |
| TEKS 3.2.B.vi | spelling words using knowledge of prefixes | |
| TEKS 3.2.B.vii | spelling words using knowledge of suffixes, including how they can change base words such as dropping e, changing y to i, and doubling final consonants | |
| TEKS 3.2.C | alphabetize a series of words to the third letter | |
| TEKS 3.2.D | write complete words, thoughts, and answers legibly in cursive leaving appropriate spaces between words. | |
| (3) Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—vocabulary. The student uses newly acquired vocabulary expressively. The student is expected to: | | |
| TEKS 3.3.A | use print or digital resources to determine meaning, syllabication, and pronunciation | U5: p. 198; U5: p. 213; U5: p. 298; U5: p. 300 |
| TEKS 3.3.B | use context within and beyond a sentence to determine the meaning of unfamiliar words and multiple-meaning words | U5: p. 176; U5: p. 180; U5: p. 190 |
| TEKS 3.3.C | identify the meaning of and use words with affixes such as <i>im-</i> (into), <i>non-</i> , <i>dis-</i> , <i>in-</i> (not, non), <i>pre-</i> , <i>-ness</i> , <i>-y</i> , and <i>-ful</i> | U5: p. 8, U5: p. 20, U5: p. 22; U5: p. 88; U5: p. 116; U5: p. 140; U5: p. 165; U5: p. 176; U5: p. 193; U5: p. 194, U5: p. 298; U5: p. 300 |
| TEKS 3.3.D | identify and explain the meaning of antonyms, synonyms, idioms, homophones, and homographs in a text | U5: p. 198; U5: p. 213 |
| (4) Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—fluency. The student reads grade-level text with fluency and comprehension. The student is expected to use appropriate fluency (rate, accuracy, and prosody) when reading grade-level text. | | |
| TEKS 3.4 | use appropriate fluency (rate, accuracy, and prosody) when reading grade-level text | U5: p. 298, U5: p. 300 |
| (5) Developing and sustaining foundational language skills: listening, speaking, reading, writing, and thinking—self-sustained reading. The student reads grade-appropriate texts independently. The student is expected to self-select text and read independently for a sustained period of time. | | |
| TEKS 3.5 | self-select text and read independently for a sustained period of time | U5: p. 175; U5: p. 326; U5: p. 330 |

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher’s Guide

(6) Comprehension skills: listening, speaking, reading, writing, and thinking using multiple texts. The student uses metacognitive skills to both develop and deepen comprehension of increasingly complex texts. The student is expected to:

| | | |
|------------|--|---|
| TEKS 3.6.A | establish purpose for reading assigned and self-selected texts | |
| TEKS 3.6.B | generate questions about text before, during, and after reading to deepen understanding and gain information | U5: p. 198; U5: p. 200; U5: p. 211; U5: p. 216; U5: p. 237 |
| TEKS 3.6.C | make and correct or confirm predictions using text features, characteristics of genre, and structures | U5: p. 42; U5: p. 47; U5: p. 240; U5: p. 242 |
| TEKS 3.6.D | create mental images to deepen understanding | |
| TEKS 3.6.E | make connections to personal experiences, ideas in other texts, and society | U5: p. 24; U5: p. 37; U5: p. 38 |
| TEKS 3.6.F | make inferences and use evidence to support understanding | U5: p. 24; U5: p. 37; U5: p. 38; U5: p. 120; U5: p. 122; U5: p. 132; U5: p. 140; U5: p. 152; U5: p. 176; U5: p. 192; U5: p. 216; U5: p. 226 |
| TEKS 3.6.G | evaluate details read to determine key ideas | U5: p. 8; U5: p. 11; U5: p. 24; U5: p. 27; U5: p. 88; U5: p. 91; U5: p. 104; U5: p. 140; U5: p. 143; U5: p. 198; U5: p. 200; U5: p. 216; U5: p. 226 |
| TEKS 3.6.H | synthesize information to create new understanding | U5: p. 8; U5: p. 19; U5: p. 24; U5: p. 37; U5: p. 140; U5: p. 152; U5: p. 176; U5: p. 179; U5: p. 198; U5: p. 200; U5: p. 284; U5: p. 286 |
| TEKS 3.6.I | monitor comprehension and make adjustments such as re-reading, using background knowledge, asking questions, and annotating when understanding breaks down | U5: p. 120; U5: p. 122 |

(7) Response skills: listening, speaking, reading, writing, and thinking using multiple texts. The student responds to an increasingly challenging variety of sources that are read, heard, or viewed. The student is expected to:

| | | |
|------------|---|--|
| TEKS 3.7.A | describe personal connections to a variety of sources including self-selected texts | |
| TEKS 3.7.B | write a response to a literary or informational text that demonstrates an understanding of a text | |
| TEKS 3.7.C | use text evidence to support an appropriate response | U5: p. 37; U5: p. 120; U5: p. 122; U5: p. 140; U5: p. 152; U5: p. 176; U5: p. 180; U5: p. 192; U5: p. 216; U5: p. 219; U5: p. 240; U5: p. 253; U5: p. 264; U5: p. 267 |
| TEKS 3.7.D | retell and paraphrase texts in ways that maintain meaning and logical order | |
| TEKS 3.7.E | interact with sources in meaningful ways such as notetaking, annotating, freewriting, or illustrating | U5: p. 8; U5: p. 19; U5: p. 58; U5: p. 73; U5: p. 140; U5: p. 143; U5: p. 151 |
| TEKS 3.7.F | respond using newly acquired vocabulary as appropriate | U5: p. 42; U5: p. 47; U5: p. 120; U5: p. 134; U5: p. 176; U5: p. 179; U5: p. 180; U5: p. 240; U5: p. 260; U5: p. 264; U5: p. 267; U5: p. 278; U5: p. 298; U5: p. 300; U5: p. 332 |
| TEKS 3.7.G | discuss specific ideas in the text that are important to the meaning | U5: p. 8; U5: p. 10; U5: p. 24; U5: p. 37; U5: p. 58; U5: p. 61 |

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher's Guide

(8) Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—literary elements. The student recognizes and analyzes literary elements within and across increasingly complex traditional, contemporary, classical, and diverse literary texts. The student is expected to:

| | | |
|------------|---|------------------------|
| TEKS 3.8.A | infer the theme of a work, distinguishing theme from topic | |
| TEKS 3.8.B | explain the relationships among the major and minor characters | U5: p. 24; U5: p. 27 |
| TEKS 3.8.C | analyze plot elements, including the sequence of events, the conflict, and the resolution | U5: p. 298; U5: p. 300 |
| TEKS 3.8.D | explain the influence of the setting on the plot | |

(9) Multiple genres: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student recognizes and analyzes genre-specific characteristics, structures, and purposes within and across increasingly complex traditional, contemporary, classical, and diverse texts. The student is expected to:

| | | |
|------------|--|--|
| TEKS 3.9.A | demonstrate knowledge of distinguishing characteristics of well-known children's literature such as folktales, fables, fairy tales, legends, and myths | |
| TEKS 3.9.B | explain rhyme scheme, sound devices, and structural elements such as stanzas in a variety of poems | |
| TEKS 3.9.C | discuss the elements in drama such as characters, dialogue, setting, and acts | |

(D) recognize characteristics and structures of informational text, including:

| | | |
|----------------|---|---|
| TEKS 3.9.D.i | the central idea with supporting evidence | U5: p. 58; U5: p. 74; U5: p. 88; U5: p. 104 |
| TEKS 3.9.D.ii | features such as sections, tables, graphs, timelines, bullets, numbers, and bold and italicized font to support understanding | U5: p. 8; U5: p. 11; U5: p. 120; U5: p. 122; U5: p. 284; U5: p. 293 |
| TEKS 3.9.D.iii | organizational patterns such as cause and effect and problem and solution | U5: p. 42; U5: p. 47; U5: p. 176; U5: p. 192 |

(E) recognize characteristics and structures of argumentative text by:

| | | |
|----------------|---|--|
| TEKS 3.9.E.i | identifying the claim | |
| TEKS 3.9.E.ii | distinguishing facts from opinion | |
| TEKS 3.9.E.iii | identifying the intended audience or reader | |
| TEKS 3.9.F | recognize characteristics of multimodal and digital texts | |

(10) Author's purpose and craft: listening, speaking, reading, writing, and thinking using multiple texts. The student uses critical inquiry to analyze the authors' choices and how they influence and communicate meaning within a variety of texts. The student analyzes and applies author's craft purposefully in order to develop his or her own products and performances. The student is expected to:

| | | |
|-------------|---|---------------------------------|
| TEKS 3.10.A | explain the author's purpose and message within a text | U5: p. 24; U5: p. 27; U5: p. 36 |
| TEKS 3.10.B | explain how the use of text structure contributes to the author's purpose | |
| TEKS 3.10.C | explain the author's use of print and graphic features to achieve specific purposes | |
| TEKS 3.10.D | describe how the author's use of imagery, literal and figurative language such as simile, and sound devices such as onomatopoeia achieves specific purposes | |

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher's Guide

| | | |
|---|---|--|
| TEKS 3.10.E | identify the use of literary devices, including first- or third-person point of view | U5: p. 58; U5: p. 61 |
| TEKS 3.10.F | discuss how the author's use of language contributes to voice | |
| TEKS 3.10.G | identify and explain the use of hyperbole | |
| (11) Composition: listening, speaking, reading, writing, and thinking using multiple texts—writing process. The student uses the writing process recursively to compose multiple texts that are legible and uses appropriate conventions. The student is expected to: | | |
| TEKS 3.11.A | plan a first draft by selecting a genre for a particular topic, purpose, and audience using a range of strategies such as brainstorming, freewriting, and mapping | U5: p. 284; U5: p. 294 |
| (B) develop drafts into a focused, structured, and coherent piece of writing by: | | |
| TEKS 3.11.B.i | organizing with purposeful structure including an introduction and conclusion | U5: p. 298; U5: p. 302; U5: p. 303; U5: p. 318; U5: p. 321; U5: p. 332 |
| TEKS 3.11.B.ii | developing an engaging idea with relevant details | U5: p. 298; U5: p. 302; U5: p. 303; U5: p. 318; U5: p. 321; U5: p. 332 |
| TEKS 3.11.C | revise drafts by adding, revise drafts to improve sentence structure and word choice by adding, deleting, combining, and rearranging ideas for coherence and clarity deleting, or rearranging words, phrases or sentences | U5: p. 308; U5: p. 311; U5: p. 332 |
| (D) edit drafts using standard English conventions, including: | | |
| TEKS 3.11.D | edit drafts using standard English conventions | U5: p. 332 |
| TEKS 3.11.D.i | complete simple and compound sentences with subject-verb agreement | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.ii | past, present, and future verb tense | U5: p. 318; U5: p. 298; U5: p. 300; U5: p. 321 |
| TEKS 3.11.D.iii | singular, plural, common, and proper nouns | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.iv | adjectives, including their comparative and superlative forms | U5: p. 42; U5: p. 54; U5: p. 198; U5: p. 213; U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.v | adverbs that convey time and adverbs that convey manner | U5: p. 24; U5: p. 38; U5: p. 42; U5: p. 54; U5: p. 58; U5: p. 85; U5: p. 198; U5: p. 213; U5: p. 298; U5: p. 300; U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.vi | prepositions and prepositional phrases | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.vii | pronouns, including subjective, objective, and possessive cases | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.viii | coordinating conjunctions to form compound subjects, predicates, and sentences | U5: p. 264; U5: p. 279; U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.ix | capitalization of official titles of people, holidays, and geographical names and places | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.x | punctuation marks including apostrophes in contractions and possessives and commas in compound sentences and items in a series | U5: p. 318; U5: p. 321 |
| TEKS 3.11.D.xi | correct spelling of words with grade-appropriate orthographic patterns and rules and high-frequency words | U5: p. 318; U5: p. 321 |
| TEKS 3.11.E | publish written work for appropriate audiences | U5: p. 318; U5: p. 321; U5: p. 323; U5: p. 332 |

TEXAS ESSENTIAL KNOWLEDGE AND SKILLS - GRADE 3

Unit 5

Correlation—Teacher's Guide

(12) Composition: listening, speaking, reading, writing, and thinking using multiple texts—genres. The student uses genre characteristics and craft to compose multiple texts that are meaningful. The student is expected to:

| | | |
|-------------|---|--|
| TEKS 3.12.A | compose literary texts, including personal narratives and poetry, using genre characteristics and craft | U5: p. 240; U5: p. 260 |
| TEKS 3.12.B | compose informational texts, including brief compositions that convey information about a topic, using a clear central idea and genre characteristics and craft | U5: p. 24; U5: p. 37; U5: p. 176; U5: p. 192; U5: p. 216; U5: p. 237; U5: p. 298; U5: p. 302; U5: p. 303; U5: p. 318; U5: p. 321; U5: p. 332 |
| TEKS 3.12.C | compose argumentative texts, including opinion essays, using genre characteristics and craft | |
| TEKS 3.12.D | compose correspondence such as thank you notes or letters | U5: p. 120; U5: p. 134 |

(13) Inquiry and research: listening, speaking, reading, writing, and thinking using multiple texts. The student engages in both short-term and sustained recursive inquiry processes for a variety of purposes. The student is expected to:

| | | |
|-------------|---|--|
| TEKS 3.13.A | generate questions on a topic for formal and informal inquiry | U5: p. 198; U5: p. 211; U5: p. 284; U5: p. 294 |
| TEKS 3.13.B | develop and follow a research plan with adult assistance | U5: p. 140; U5: p. 152; U5: p. 284; U5: p. 294; U5: p. 298; U5: p. 302; U5: p. 332 |
| TEKS 3.13.C | identify and gather relevant information from a variety of sources | U5: p. 284; U5: p. 294; U5: p. 298; U5: p. 302 |
| TEKS 3.13.D | identify primary and secondary sources | U5: p. 284, U5: p. 294 |
| TEKS 3.13.E | demonstrate understanding of information gathered | U5: p. 42; U5: p. 47; U5: p. 58; U5: p. 73; U5: p. 140; U5: p. 152; U5: p. 284, U5: p. 294, U5: p. 298; U5: p. 302; U5: p. 326; U5: p. 328; U5: p. 332 |
| TEKS 3.13.F | recognize the difference between paraphrasing and plagiarism when using source materials | U5: p. 284; U5: p. 294 |
| TEKS 3.13.G | create a works cited page | U5: p. 284; U5: p. 294; U5: p. 318; U5: p. 321 |
| TEKS 3.13.H | use an appropriate mode of delivery, whether written, oral, or multimodal, to present results | U5: p. 318; U5: p. 321; U5: p. 326; U5: p. 328 |

ENGLISH LANGUAGE PROFICIENCY STANDARDS - GRADE 3

Unit 5

Correlation—Teacher's Guide

(1) Cross-curricular second language acquisition/learning strategies. The ELL uses language learning strategies to develop an awareness of his or her own learning processes in all content areas. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. The student is expected to:

| | | |
|----------|--|---|
| ELPS 1.A | use prior knowledge and experiences to understand meanings in English | |
| ELPS 1.B | monitor oral and written language production and employ self-corrective techniques or other resources | |
| ELPS 1.C | use strategic learning techniques such as concept mapping, drawing, memorizing, comparing, contrasting, and reviewing to acquire basic and grade-level vocabulary | U5: p. 22, U5: p. 213, U5: p. 262 |
| ELPS 1.D | speak using learning strategies such as requesting assistance, employing non-verbal cues, and using synonyms and circumlocution (conveying ideas by defining or describing when exact English words are not known) | U5: p. 71, U5: p. 212 |
| ELPS 1.E | internalize new basic and academic language by using and reusing it in meaningful ways in speaking and writing activities that build concept and language attainment | U5: p. 22, U5: p. 35, U5: p. 47, U5: p. 103, U5: p. 134, U5: p. 135, U5: p. 152, U5: p. 179, U5: p. 192, U5: p. 211, U5: p. 235, U5: p. 237, U5: p. 251 |
| ELPS 1.F | use accessible language and learn new and essential language in the process | |
| ELPS 1.G | demonstrate an increasing ability to distinguish between formal and informal English and an increasing knowledge of when to use each one commensurate with grade-level learning expectations | U5: p. 46 |
| ELPS 1.H | develop and expand repertoire of learning strategies such as reasoning inductively or deductively, looking for patterns in language, and analyzing sayings and expressions commensurate with grade-level learning expectations | U5: p. 251; U5: p. 252 |

(2) Cross-curricular second language acquisition/listening. The ELL listens to a variety of speakers including teachers, peers, and electronic media to gain an increasing level of comprehension of newly acquired language in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in listening. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. The student is expected to:

| | | |
|----------|---|--|
| ELPS 2.A | distinguish sounds and intonation patterns of English with increasing ease | |
| ELPS 2.B | recognize elements of the English sound system in newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters | |
| ELPS 2.C | learn new language structures, expressions, and basic and academic vocabulary heard during classroom instruction and interactions | U5: p. 40, U5: p. 47, U5: p. 103, U5: p. 117, U5: p. 152, U5: p. 169, U5: p. 194 |
| ELPS 2.D | monitor understanding of spoken language during classroom instruction and interactions and seek clarification as needed | U5: p. 46 |

ENGLISH LANGUAGE PROFICIENCY STANDARDS - GRADE 3

Unit 5

Correlation—Teacher's Guide

| | | |
|---|--|------------------------------------|
| ELPS 2.E | use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language | U5: p. 164, U5: p. 188 |
| ELPS 2.F | listen to and derive meaning from a variety of media such as audio tape, video, DVD, and CD-ROM to build and reinforce concept and language attainment | U5: p. 193 |
| ELPS 2.G | understand the general meaning, main points, and important details of spoken language ranging from situations in which topics, language, and contexts are familiar to unfamiliar | U5: p. 37 |
| ELPS 2.H | understand implicit ideas and information in increasingly complex spoken language commensurate with grade-level learning expectations | U5: p. 71, U5: p. 74: U5: p. 164 |
| ELPS 2.I | demonstrate listening comprehension of increasingly complex spoken English by following directions, retelling or summarizing spoken messages, responding to questions and requests, collaborating with peers, and taking notes commensurate with content and grade-level needs | |
| (3) Cross-curricular second language acquisition/speaking. The ELL speaks in a variety of modes for a variety of purposes with an awareness of different language registers (formal/informal) using vocabulary with increasing fluency and accuracy in language arts and all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in speaking. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. The student is expected to: | | |
| ELPS 3.A | practice producing sounds of newly acquired vocabulary such as long and short vowels, silent letters, and consonant clusters to pronounce English words in a manner that is increasingly comprehensible | |
| ELPS 3.B | expand and internalize initial English vocabulary by learning and using high-frequency English words necessary for identifying and describing people, places, and objects, by retelling simple stories and basic information represented or supported by pictures, and by learning and using routine language needed for classroom communication | U5: p. 55 |
| ELPS 3.C | speak using a variety of grammatical structures, sentence lengths, sentence types, and connecting words with increasing accuracy and ease as more English is acquired | U5: p. 87 |
| ELPS 3.D | speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency | U5: p. 135, U5: p. 235, U5: p. 251 |
| ELPS 3.E | share information in cooperative learning interactions | U5: p. 294 |

ENGLISH LANGUAGE PROFICIENCY STANDARDS - GRADE 3

| Unit 5 | | Correlation—Teacher's Guide |
|--|--|--|
| ELPS 3.F | ask and give information ranging from using a very limited bank of high-frequency, high-need, concrete vocabulary, including key words and expressions needed for basic communication in academic and social contexts, to using abstract and content-based vocabulary during extended speaking assignments | |
| ELPS 3.G | express opinions, ideas, and feelings ranging from communicating single words and short phrases to participating in extended discussions on a variety of social and grade-appropriate academic topics | U5: p. 35, U5: p. 330 |
| ELPS 3.H | narrate, describe, and explain with increasing specificity and detail as more English is acquired | |
| ELPS 3.I | adapt spoken language appropriately for formal and informal purposes | U5: p. 71, U5: p. 74, U5: p. 192 |
| ELPS 3.J | respond orally to information presented in a wide variety of print, electronic, audio, and visual media to build and reinforce concept and language attainment | U5: p. 251 |
| (4) Cross-curricular second language acquisition/reading. The ELL reads a variety of texts for a variety of purposes with an increasing level of comprehension in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in reading. In order for the ELL to meet grade-level learning expectations across the foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. For kindergarten and grade 1, certain of these student expectations apply to text read aloud for students not yet at the stage of decoding written text. The student is expected to: | | |
| ELPS 4.A | learn relationships between sounds and letters of the English language and decode (sound out) words using a combination of skills such as recognizing sound-letter relationships and identifying cognates, affixes, roots, and base words | |
| ELPS 4.B | recognize directionality of English reading such as left to right and top to bottom | |
| ELPS 4.C | develop basic sight vocabulary, derive meaning of environmental print, and comprehend English vocabulary and language structures used routinely in written classroom materials | U5: p. 125 |
| ELPS 4.D | use prereading supports such as graphic organizers, illustrations, and pretaught topic-related vocabulary and other prereading activities to enhance comprehension of written text | U5: p. 20, U5: p. 81, U5: p. 210, U5: p. 276 |
| ELPS 4.E | read linguistically accommodated content area material with a decreasing need for linguistic accommodations as more English is learned | U5: p. 19, U5: p. 116, U5: p. 179 |
| ELPS 4.F | use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language | U5: p. 37, U5: p. 52, U5: p. 144, U5: p. 292, U5: p. 330 |

ENGLISH LANGUAGE PROFICIENCY STANDARDS - GRADE 3

Unit 5

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| | | |
|---|--|---|
| ELPS 4.G | demonstrate comprehension of increasingly complex English by participating in shared reading, retelling or summarizing material, responding to questions, and taking notes commensurate with content area and grade level needs | U5: p. 144, U5: p. 226, U5: p. 259 |
| ELPS 4.H | read silently with increasing ease and comprehension for longer periods | |
| ELPS 4.I | demonstrate English comprehension and expand reading skills by employing basic reading skills such as demonstrating understanding of supporting ideas and details in text and graphic sources, summarizing text, and distinguishing main ideas from details commensurate with content area needs | U5: p. 20, U5: p. 39, U5: p. 81, U5: p. 116, U5: p. 292 |
| ELPS 4.J | demonstrate English comprehension and expand reading skills by employing inferential skills such as predicting, making connections between ideas, drawing inferences and conclusions from text and graphic sources, and finding supporting text evidence commensurate with content area needs | |
| ELPS 4.K | demonstrate English comprehension and expand reading skills by employing analytical skills such as evaluating written information and performing critical analyses commensurate with content area and grade-level needs | |
| (5) Cross-curricular second language acquisition/writing. The ELL writes in a variety of forms with increasing accuracy to effectively address a specific purpose and audience in all content areas. ELLs may be at the beginning, intermediate, advanced, or advanced high stage of English language acquisition in writing. In order for the ELL to meet grade-level learning expectations across foundation and enrichment curriculum, all instruction delivered in English must be linguistically accommodated (communicated, sequenced, and scaffolded) commensurate with the student's level of English language proficiency. For kindergarten and grade 1, certain of these student expectations do not apply until the student has reached the stage of generating original written text using a standard writing system. The student is expected to: | | |
| ELPS 5.A | learn relationships between sounds and letters of the English language to represent sounds when writing in English | |
| ELPS 5.B | write using newly acquired basic vocabulary and content-based grade-level vocabulary | U5: p. 47, U5: p. 134, U5: p. 192, U5: p. 211, U5: p. 237, U5: p. 278 |
| ELPS 5.C | spell familiar English words with increasing accuracy, and employ English spelling patterns and rules with increasing accuracy as more English is acquired | U5: p. 74 |
| ELPS 5.D | edit writing for standard grammar and usage, including subject-verb agreement, pronoun agreement, and appropriate verb tenses commensurate with grade-level expectations as more English is acquired | U5: p. 324 |

ENGLISH LANGUAGE PROFICIENCY STANDARDS - GRADE 3

Unit 5

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| | | |
|----------|--|--|
| ELPS 5.E | employ increasingly complex grammatical structures in content area writing commensurate with grade level expectations such as (i) using correct verbs, tenses, and pronouns/antecedents; (ii) using possessive case (apostrophe -s) correctly; and, (iii) using negatives and contractions correctly | U5: p. 39 |
| ELPS 5.F | write using a variety of grade-appropriate sentence lengths, patterns, and connecting words to combine phrases, clauses, and sentences in increasingly accurate ways as more English is acquired | U5: p. 273, U5: p. 282 |
| ELPS 5.G | narrate, describe, and explain with increasing specificity and detail to fulfill content area writing needs as more English is acquired | U5: p. 260, U5: p. 296, U5: p. 304, U5: p. 314 |

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Grade 3 | Unit 5 | Teacher Guide
Flash, Bang, Boom! Exploring Light and Sound

ISBN 9781683919629



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Grade 3

Unit 5 | Activity Book

Flash, Bang, Boom! Exploring Light and Sound

Grade 3

Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

Activity Book

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Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

Activity Book

This Activity Book contains activity pages that accompany the lessons from the Unit 5 Teacher Guide. The activity pages are organized and numbered according to the lesson number and the order in which they are used within the lesson. For example, if there are two activity pages for Lesson 4, the first will be numbered 4.1 and the second 4.2. The Activity Book is a student component, which means each student should have an Activity Book.

NAME: _____

DATE: _____

What Is Light?

1. Before Reading:

Think-Draw-Share: Draw a picture in the space below that shows the answer to the question “What is light?” Share with a partner and explain why you drew the picture.



2. **After Reading:**

Responding to Text: Finish the sentence and list the page number where you found the answer.

Light is important because _____

_____ .

page _____

NAME: _____

DATE: _____

Lab Notes

| Light | |
|--|--|
| What is it? | |
| How do we get it?
What is the source? | |
| How fast does it travel? | |
| How does it travel? | |

NAME: _____

DATE: _____

Suffixes: –er, –or, –ist, and –ian

This chart lists words with some of the suffixes studied in Grade 3. Some of these words are new to you. Use the chart to fill out Activity Page 1.4.

| | –er | –or | –ist | –ian |
|---|------------|------------|-------------|---------------|
| a | | actor | artist | |
| c | | counselor | cartoonist | comedian |
| d | dancer | | | |
| e | | editor | | electrician |
| f | farmer | | | |
| g | | governor | guitarist | |
| h | hunter | | | historian |
| i | | inspector | | |
| l | | | | librarian |
| m | | | | mathematician |
| n | | | novelist | |
| o | | | organist | |
| p | player | | | pediatrician |
| r | reporter | | | |
| s | singer | sailor | | |
| t | teacher | | tourist | |
| v | | visitor | violinist | vegetarian |
| z | | | zoologist | |

NAME: _____

DATE: _____

Suffixes: *-er*, *-or*, *-ist*, and *-ian*

Answer the following questions using the words on Activity Page 1.3.

1. Which word on the chart names a doctor who specializes in taking care of babies and children? _____
2. Which word on the chart names someone who can help you find good books to read at the library? _____
3. You might be one of these if you like to play on sports teams.

4. If you don't eat any meat, you are a _____.
5. If you like to tell jokes and make people laugh, you are a _____.
6. If you have done extensive research on ancient Rome, you are probably a _____.
7. If your job is to study animals and their habitats, you are probably a _____.
8. List the words that name people who play musical instruments.

9. If you like to draw, you could be either one of these. _____

10. If you want to be a person who makes or writes fictional books, you want to be a _____.
11. If you go to a new city to explore for a few days, you may be either one of these. _____
12. If you understand how to put wires for electricity in a new house, you might be an _____.

NAME: _____

DATE: _____

Take-Home Letter

Dear Family Members,

Please help your student succeed in spelling by taking a few minutes each evening to review the words together. Helpful activities for your student to do include: spelling the words orally, writing sentences using the words, or simply copying the words.

Spelling Words

This week, we are reviewing all eight spelling patterns for the sound /ee/ that we have already learned. Your student will be tested on these words.

Students have been assigned two Challenge Words, *almost* and *really*. Challenge Words are words used very often. While *almost* does not follow the spelling pattern of /ee/, *really* does as the 'ea' and the 'y' in *really* are both pronounced /ee/.

The Content Word for this week is *electricity*. This word is directly related to the material that we are reading in *Adventures in Light and Sound*. The Content Word is an optional spelling word for your student. If your student would like to try it but gets it incorrect, it will not count against them on the test. We encourage everyone to stretch themselves a bit and try to spell this word.

The spelling words, including the Challenge Words and the Content Word, are listed below:

| | |
|---------------|---|
| 1. succeeded | 12. stadium |
| 2. money | 13. chariot |
| 3. enemy | 14. degree |
| 4. centipede | 15. athlete |
| 5. experience | 16. chief |
| 6. believe | 17. grease |
| 7. secret | 18. scenic |
| 8. increase | Challenge Word: <i>almost</i> |
| 9. chimney | Challenge Word: <i>really</i> |
| 10. tedious | Content Word: <i>electricity</i> |
| 11. fancy | |

Student Reader

The chapters your student will read this week in *Adventures in Light and Sound* include information about what light is, how shadows are made, and mirrors and reflections. Be sure to ask your student each evening about what they are learning.

Students will take home text copies of the chapters in the Reader throughout the unit. Encouraging students to read a text directly related to this domain-based unit will provide content and vocabulary reinforcement. Your student will also bring home a copy of the glossary for use in reading the text copies to family members. The bolded words on the text copies are the words found in the glossary.

NAME: _____

DATE: _____

What Is Light?

Answer each question below. Write in complete sentences with correct capitalization and punctuation. List the page number where you found the answer.

1. What determines whether or not you see light waves?

page _____

2. Describe white light.

page _____

3. What is the central idea of this chapter?

Read-Aloud: Excerpts from “What Is Light?”

Samuel lifted himself out of his garden chair and stood beneath the giant oak. As he stood, he gazed out into his beautiful garden that was bursting with color and scent and began to speak.

“Our main source of light and heat is the sun, a hot star of ‘glowing gas.’” Samuel smiled as he went on. “Light illuminates objects and makes them visible. Light spreads out in all directions. Because of light, our eyes and our brains are able to form pictures of the world we live in. I have spent my life painting those pictures. Light gives us every sunrise and every sunset. Without light, there is only darkness.”

Jack stared up into the sky. “I’ve always wondered how exactly light reaches us here on Earth. The sun is more than 92,000,000 miles away!”

“Light travels in the form of tiny waves called light waves,” explained Samuel. “These light waves travel in straight paths called rays. Rays of light waves travel at the fastest speed possible in a vacuum, a place that has no tiny particles or bits of matter. Because most of outer space has very few particles, it is a vacuum, and light travels there at the remarkable speed of approximately 186,000 miles a second!”

“Light from the sun reaches Earth because it can pass so quickly through outer space. There is almost nothing to block its path. Once light reaches Earth’s atmosphere, it slows down a little bit.”

“The atmosphere is like a blanket of air full of gases and moisture that covers the Earth. This blanket of air slows the light down.”

“Then,” Samuel continued, “the speed of light slows down even more because objects start getting in the way of the light rays.” Samuel pointed to the lemonade. “For example, rays of light waves move more slowly when traveling through liquids, such as this lemonade.” Then Samuel pointed to the oak tree. “Light waves cannot pass through other objects, such as this beautiful oak tree. Because rays of light waves travel in a straight line, they cannot bend around the tree, either; instead, they leave a shadow, or shade, on the other side of it.”

“Another important thing to remember is light is fuel for our planet,” announced Samuel. “Light is energy! Energy from the sun supports all forms of life on this planet. Without light and heat from the sun, the farmer would not have food to harvest. In fact, we could not exist on Earth!”

“Isn’t it amazing that stars make their own light, but the moon does not? Sunlight bounces off the moon to make it look like it’s shining brightly in the night sky,” mused Samuel. “Of course, I could sit here all night and talk about why light is so important, not only for myself as a painter, but also for our very existence,” he said contemplatively.

NAME: _____

DATE: _____

Comparing and Contrasting Organizer

| Text 1: What Is Light? (Reader) | Text 2: What Is Light? (Excerpts) |
|---------------------------------|-----------------------------------|
| | |

Differences:

NAME: _____

DATE: _____

Contrasting Organizer

| Text 1: What is Light? (Reader) | Text 2: What is Light? (Excerpts) |
|---------------------------------|-----------------------------------|
| | |

Differences:

The main difference between Text 1 and Text 2 is that Text 1 is

_____ text and Text 2 is _____ text.

Text 1 has _____.

Text 2 has _____.

NAME: _____

2.4

ACTIVITY PAGE

DATE: _____

Making Adverbs with the Suffix *-ly*

- Draw a wiggly line under the verb.
- Then, change the adjective under the blank to an adverb by adding *-ly* to complete the sentence.
- Draw a triangle around the adverb and an arrow from the adverb to the verb. Then, answer the question after the sentence.

1. We waited _____ for our turn to look through the telescope.
(patient)

How did we wait? _____

2. People were riding in the car _____ because they weren't wearing their seatbelts.
(illegal)

How were the people riding? _____

3. Our teacher drew lines _____ on the paper so we would know where to write each separate part.
(vertical)

How did our teacher draw lines? _____

4. I _____ arranged my books on the shelves when I cleaned my room.
(neat)

How did I arrange my books? _____

5. A woman at a table near us in the restaurant _____ (polite)
asked the waiter for more water.

How did the woman ask? _____

6. The new medicine the doctor gave me went down _____ (smooth)
when I swallowed it compared to what I took last year when I was sick.

How did the medicine go down? _____

Write a sentence using each adverb. Remember, the adverb should describe the verb.

1. *slowly*

2. *loudly*

NAME: _____

2.5

TAKE-HOME

DATE: _____

What Is Light?

Did you know that the sun is the greatest **source** of light for our planet, Earth? But what is light? Why is it so important?

Hot gases of the sun give off both light and heat **energy**. Light carries **energy**, with the long **wavelengths** carrying the least and the short **wavelengths** carrying the most. When you think of something with lots of **energy**, what comes to mind?

Do you think of something fast like a race car? Do you think of something with great force like a very strong wind knocking down a tree?

Believe it or not, light can be many times more energetic than a car or the wind.

Light travels at 186,000 miles every second in a **vacuum**. At that **speed**, light can go around Earth more than seven times every second! No human-made machine can go that fast—not even a jet plane or rocket!

One way that light travels, including light from the sun, is in the form of **waves**. Scientists can measure how long light **waves** are. **Waves** can be different sizes—some are long and some are short. Some light **waves** are visible and some are invisible. Whether you can see light or not depends on the length of the **wave**. The longest **wavelength** of visible light is seen as red and the shortest **wavelength** is violet. Short **wavelengths** carry the most **energy**.

The sun gives off what is called **white light**. Perhaps you think of the light from the sun as having no color at all. Maybe you think the light from the sun is more yellow in color. It may surprise you to know that the sun's light, **white light**, is made up of all the colors of the rainbow. **White light** includes light of different **wavelengths**, including all the colors we can see.

Of all the **wavelengths** in the sun's light, there is just a little more of the yellow **wavelengths** than the other colors. This is why the sun looks yellow when we see it against the blue sky. Still, the light from the sun includes all of the other colors and **wavelengths**. You will learn more about **white light**, visible light, and colors in a later chapter in this Reader.

Although the sun is the greatest **source** of visible light, there are also other **sources** of light. What else in the sky provides light? The other stars in the night sky provide light, though it is not as bright as the light from the sun during the day. The moon is not a star and does not give off its own light.

Can you think of other **sources** of light? Is there light in your classroom right now? Perhaps it is from the sun shining through the windows. Chances are good, though, that some of the light in the room may be coming from light bulbs. Like the sun, most light bulbs give off **white light**. **Electric** lights are such a part of our everyday life, we don't even think about them—unless the **electricity** goes off! This doesn't happen often, but sometimes it does during a bad storm. When the electricity goes off and we do not have light from light bulbs, people sometimes use other **sources** of light, like flashlights or candles.

Light is important for many reasons. Light and heat **energy** from the sun warms Earth. Without the light and heat **energy** from the sun, Earth would be freezing cold. You also learned back in kindergarten that the sun's light is needed for plants to grow. Also, without light, there would be no colors. Can you think of another reason that light is important?

Try to imagine a world in which there is no light—no sun, no stars, no candles, and no light bulbs. What would be different? If you just said that it would be dark, you are only partly right. What else would change? Without light, you would not be able to see anything! A world without light is almost impossible to imagine.

NAME: _____

2.6

TAKE-HOME

DATE: _____

Make Adverbs with the Suffix *-ly*

- Draw a wiggly line under the verb.
- Then, change the adjective under the blank to an adverb by adding *-ly* to complete the sentence.
- Draw a triangle around the adverb and an arrow from the adverb to the verb. Then, answer the question after the sentence.

Example:

Tom answered _____ that he did not know how the
vase got broken. (honest)

Tom answered how? honestly

1. The man on the subway _____ offered his seat to
the older woman. (kind)

How did the man offer his seat? _____

2. The little boy walked _____ down the stairs.
(quick)

How did the little boy walk? _____

3. The mayor _____ announced that he would retire.
(official)

How did the mayor announce he would retire? _____

4. Our teacher _____ explained what we were to do for homework. (clear)

How did our teacher explain the homework? _____

5. My sister _____ dropped her jacket on the floor. (careless)

How did my sister drop her jacket? _____

Write a sentence using each adverb. Remember, the adverb should describe the verb.

1. *softly*

2. *tightly*

Light Experiment Procedure

Follow the directions below to conduct your experiment with your group. Make sure all group members have a chance to participate in the experiment.

Your group's materials:

- one flashlight
- one square of clear plastic wrap
- one square of wax paper
- one square of cardboard
- one square of aluminum foil

1. Make sure your group has all the materials, including Activity Page 3.2.
2. Use Activity Page 3.2 to write down your predictions and record the results.
3. Before conducting the experiment, write down your prediction for what will happen when the light from the flashlight shines on each object.
4. Have one person hold up the clear plastic wrap close to a wall. Another group member will shine the beam from the flashlight on the plastic wrap. What happens? What do you notice? Discuss with your group. Record the results on Activity Page 3.2.
5. Have a different person hold up the square of wax paper and someone else shine the flashlight. What happens? Record the results.
6. Continue with the rest of the materials.
7. When the experiment is done, complete the reflection activity on your own.

NAME: _____

DATE: _____

Lab Notes

| Object | What do I think will happen? | What happened? |
|--------------------|------------------------------|----------------|
| Clear plastic wrap | | |
| Wax paper | | |
| Cardboard | | |
| Aluminum foil | | |

Light Experiment Reflection

Based on your experiment, what predictions can you make about what happens to light when it hits a parked car? Think about all the surfaces that you see on a car.

NAME: _____

3.3

ACTIVITY PAGE

DATE: _____

Lab Notes

| Cause and Effect: When Light Hits Different Types of Objects | | |
|---|---------------------------|------------------------|
| Transparent

Examples:

Evidence on page _____ | What does it mean? | What happens? |
| | | Draw a picture. |
| Opaque

Examples:

Evidence on page _____ | What does it mean? | What happens? |
| | | Draw a picture. |

NAME: _____

DATE: _____

Use Adjectives and Adverbs Correctly

Fill in the blank with an adjective or an adverb, depending on whether a noun or verb is described.

| | | | | | |
|--------|-----------|---------|--------|--------|----------|
| loud | careful | tight | slow | glad | silent |
| loudly | carefully | tightly | slowly | gladly | silently |

1. The turtle walked _____ across the sidewalk toward the pond.
2. The _____ belt pinched my waist.
3. The _____ sound hurt my ears.
4. Our teacher asked us to read _____ instead of with a partner.
5. The father _____ buckled his seat belt.
6. She _____ put the baby down in his crib so she would not wake him up.
7. My brother _____ fastened his shoelaces so he would not trip.
8. People cheered _____ as the soccer team scored a goal to break the tie.

Bonus: *Mark the adjectives with a box and the adverbs with a triangle, and then draw an arrow to the word they describe.*

NAME: _____

3.5

ACTIVITY PAGE

DATE: _____

Blank Busters

| | | | |
|---|---------|--------|-----------|
| succeeded | money | enemy | centipede |
| experience | believe | secret | increase |
| chimney | tedious | fancy | degree |
| athlete | chief | grease | scenic |
| chariot | stadium | | |
| Challenge Word: <i>almost</i>
Challenge Word: <i>really</i>
Content Word: <i>electricity</i> | | | |

Fill in the blanks in the sentences below with one of the spelling words in the chart. Only if needed, add a suffix to the end of a word in order for the sentence to make sense: -s, -ed, -ing, or -ly.

1. The hiker trudged along _____ up the mountain.
2. She enjoyed watching the sprinters and other talented _____ race around the enormous _____.
3. It seemed that the _____ on the rooftop was _____ as tall as a skyscraper.
4. The _____ overlook on the mountain road was breathtaking!
5. Can you _____ that the amount of homework will be _____ in January?
6. It was a _____ that the many-legged _____ in the story had pockets full of _____.

7. The _____ of police has a _____ office with a beautiful view of the city.
8. The fire on the stove was caused by _____ that spilled from the pan.
9. You have _____ in making me laugh for hours!
10. Do you understand how _____ works to make an oven heat up?

Write three sentences using spelling words of your choice that were not used in the first ten sentences. Make sure to use correct capitalization and punctuation. You may use the Challenge Words or the Content Word in your sentences.

1. _____

2. _____

3. _____

How Are Shadows Made?

Do you remember any interesting facts about how light travels? In the last chapter, you learned that it travels in waves that can be measured as wavelengths. You also learned that it travels at a very high rate of speed. Here's another interesting fact—light waves travel from a source in straight lines that spread out in all directions, like rays.

Have you ever wondered what happens when a line or path of light bumps into something in its way? Different things may happen depending on what exactly is in the light's path.

If a path of light hits something that is **transparent**, most of the light will pass right through. Air, water, and glass are all **transparent**. When light hits these **transparent** objects, it passes through to the other side. It is almost as if the object isn't there.

Most buildings have glass windows so that natural sunlight can travel from the outdoors inside. Have you ever been in a building that has a glass roof or **skylight**? Sometimes you can even see blue sky and clouds through the **skylight**!

Light cannot travel through all materials. If a path of light hits something that is **opaque**, the light is **absorbed** and blocked by the object. It cannot continue in a straight line through the object. Wood, cardboard, and even a person's body are all **opaque** objects. Light cannot pass through to the other side. Instead, a **shadow** is created because the light is **absorbed**.

Look around your classroom. Do you see **transparent** objects through which light is passing? Can you also find **opaque** objects? You will probably find that your classroom has many more **opaque** objects than **transparent** objects. Do you see any **shadows**?

The **shadow** created by blocked light takes on the shape of the object.

NAME: _____

DATE: _____

How Are Shadows Made?

Read the examples below carefully. If the light source causes a shadow, write “shadow” on the blank. If the light source does not cause a shadow, write “no shadow” on the blank.

1. The sunlight is streaming through a window hitting a rocking chair.

2. It is a rainy, cloudy day and you are standing outside under an umbrella.

3. It is midnight and there are no lights on anywhere. _____
4. It is a bright, sunny day at the beach and you are sitting under a beach umbrella. _____
5. You are swinging outside on a sunny, but cold day. _____
6. What is the central idea of this chapter?

NAME: _____

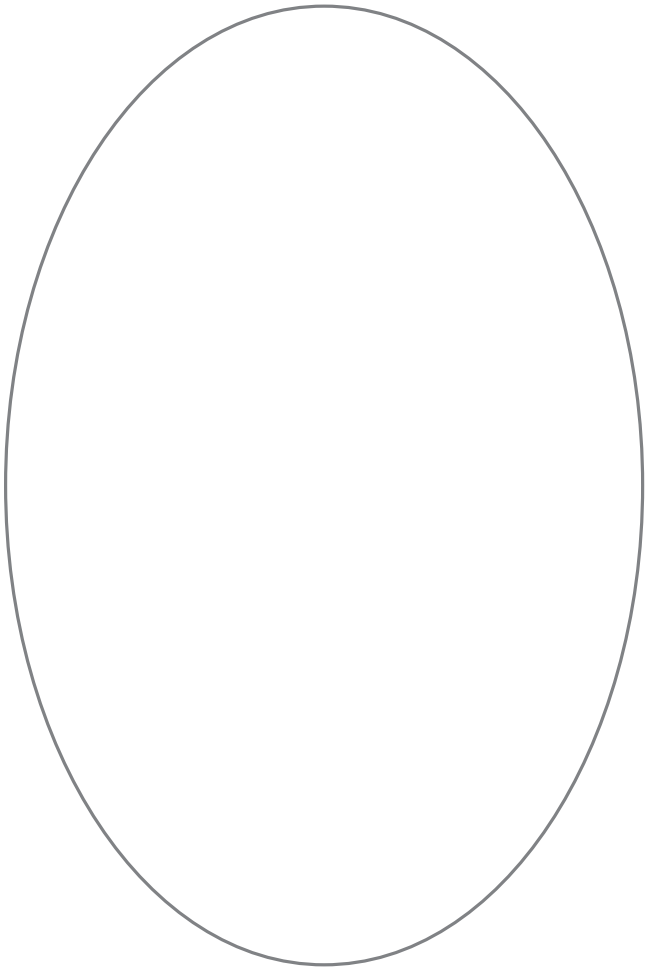
DATE: _____

Lab Notes

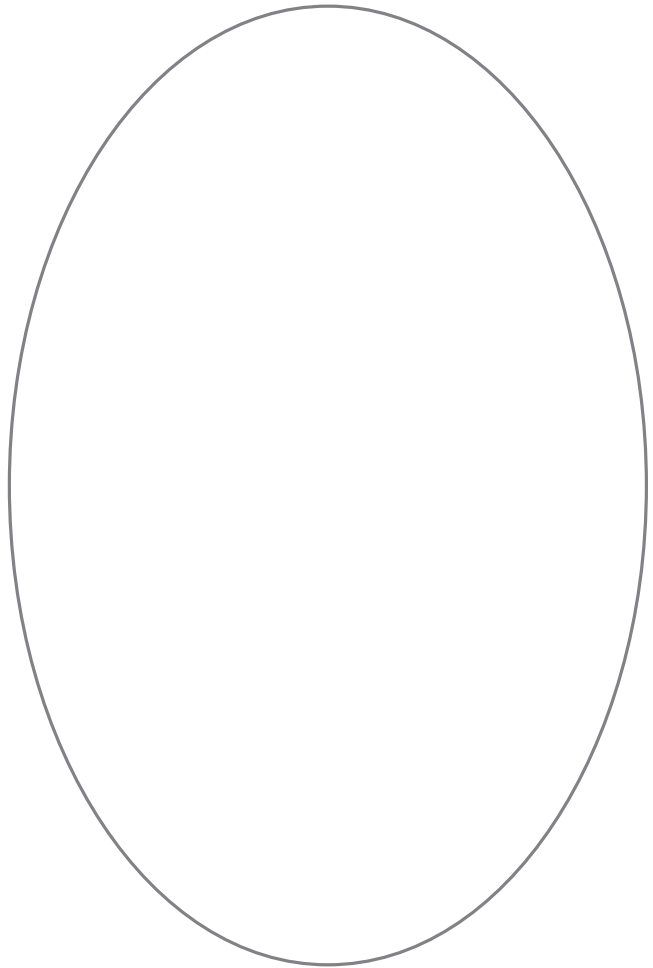
Compare and Contrast

Directions: First, look at the convex side of the spoon and draw a picture of your reflection in the first oval. Then, look at the concave side of the spoon and draw a picture of your reflection in the second oval.

Convex



Concave



1. What is similar about the two reflections?

2. What is different about the two reflections?

NAME: _____

DATE: _____

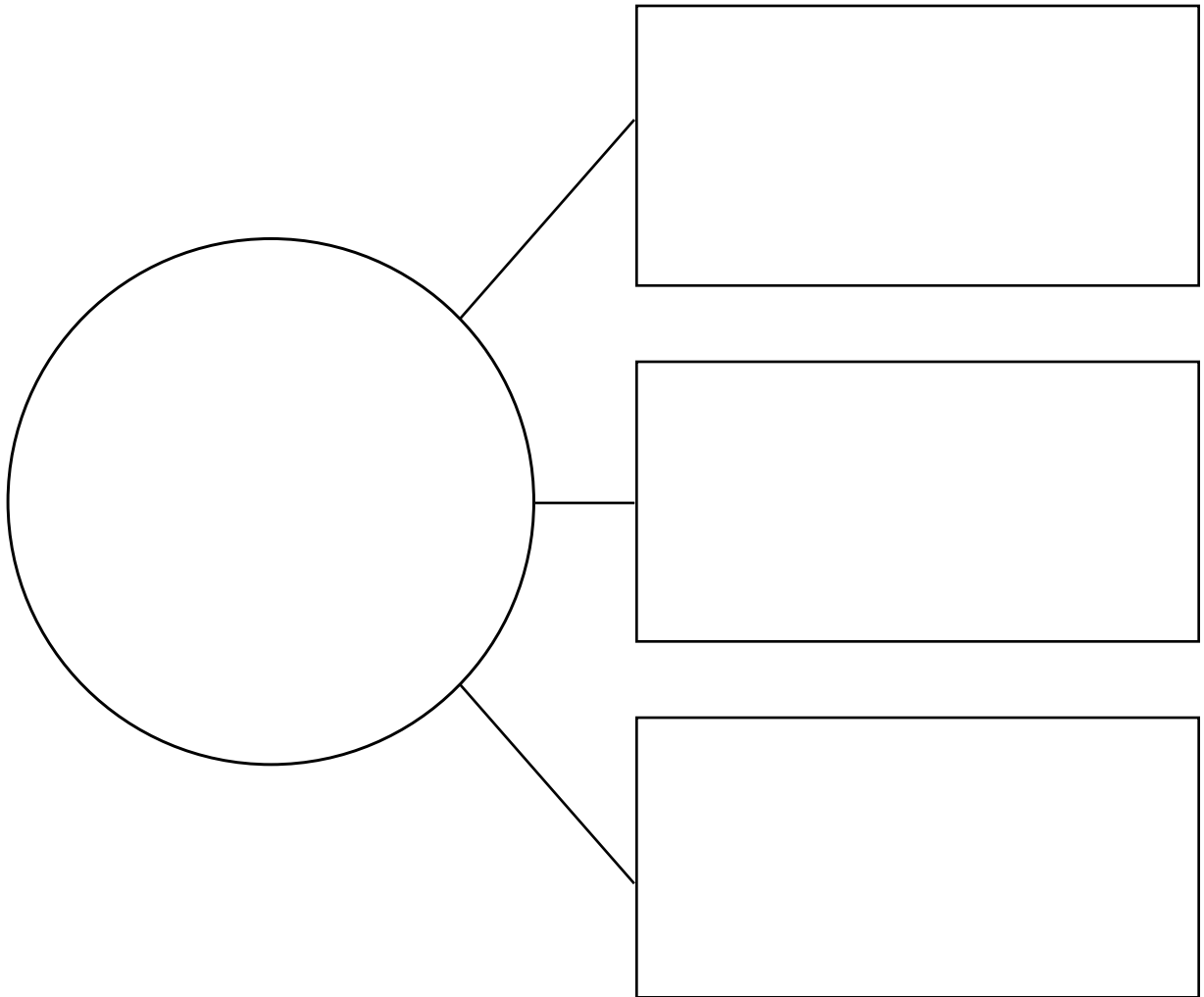
Lab Notes

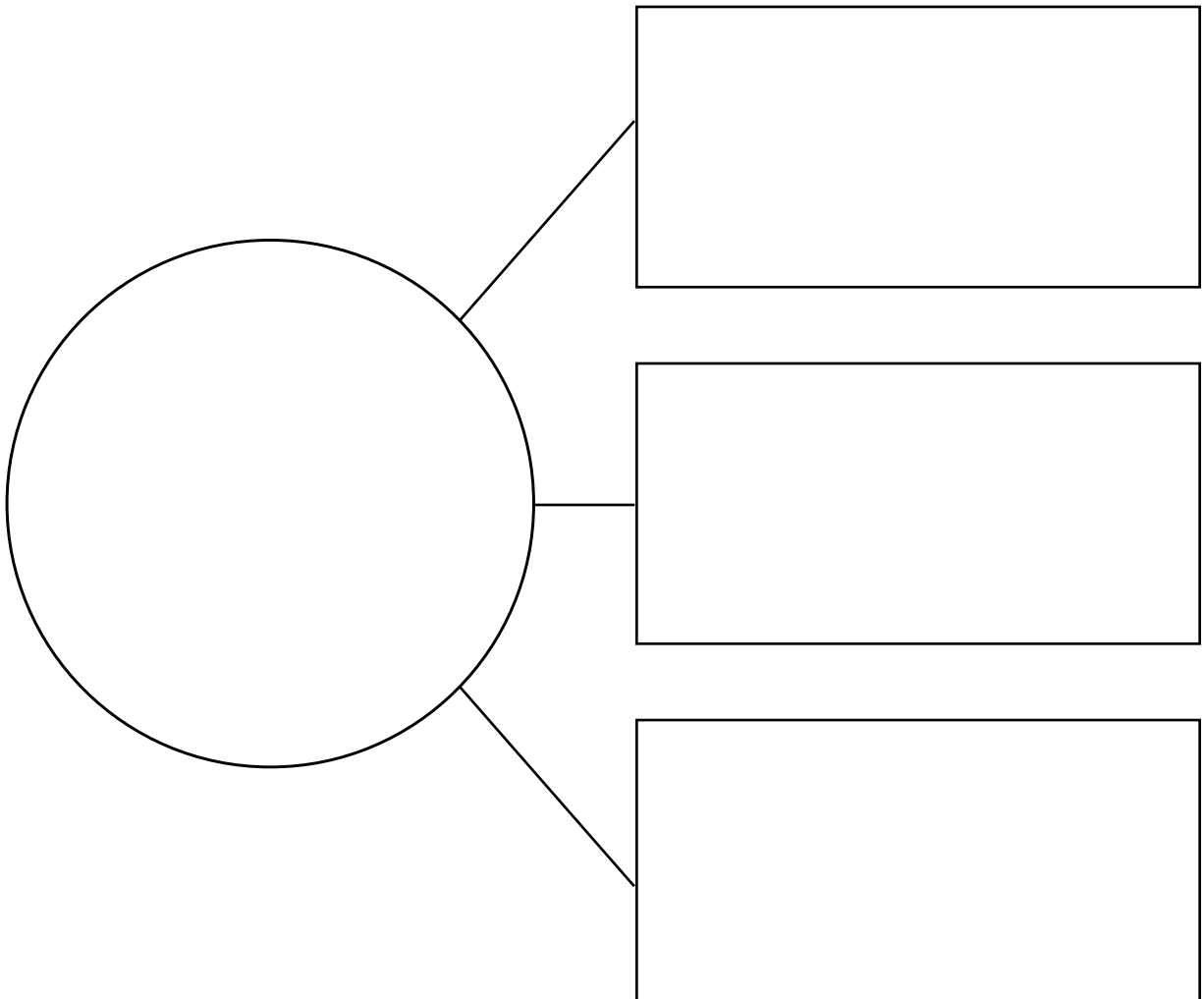
Central Idea and Details

Pages 30–31

Central Idea

Details





The central idea of both texts is _____.

NAME: _____

DATE: _____

Adverbs that Tell *how, when, and where*

There is one adverb in each sentence. Draw a triangle around each adverb and a wiggly line under the verb it describes. Then, draw an arrow from the adverb to the verb. On the blank line after the sentence, write whether the adverb tells how, when, or where.

1. I am going to a birthday party tomorrow. _____
2. The dog slept outside. _____
3. I always ride the bus to school. _____
4. John has never taken the train. _____
5. Mary left her coat here. _____
6. Dad clapped loudly. _____
7. It snowed everywhere. _____
8. He picked up the baby carefully. _____
9. I ate my peas last because I don't like them. _____
10. The squirrel quickly gathered some acorns. _____
11. Please stack the books there. _____
12. I read my book silently. _____

NAME: _____

DATE: _____

Word Sort

Identify the headers. Read the words in the box and circle the vowels that have the /ee/ sound. Write the words under each header that match the header's spelling pattern.

'y' > /ee/

'e' > /ee/

'i' > /ee/

'ea' > /ee/

| | | | |
|-------|-------|-------|-------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

'ee' > /ee/

'ie' > /ee/

'ey' > /ee/

'e_e' > /ee/

| | | | |
|-------|-------|-------|-------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

| | | | | |
|-------|---------|----------|---------|---------|
| skied | debate | greeting | piano | recess |
| early | handy | wheat | honey | sweat |
| funny | element | sweet | seaside | recipe |
| cope | valley | head | Chinese | yellow |
| great | fly | bedding | fried | radiant |

NAME: _____


4.5

TAKE-HOME

DATE: _____

Adverbs that Tell *how*, *when*, and *where*

There is one adverb in each sentence. Draw a triangle around each adverb and a wiggly line under the verb it describes and draw an arrow from the adverb to the verb. On the blank line after the sentence, write whether the adverb tells how, when, or where.

Example: The nurse  gently cleaned my cut finger. how

1. I carried the newspaper inside. _____
2. I will wash the dishes later. _____
3. The people folded the laundry there. _____
4. Sam ripped his pants today. _____
5. The boys whispered quietly. _____
6. Beth has never met her aunt. _____
7. The boy pounded his fists madly. _____
8. My dog always wags his tail. _____
9. Sometimes I walk home from school. _____

Mirrors and Reflections

Have you been to the dentist recently? Do you remember if they used a tool with a **mirror** to look at your teeth? Think for a minute about how useful that **mirror** is. Why does the dentist use it? This simple tool allows them to see the back of your teeth. They can also see teeth way in the back of your mouth. Without it, they couldn't do their job nearly as well! Ask to see this tool the next time you're at the dentist.

So what is a **mirror**? A **mirror** has a smooth, shiny **surface** that **reflects** light. Light that is **reflected** bounces off of something in its path. You have already learned that light travels in a straight line, unless it runs into something in its way. If light hits a transparent object, it passes right through the object. If it hits an opaque object, the light is absorbed and blocked so a shadow is made. If light hits a smooth, shiny surface like a **mirror**, it is **reflected**.

When a **mirror** is made, glass is coated with hot, **silvery** metals and then cooled. This coating makes the **mirror** shiny so it **reflects** back all the light that hits it.

Did you know that there are different types of **mirrors**? You probably use a **plane mirror** every morning when you get ready for school. A **plane mirror** has a more or less flat **surface**. The **reflection** of something in a **plane mirror** is almost the same size as the real object.

Plane mirrors are used in many tools. Cameras, telescopes, and microscopes sometimes use **plane mirrors**. Some toys even use **plane mirrors**. Have you ever looked through a toy called a **kaleidoscope**? A **kaleidoscope** is a tube with **plane mirrors** inside. There are also tiny bits of colored glass and beads sealed up inside the **kaleidoscope**. You look

through a small hole at one end of the **kaleidoscope** and point it toward the light. As you rotate the tube, you will see beautiful, colored patterns.

There are two other types of mirrors that are different from **plane mirrors**. **Plane mirrors** have flat surfaces, but **concave** and **convex mirrors** have **curved** surfaces. The smooth, shiny side of a **concave mirror curves** inward like a spoon. The smooth, shiny side of a **convex mirror curves** outward.

Here's another way that **concave** and **convex mirrors** are different from **plane mirrors**. Remember that in a **plane mirror**, the **reflection** of an object is about the same size as the object. In **concave** and **convex mirrors**, the **reflection** can look larger or smaller than the real object.

Concave and **convex mirrors** are also useful. **Concave mirrors** can be used to provide heat using the light from the sun. Remember that sunlight is a form of light and heat energy.

What about **convex mirrors**? The next time you get on a bus, take a look at the mirrors on the sides of the bus. Most buses and large trucks have a small, extra **convex mirror** on the side-view **plane mirror**. The **convex mirror** makes objects look smaller but shows a wider area so you can see more. It helps drivers avoid hitting something they might not see in the regular **plane mirror**.

So now you see how useful **mirrors** are in our everyday lives. **Mirrors** can also be a lot of fun. A circus or carnival sometimes has a place called the "Funhouse," or "House of **Mirrors**." If you go in, there are lots of **concave** and **convex mirrors**. When you look in these **mirrors**, you might not recognize yourself! Your **reflection** is **distorted**. What makes that happen? Now you know it's **concave** and **convex mirrors**.

NAME: _____

DATE: _____

Spelling Assessment

As your teacher calls out the words, write them under the correct header.

'y' > /ee/

'ey' > /ee/

'ee' > /ee/

'i' > /ee/

'ea' > /ee/

'ie' > /ee/

'e' > /ee/

'e_e' > /ee/

Challenge Word: _____

Challenge Word: _____

Content Word: _____

Dictated Sentences:

1. _____

2. _____

NAME: _____

DATE: _____

Lab Notes

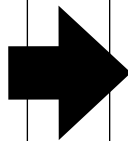
Refraction

Directions: Look at the image below. What is causing the straw to look like this? Fill in the boxes for both the cause and the effect.



Cause: Why does it happen?

Effect: What happens?



NAME: _____

DATE: _____

Lab Notes

Refraction and Lenses

| Central Idea and Details | |
|---|--|
| What is the central idea? | |
| List three key facts or details. | |
| List three new words you learned and what they mean. | |

| | |
|---|--|
| <p>What is the most interesting thing you learned?</p> | |
| <p>Write three questions you still have.</p> | |

NAME: _____

DATE: _____

Words with Suffixes *-y* and *-al*

Add the correct suffix to the root word provided. Write the new word in a sentence.

1. Root word: *mess*

Add *-y* or *-al* to make: _____

2. Root word: *magic*

Add *-y* or *-al* to make: _____

3. Root word: *culture*

Add *-y* or *-al* to make: _____

4. Root word: *dirt*

Add *-y* or *-al* to make: _____

5. Root word: *rust*

Add *-y* or *-al* to make: _____

Circle the word that matches the meaning.

1. Meaning: related to sounds made by voices or instruments and arranged in a way that is pleasing to hear

Word: music musical

2. Meaning: the unplanned occurrence of good events

Word: luck lucky

NAME: _____

DATE: _____

3. Meaning: related to stories about things that are not real

Word: fictional fiction

4. Meaning: full of a natural white substance used to flavor and preserve food

Word: salt salty

5. Meaning: the process of eating the right kind of food so you can be healthy and grow properly

Word: nutritional nutrition

6. Meaning: full of spirals or winding shapes

Word: curly curl

NAME: _____

5.5

TAKE-HOME

DATE: _____

Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

chest

chisel

chief 1. *noun* A leader of a group. 2. *adjective* Most important or main.

chimney *noun* A pipe that carries smoke out of a building, usually through the roof.

1. What are the two guide words on the page?

2. What are the two entry words on the page?

3. How many definitions are there for *chief*? _____

4. Would the word *choir* be on this page? _____

5. Circle the word(s) that would come before **chest** from the following list:
choke, cherry, chestnut

NAME: _____

DATE: _____

Letter to My Partner

Dear _____:

Today I learned about _____

Three facts I learned were:

1. _____

2. _____

3. _____

One thing I'm having trouble understanding is: _____

_____.

I have a question for you about the chapter: _____

_____.

Can you help me with this question?

Your partner,

Partner Response:

From _____

The answer to your question is _____

_____.

NAME: _____

6.2

TAKE-HOME

DATE: _____

Take-Home Letter

Dear Family Members,

Please help your student succeed in spelling by taking a few minutes each evening to review the words together. Helpful activities for your student to do include: spelling the words orally, writing sentences using the words, or simply copying the words.

Spelling Words

This week, we are reviewing three of the seven spelling patterns for /ae/. Your student learned to spell words with the /ae/ sound in second grade, so this should be a review. Your student will be tested on these words.

Students have been assigned two Challenge Words, *family* and *young*. Challenge Words are words used very often. Neither Challenge Word follows the spelling pattern of /ae/.

The Content Word for this week is *straight*. This word is directly related to the material that we are reading in *Adventures in Light and Sound*. The Content Word is an optional spelling word for your student. If your student would like to try it but gets it incorrect, it will not count against them on the assessment. We encourage everyone to stretch themselves a bit and try to spell this word.

The spelling words, including the Challenge Words and the Content Word, are listed below:

| | |
|----------------|--------------------------------------|
| 1. subway | 12. beefsteak |
| 2. daydreams | 13. explain |
| 3. payment | 14. dainty |
| 4. daisies | 15. mermaid |
| 5. awaited | 16. trainees |
| 6. obtain | 17. great |
| 7. ballplayers | 18. giveaway |
| 8. breaker | Challenge Word: <i>family</i> |
| 9. yesterday | Challenge Word: <i>young</i> |
| 10. betrayer | Content Word: <i>straight</i> |
| 11. crayons | |

Student Reader

The chapters your student will read this week in *Adventures in Light and Sound* include information about refraction and lenses, color and light, what sound is, and the characteristics of sound. Be sure to ask your student each evening about what they are learning.

Students will take home text copies of the chapters in the Reader throughout the unit. Encouraging students to read a text directly related to this domain-based unit will provide content and vocabulary reinforcement. Please remind your student that the glossary can be used for finding the meaning of the bolded words.

NAME: _____

DATE: _____

Lab Notes

White Light Experiment Research

| Key ideas from the text | |
|-------------------------|--|
| Pages 56–57 | |
| Pages 58–59 | |
| Pages 60–61 | |
| Pages 62–63 | |
| Pages 64–65 | |
| Pages 66–67 | |

NAME: _____

DATE: _____

Lab Notes

White Light Experiment Research

| Experiment #1 | Experiment #2 |
|------------------------|------------------------|
| Prediction: | Prediction: |
| Observations: | Observations: |
| Draw a picture. | Draw a picture. |

NAME: _____

DATE: _____

Lab Notes

White Light Research Summary

Use the information you found in “Color and Light” and the observations you made from the two experiments to complete the following sentences below. Make sure you use academic vocabulary words and write in complete sentences with correct capitalization and punctuation.

1. White light is _____

_____.
2. Chapter 5 explains how a prism works. It says _____

_____.
3. The colors in the light spectrum are _____

_____.

4. I saw this myself in the two experiments! What I saw was _____

5. If I were to tell someone else to try one of the experiments, I would tell them to gather the following materials: _____

6. The type of light I did not see in the experiments was invisible light. Three types of invisible light are _____

NAME: _____

7.3A

ACTIVITY PAGE

DATE: _____

Lab Notes

White Light Research Summary

Use the information you found in “Color and Light” and the observations you made from the two experiments to complete the sentences below. Make sure you use academic vocabulary words and write in complete sentences with correct capitalization and punctuation.

1. White light is _____

2. Where does the text explain what a prism is? page number _____
3. Draw a diagram of a prism. Draw arrows to show where the light enters and then draw lines to show what happens when it refracts.

4. What does the white light do when it leaves the prism?

5. List the colors in the light spectrum in order:

6. The first experiment showed _____

7. The second experiment showed _____

8. List three types of invisible light. List the page numbers where you found the answer.

NAME: _____

DATE: _____

Word Shelf

The left-hand side of the table contains words that use the suffix you have been studying. Use the blanks on the right side to record additional words that use the same suffix. Then write those words and their definitions on the table on the following page.

| | |
|--|--|
| Suffix <i>-ous</i>
means <i>full of or having</i> | |
| joyous | |
| dangerous | |
| mountainous | |
| poisonous | |

NAME: _____

7.5

ACTIVITY PAGE

DATE: _____

–ous: Suffix Meaning “full of”

| | |
|---|--|
| joyous —(adjective) full of a feeling of great happiness | |
| dangerous —(adjective) full of the chance that something bad will happen | |
| mountainous —(adjective) full of land that rises very high above its surroundings | |
| poisonous —(adjective) full of a substance that can hurt or kill people or animals if touched, swallowed, or inhaled | |

Write the correct word to complete each sentence.

famous poisonous mysterious furious dangerous humorous

1. The _____ ending to the movie had everyone in the theater laughing.
2. When I got to school, there was a _____ smell in our classroom, and I couldn't figure out what it was coming from.
3. My _____ brother could not believe our little sister had scribbled all over his history paper with crayons.
4. A _____ basketball player is said to be coming to our community fair next week but nobody knows who it is.

5. Some farmers put _____ chemicals on their crops to keep the bugs from eating them, but the chemicals can be harmful to people who eat the food.

Write your own sentence using the one word left in the box.

6. _____

_____ .

Word Shelf

The left-hand side of the table contains words that use the suffix you have been studying. Use the blanks on the right side to record additional words that use the same suffix. Then write those words and their definitions on the table on the following page.

| | |
|---|--|
| <p>Suffix <i>-ly</i>
means in a _____ way</p> | |
| <p>furiously</p> | |
| <p>mysteriously</p> | |
| <p>dangerously</p> | |
| <p>famously</p> | |

NAME: _____

DATE: _____

-ly: Suffix Meaning “in a ____ way”

| | |
|---|--|
| furiously —(adverb) in a furious way | |
| mysteriously —(adverb) in a mysterious way | |
| dangerously —(adverb) in a dangerous way | |
| famously —(adverb) in a famous way | |

Write the correct word to complete each sentence.

| | | | | |
|-------------|-----------|--------------|----------|------------|
| dangerously | furiously | mysteriously | famously | humorously |
|-------------|-----------|--------------|----------|------------|

1. My cell phone _____ turned itself off when I put it down on the table.
2. My uncle _____ asked his girlfriend to marry him at the family reunion in a way that nobody will forget.
3. My sister _____ wore a small hat for a baby as part of her costume for the party.
4. A little boy in the subway station walked _____ near the edge of the passenger platform above the tracks.

Write your own sentence using the one word left in the box.

5. _____

_____.

NAME: _____

7.8

ACTIVITY PAGE

DATE: _____

Blank Busters

| | | | |
|---|----------|----------|-------------|
| subway | payment | awaited | ballplayers |
| yesterday | great | crayons | explain |
| mermaid | obtain | breaker | daydreams |
| daisies | dainty | trainees | betrayed |
| beefsteak | giveaway | | |
| Challenge Word: <i>family</i>
Challenge Word: <i>young</i>
Content Word: <i>straight</i> | | | |

Fill in the blanks in the sentences below with one of the spelling words in the chart. Only if needed, add a suffix to the end of a word in order for the sentence to make sense: -s, -ed, -ing, or -ier.

1. At the end of their meal, the waitress _____ change from the cashier for her customers.
2. The butcher offered many _____ of free _____.
3. The talented artist puts her _____ aside and uses oil paint on these portraits.
4. Our beautiful, yellow _____ finally bloomed _____.
5. The smallest _____ was the only one who could wear the _____ seashell necklace.
6. The ride on the _____ car was very scary because the lights went out.

7. Our _____ is made up of two adults and five
_____ children.
8. The _____ were lost in their _____ and
didn't pay attention to the game, so they lost.
9. My teacher is _____ multiplication, so I better pay attention!
10. Our long _____ Spring Break is approaching!

Write three sentences using spelling words of your choice that were not used in the first ten sentences. Make sure to use correct capitalization and punctuation. You may use the Challenge Words or Content Word in your sentences.

1. _____

2. _____

3. _____

NAME: _____

DATE: _____

Build Sentences

Read each simple sentence. Then, brainstorm adjectives, adverbs, and synonyms that you might add to the sentence, and write these words in the boxes provided. You do not need to write words in every box, but try your best. Write a new, more interesting sentence in the blank space provided, using some of the adjectives and adverbs.

| Starter Sentence: The lion made a loud noise. | | | |
|---|---|--|---|
| Adjectives to describe the lion | Adverbs to describe how the lion made a loud noise | Adverbs to describe when the lion made a loud noise | Adverbs to describe where the lion made a loud noise |
| Synonyms for made a loud noise | | | |

New sentence: _____

| Starter Sentence: The gladiator walked. | | | |
|---|--|--|---|
| Adjectives to describe the gladiator | Adverbs to describe how he walked | Adverbs to describe where he walked | Adverbs to describe when he walked |
| Synonyms for walked | | | |

New sentence: _____

| Starter Sentence: The children played. | | | |
|--|--|--|---|
| Adjectives to describe the children | Adverbs to describe how they played | Adverbs to describe where they played | Adverbs to describe when they played |
| Synonyms for played | | | |

New sentence: _____

Color and Light

Do you remember what color sunlight is? I hope you didn't say, "No color!" You learned that sunlight is white light. You also learned that instead of being "no color," white light is made up of all the colors of the rainbow. Remember, the sun looks yellow because it gives off more yellow light than it does the other colors.

You can prove that white light is really many colors if you have a wedge-shaped piece of transparent glass called a **prism**. If you hold a **prism** near a sunny window, light will shine through and make a rainbow-like band of colors. This shows that white light is really made up of all colors.

Do you remember what you learned about refraction? What happens to light when it passes through something transparent like glass? The light slows down and changes its path. A **prism** has a special shape that refracts white light into all of the colors of the rainbow.

Have you ever seen a rainbow in the sky when the sun comes out after it rains? Raindrops in the sky refract the light, just like a **prism**. This is what creates the rainbow.

When white light is refracted, it often separates into a combination of colors called the **spectrum**. The colors in the **spectrum** always appear in the same order: red, orange, yellow, green, blue, **indigo**, and violet. These colors are part of the visible light **spectrum**. They are the light waves that humans can see. The colors of visible light are a result of differences in wavelength. Red light has long wavelengths and violet light has short wavelengths.

You can remember the names of the colors in the visible light **spectrum** in the right order if you can remember this funny name: "Roy G. Biv." Each

letter in that name stands for a color in the rainbow. Say it out loud. Try to remember it!

Did you know that the color of any object depends on what light wavelengths it reflects? Different objects absorb light wavelengths of some colors, but reflect others. This is what creates color.

Blue jeans appear blue because something in the **material** reflects blue light and absorbs all of the other light colors. Do you see anyone in your class today wearing a red sweater? The sweater appears red because something in the **material** reflects red light and absorbs all of the other light.

What about things that appear to be white? They look white because the object reflects all of the white light wavelengths and doesn't absorb any light. Can you guess why something looks black? Things that appear black do not reflect any light. They absorb all of the light wavelengths.

Remember that the colors we see are from light of specific wavelengths. But, there is much more to light than just the wavelengths we can see. In fact, visible light is only a small part of the energy waves that come from sunlight.

For example, on the shorter wavelength end of the light **spectrum**, there are invisible **ultraviolet** light waves that cause sunburn. X-rays are even shorter wavelengths of light. We can't see these light x-rays but they can travel through the human body. You learned in *How Does Your Body Work?* that x-rays are used to create black and white photos of what's inside the body. Do you know of any other ways that x-rays are used?

Another type of invisible light is **infrared** waves. The wavelengths of **infrared** light are longer than those of red light. These are the type of light waves that you use when you click on the **remote control** to change television channels!

NAME: _____

DATE: _____

Triangle Connections

Using your Lab Notes and the glossary in your Student Reader, select three words we've studied in the unit so far and arrange them in a triangle shape. Then, connect the first word to the second word with a line and write on the line how the two words are connected. Next, draw a line from the second word to the third word and write on the line how those two words are connected. Finally, draw a line from the third word to the first word and write the connection.

First word: _____

Second word: _____

Third word: _____

NAME: _____

8.2

ACTIVITY PAGE

DATE: _____

Write a paragraph that describes how sound is created and how it travels. Be sure to use sequencing words and use correct spelling, capitalization, and punctuation.

[illegible]

NAME: _____

DATE: _____

Write each of the steps for how sound is created and travels below in the correct sequence. Choose an appropriate sequence word for each of the steps.

| Sequence Word Bank | |
|--------------------|---------|
| First | Then |
| Second | After |
| Third | Finally |
| Next | Lastly |

1. _____

Sequence word _____

2. _____

Sequence word _____

3. _____

Sequence word _____

4. _____

Sequence word _____

5. _____

Sequence word _____

NAME: _____

DATE: _____

Exit Ticket

Visualizing Vibrations

Do you think you can hear a tuning fork under water? Why or why not? State your opinion and list the reasons why. Draw a picture to illustrate your claim.

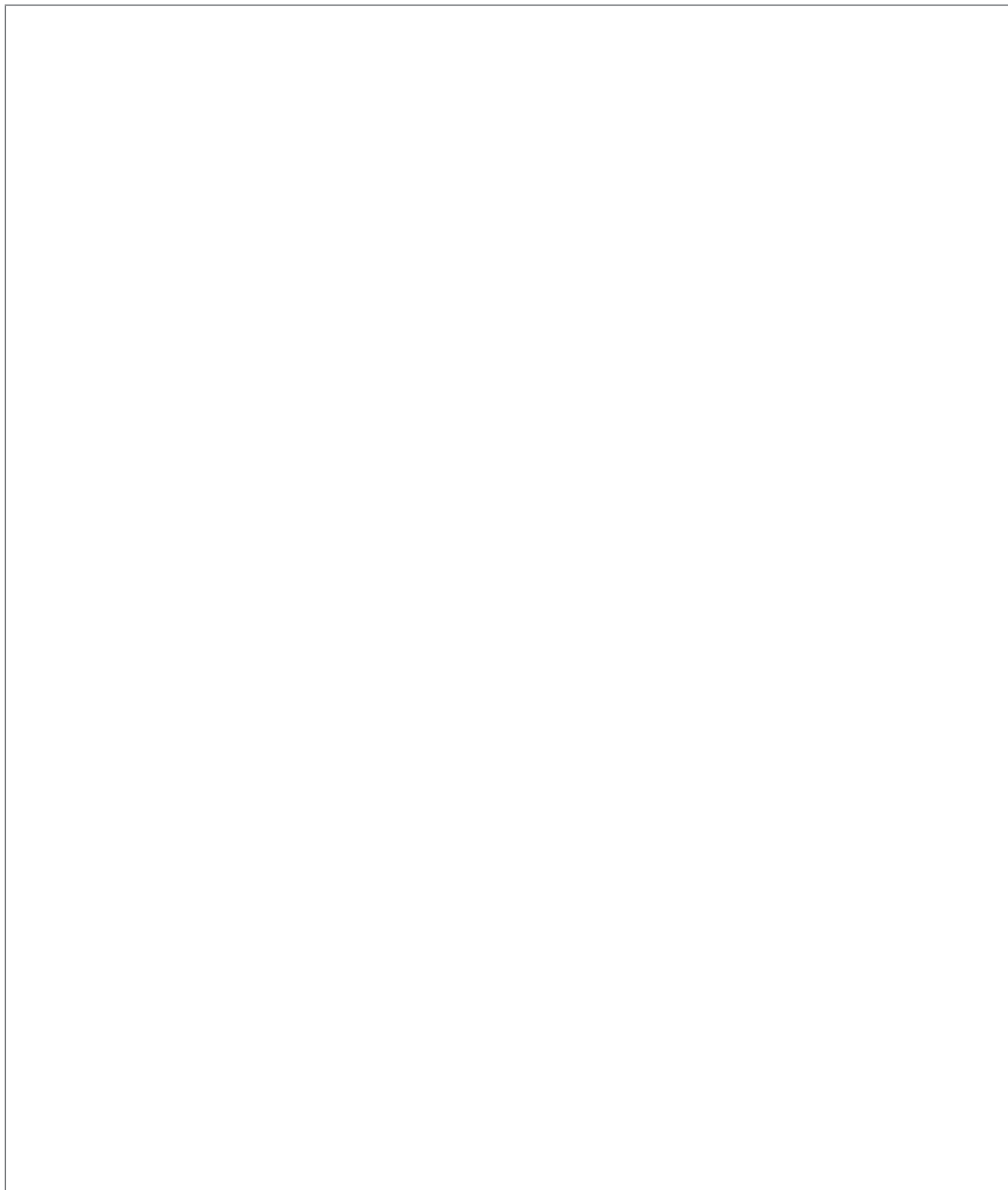
I think that _____

_____ .

One reason I think that this is true is _____

_____ .

Here is an illustration that shows what I think will happen:

A large, empty rectangular box with a thin black border, intended for a student to draw an illustration showing what they think will happen.

NAME: _____

8.4

ACTIVITY PAGE

DATE: _____

Practice Using Suffixes *-ous* and *-ly*

Choose the correct word to complete each sentence. Write the word and its part of speech below the sentence.

1. We attended the _____ party to celebrate Michael's graduation.
(joyous, joyously)

Word: _____ Part of Speech: _____

2. My new pen _____ appeared on my desk after dinner even
(mysteriously, mysterious)
though it was not there before we ate.

Word: _____ Part of Speech: _____

3. For a history project, we had to write a biography of a _____
(famously, famous)
person from the American Revolution.

Word: _____ Part of Speech: _____

4. The _____ troll shouted at the Billy Goats Gruff.
(furiously, furious)

Word: _____ Part of Speech: _____

5. The crane at the construction site sways _____ when there is
(dangerous, dangerously)
a thunderstorm with lots of wind.

Word: _____ Part of Speech: _____

6. The actor in the play _____ sang while dressed in a
(humorous, humorously)
ridiculous costume.

Word: _____ Part of Speech: _____

7. Our neighbor _____ announced that his son was admitted to the college he likes the most.
(joyous, joyously)

Word: _____ Part of Speech: _____

8. The governor had a _____ response to a serious question during the interview.
(humorously, humorous)

Word: _____ Part of Speech: _____

Bonus: Circle the correct answer and write the part of speech.

1. Which of the following words means “full of care to avoid danger or mistakes”?

cautious cautiously

Part of Speech: _____

2. Which of the following words means “in a curious way”?

curiously curious

Part of Speech: _____

3. Which of the following words means “full of something wonderful”?

fabulously fabulous

Part of Speech: _____

NAME: _____

8.5

ACTIVITY PAGE

DATE: _____

Word Sort

Identify the headers. Read the words in the box and circle the vowels that have the /ae/ sound. Write the words under each header that match the header's spelling pattern.

'ay' > /ae/**'ai' > /ae/****'ea' > /ae/**

| | | |
|-------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

| | | | | |
|---------|-----------|-------------|---------|---------|
| paid | breakneck | headers | maybe | sailing |
| monkey | waylay | read | prairie | mailman |
| maids | aisle | bricklaying | waiter | always |
| bluejay | raisins | greatest | despair | prepaid |

Take-Home Letter

Dear Family Members,

During the next several days, your student will be learning about the properties of sound; how it travels in waves, like light; and how it can be manipulated and used in certain devices. Your student will be introduced to how sound is produced, how sounds change, the similarities and differences between light and sound, and the parts of the human body that allow us to speak. They will also learn about the work of Alexander Graham Bell, the inventor of the telephone. Below are some suggestions for activities that you may do at home to reinforce what your student is learning about in class.

1. Sayings and Phrases: His Bark Is Worse Than His Bite/Actions Speak Louder Than Words

Your student will be learning the sayings “his bark is worse than his bite,” and “actions speak louder than words.” Ask your student to explain what they have learned about these phrases. Discuss with your student that the literal meaning of the phrase “his bark is worse than his bite” is in reference to how a dog is more likely to bark loudly and viciously than it is likely to injure someone. The phrase can be used in reference to a person who may speak loudly or harshly, but who is actually quite harmless. Talk with your student about a time when you have used this phrase in reference to an animal or person. Discuss with your student the meaning of “actions speak louder than words.” Explain that actions are personified in this phrase, because actions cannot physically speak. Discuss how the things we do can make more of a statement than the things we say. Talk with your student about a time when this phrase has been applicable to a situation you experienced. Find opportunities to use these sayings.

2. Sound Waves

For this experiment, stretch some plastic wrap over the top of an empty bowl. Sprinkle some dry rice grains or salt over the plastic wrap. Next, have

your student clap their hands or take two nonbreakable objects and bang them together over the bowl. The rice or salt should bounce every time the objects bang together. Explain to your student that this experiment shows how sound moves in waves. Discuss with your student how every time hands are clapped or the objects are banged together, the sound waves move through the air causing the plastic wrap to vibrate and the rice or salt to bounce on the plastic wrap. You may wish to have your student write a brief summary explaining what happened in the experiment and why.

3. Bottle Music

Use five identical glass or plastic bottles. Glass cola bottles would probably work best for this experiment, but plastic will also be fine. Fill the bottles with different amounts of water. Then, place the bottles in order from most filled to least filled. After that, have your student blow across the top of a bottle to create a sound. Have your student blow across a different bottle and discuss the differences in pitch. Discuss with your student that this is how certain musical instruments work, like an organ or flute. Discuss with your student how the amount of air in the bottle affects the quality of sound that is produced. These differences create a change in pitch. When there is more air and less water in the bottle, the pitch is lower. A smaller amount of air in the bottle, and more water, produces a higher pitch. The difference in pitch creates variations in sound. You may wish to have your student write a brief summary explaining what happened in the experiment and why.

4. Words to Use

Below is a list of some of the words that your student will be learning about and using. Try to use these words as they come up in everyday speech with your student.

NAME: _____

DATE: _____

- *cacophony*—The car alarm created a cacophony because it was very loud and harsh sounding, causing the dogs in the area to bark.
- *frequency*—If you are near a jet engine, you need to wear equipment to protect your ears because of the very high frequency of the sound waves.
- *medium*—Sound waves travel more easily through a solid medium like a brick wall than through a liquid medium like water.
- *pitch*—When we went to the opera, the singer on stage sang in a very high pitch.
- *receiver*—A satellite dish is an example of a receiver because it receives signals from satellites so that we can get different channels on our television set.
- *transmitter*—The transmitter in my telephone broke, which made it impossible for a person on the other end of the phone line to hear anything that was said.
- *variations*—While singing or playing a musical instrument, one can create smooth variations between sounds, or produce different musical notes.

5. Read Aloud Each Day

It is very important that you read with your student every day. Set aside time to read to your student and to listen to your student read to you.

Be sure to praise your student whenever they share what has been learned at school.

NAME: _____

DATE: _____

Lab Notes

What Is Sound?

| | | | | |
|--|--|--|--|--|
| What is it? | | | | |
| How do we get it? | | | | |
| How does it travel? | | | | |
| The speed of sound vs. the speed of light | | | | |

NAME: _____

DATE: _____

Lab Notes

Compare and Contrast: Light and Sound

| | |
|--|--|
| | |
|--|--|

Light and sound are similar because _____

_____ .

Light and sound are different because _____

_____ .

NAME: _____

DATE: _____

Question Wall

Rewrite the questions you chose below. Then, write an answer for each question. Make sure that you use content vocabulary words to explain your answer.

1. _____

2. _____

3. _____

NAME: _____

DATE: _____

Building Sentences

Read each simple sentence. Then, brainstorm adjectives, adverbs, and synonyms that you might add to the sentence, and write these words in the boxes provided. You do not need to write words in every box, but try your best. Write a new, more interesting sentence in the blank space provided, using some of the adjectives and adverbs.

| Starter Sentence: The baby slept. | | | |
|--|---|--|---|
| Adjectives to describe the baby | Adverbs to describe how the baby slept | Adverbs to describe when the baby slept | Adverbs to describe where the baby slept |
| Synonyms for slept | | | |

New sentence: _____

| Starter Sentence: The general rode his horse. | | | |
|---|--|--|---|
| Adjectives to describe the general | Adverbs to describe how he rode his horse | Adverbs to describe where he rode his horse | Adverbs to describe when he rode his horse |
| Synonyms for rode | | | |

New sentence: _____

| Starter Sentence: The boys laughed. | | | |
|--|---|---|--|
| Adjectives to describe the boys | Adverbs to describe how they laughed | Adverbs to describe where they laughed | Adverbs to describe when they laughed |
| Synonyms for laughed | | | |

New sentence: _____

NAME: _____

9.5

ACTIVITY PAGE

DATE: _____

Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

part

pickle

pay 1. *verb* To give money to buy something. 2. *verb* To be worthwhile.
3. *noun* Money earned from working at a job.

peck 1. *verb* To pick up something with a beak. 2. *verb* To eat something in small bites with no enjoyment. 3. *noun* A light kiss.

1. What are the two guide words on the page?

2. What are the two entry words on the page?

3. Would the word *pill* be on this page? _____

4. Circle the word(s) that would come before *part* in the following list:
pattern, peace, pack

5. Which definition of *pay* matches the use of the word in the sentence:

It *pays* to be an honest person. _____

What part of speech is *pay* in this sentence? _____

6. Which definition of *pay* matches the use of the word in the sentence:

My mother receives her *pay* on Fridays. _____

What part of speech is *pay* in this sentence? _____

7. Write a sentence using the definition of *pay* not already used in the sentences above.

8. Which definition of *peck* matches the use of the word in the sentence:

The child *pecked* at her food without eating much. _____

What part of speech is *peck* in this sentence? _____

9. Which definition of *peck* matches the use of the word in the sentence:

My grandmother gives me a *peck* on my cheek each time I see her. _____

What part of speech is *peck* in this sentence? _____

10. Write a sentence using the definition of *peck* not already used in the sentences above.

What Is Sound?

An alarm clock rings, a dog barks, a voice calls, “Time to get up!” Every day is full of familiar sounds but what exactly is sound?

Sound is caused by a back-and-forth movement called vibration. Try this. Close your lips and hum. While you are humming, feel your throat under your chin. Do you feel something buzzing or vibrating? What you feel is caused by something moving back and forth very fast. When you hum, the **vocal cords** in your throat vibrate back and forth. This makes the air around them vibrate, which then creates the sound you hear.

Sound, like light, is a form of energy. Also like light, sound moves in waves. **Sound waves** move out from a vibrating object, making the air move back and forth in a way that we can’t see.

Two things must happen to create a sound. First, something needs to vibrate and create **sound waves**. Then, something like air or another **medium** needs to carry the **sound waves**. You hear sounds more clearly if you are close to whatever is vibrating and making the **sound waves**. The farther away that the **sound waves** spread out, the weaker they get. That is why you can hear a friend standing right next to you better than if they are calling to you from across the street

Sound travels not only through air, which is a gas, but through other **mediums**. In fact, sound can travel through solids, liquids, and gases.

Think about sound traveling through solids, like a window or even a closed door. If you are close enough, you can still hear sounds on the other side of a window or door.

How about liquids? Have you ever been underwater in a swimming pool when you have heard someone’s voice or another sound? It probably sounded

different than it would if you were not underwater, but you were still able to hear it. This is an example of sound traveling through a liquid—the water in the pool.

One place that sound cannot travel is in outer space. Sound cannot travel through the emptiness, or vacuum, of space. There is no sound in outer space because there is no **medium** to carry it.

You might wonder about the speed at which sound travels. **Sound waves** travel much slower than light waves. **Sound waves** travel at about 750 miles per hour. That's fast, but not close to the 186,000 miles per second that light can travel. It would take a sound 33 hours to travel around Earth once. Remember that light can go seven times around Earth every second!

Here's an example to prove that light travels faster than sound. Think about the last time you were around a storm with thunder and lightning. Did you notice that you saw each flash of lightning before you heard the clap of thunder? That's because light travels faster than sound!

The **medium** through which sound travels affects its rate of speed. Interestingly, **sound waves** travel fastest through solids. In old western movies, you may have seen a cowboy put his ear down to the steel railroad tracks to hear if a train is coming. That is because the sound travels faster through the steel than through the air.

Try this. Listen while you drum your fingers on your desk. Now, rest your ear right on the surface of the desk and drum your fingers again. Which way sounded louder?

The sound was louder when you put your head on the desk. This is because the sound traveling through the solid wood of your desk traveled faster than if it had first traveled through the air. Every time sound changes **mediums**, it loses some of its loudness.

NAME: _____

10.1

ACTIVITY PAGE

DATE: _____

Spelling Assessment

As your teacher calls out the words, write them under the correct header.

'ay' > /ae/

'ai' > /ae/

'ea' > /ae/

Challenge Word: _____

Challenge Word: _____

Content Word: _____

Dictated Sentences:

1. _____

_____.

2. _____

_____.

NAME: _____

DATE: _____

Lab Notes

Characteristics of Sound

1. What is pitch?
 - A. Pitch is how loud or soft a sound is.
 - B. Pitch is how high or low a sound is.
 - C. Pitch is how fast sound travels through a medium.
 - D. Pitch is the intensity of a sound.

2. What is volume?
 - A. Volume is how high or low a sound is.
 - B. Volume is the intensity of a sound.
 - C. Volume is how long or short a sound wave is.
 - D. Volume is how fast sound travels through a medium.

3. Describe how the length of sound waves affects pitch.

4. List three sources of a low-pitched sound.

5. Which of these books would be the best to find out more facts about the characteristics of sound?
- A. *Adventures in Light*
 - B. *Can You Hear Me Now?*
 - C. *All About Animals*
 - D. *Experiments with Food*
6. Read this sentence from the selection: *Very loud sounds can damage your hearing*. Based on the sentence, which phrase best describes what loud sounds can do?
- A. They can make you hear well.
 - B. They can hurt your hearing.
 - C. They can make you able to hear from great distances.
 - D. They can make you able to hear a whisper better.
7. How would the world be different if all sounds were the same pitch and volume?

NAME: _____

DATE: _____

3-2-1 Reflection

Write a sentence for each of the categories below:

Write three things you learned from reading the chapter, "Characteristics of Sound."

1.

2.

3.

Write two things you learned from the Read-Aloud "Qualities of Sound."

1.

2.

Write one question you have about sound.

1.

Characteristics of Sound

Let's review what you have learned so far about sound by comparing it to light. How is sound different from light? Sound must have a medium to travel through—a solid, liquid, or gas. Light does not need a medium. Remember, light can travel through the emptiness, or vacuum, of outer space. Sound cannot.

The speed at which light and sound travel is also different. Light travels much faster than sound.

There are important ways that light and sound are similar. They are both forms of energy that travel in waves. There are also other similarities.

When you learned about light, you learned that light waves can be different lengths. Some are long and some are short. It is the length of a light wave that makes it appear to be a particular color.

Perhaps you are wondering whether sound waves differ from one another. Imagine these two sounds—a baby crying for its mother and an adult yelling. Both of these are sounds. The sound waves of each travel through the same medium, air, so they are alike in that way. But a baby crying surely sounds different than an adult yelling! The baby makes a high-**pitched**, “screeching” sound. When an adult yells, it is a low-**pitched**, deep tone. Could this difference in **pitch**, or how high or how low a sound is, come from different kinds of sound waves?

The answer is yes and it has to do with the length of the sound waves! It helps if we first understand how vibrations affect sound waves. Faster vibrations produce shorter sound waves, which make sounds with a higher

pitch. The baby’s screeching sound vibrates very rapidly, making shorter, but more, sound waves. Can you think of some other sounds that have a high **pitch**?

Slower vibrations produce longer waves, which make sounds with a lower **pitch**. A yelling voice makes longer, fewer waves so you hear a lower **pitch**. **Pitch** describes the highness or lowness of a sound. Can you think of some sounds that have a low **pitch**?

Try changing your voice **pitch**. Can you speak in a high, squeaky voice? Can you speak in a low, rumbling voice?

Sound also varies in loudness. If you’re listening to the radio and a favorite song comes on, you might say, “Turn it up!” and reach for the knob marked **VOLUME**.

When you turn up the **volume**, you are making the sound louder. A scientist might say that you are increasing the sound’s **intensity**. More **intense** sound waves carry more energy and make louder sounds.

How far away you can hear a sound depends on its **intensity**. A quiet sound, like a whisper, doesn’t travel very far. A really loud sound can travel for hundreds of miles. When fireworks are set off, the sound can be heard miles away.

Very loud sounds can **damage** your hearing. People who work around loud sounds all day long often wear ear coverings or plugs to protect their hearing. You should be careful, too, not to turn the **volume** too loud if you like to listen to music.

NAME: _____

DATE: _____

Can You Guess My Sound?

NAME: _____

11.2

TAKE-HOME

DATE: _____

Take-Home Letter

Dear Family Members,

Please help your student succeed in spelling by taking a few minutes each evening to review the words together. Helpful activities for your student to do include: spelling the words orally, writing sentences using the words, or simply copying the words.

Spelling Words

This week, we are reviewing two of the seven spelling patterns for /ae/. Your student learned to spell words with the /ae/ sound in second grade, so this should be a review. Your student will be assessed on these words.

Students have been assigned two Challenge Words, *another* and *finally*. Challenge Words are words used very often. Neither Challenge Word follows the spelling pattern of /ae/.

The Content Word for this week is *concave*. This word is directly related to the material that we are reading in *Adventures in Light and Sound*. The Content Word is an optional spelling word for your student. If your student would like to try it but gets it incorrect, it will not count against them on the test. We encourage everyone to stretch themselves a bit and try to spell this word.

The spelling words, including the Challenge Words and the Content Word, are listed below:

| | |
|----------------|---------------------------------------|
| 1. translate | 12. spacious |
| 2. major | 13. inhale |
| 3. nation | 14. changes |
| 4. famous | 15. basic |
| 5. pancake | 16. elevator |
| 6. danger | 17. hurricane |
| 7. cascade | 18. fragrant |
| 8. escape | Challenge Word: <i>another</i> |
| 9. refrigerate | Challenge Word: <i>finally</i> |
| 10. invade | Content Word: <i>concave</i> |
| 11. earthquake | |

The Human Voice

Have you ever noticed how well you know your mother or grandmother's voice? You have heard it so often that you can tell right away who it is. Each person has a distinct voice. It's a voice that can make many sounds with different pitch and intensity. It can make high- and low-pitched sounds, loud and soft sounds.

So how does your body make all of those different sounds? You already know that something needs to vibrate to create sound waves. You also know that sound needs a medium, like air, to travel through. Here's how it works in the human body.

Air passes in and out of your body all of the time when you breathe. Inside your chest, your **lungs** expand to take in air and then contract to let it out.

Leading out of your **lungs** is a long tube called the **trachea**, or "windpipe." At the top of your trachea is another part of your body called the **larynx**, or "voice box."

Inside the **larynx** are two bundles of muscle that are known as vocal cords. When you breathe in, the vocal cords relax so that air can move past them and into your **lungs**. When you speak, you force the air out of your **lungs** and over the vocal cords in your **larynx**. The vocal cords vibrate to make waves in the air that continue up your throat and out of your mouth.

When you were a baby, you did not need to learn how to breathe. Your **lungs** worked **automatically**, bringing air into and out of your body. You also did not need to learn how to use your vocal cords to make sounds. When you were a baby, you made lots of funny noises and grunts. Ask your parents!

You did, however, need to learn how to change those grunts and noises into words so you could talk. You did this by listening to the people who talked to you when you were a baby. You practiced saying the same sounds and words. You learned to speak whatever **language** all of those people were speaking to you. If your family spoke only English to you, you learned to speak English. If your family spoke only Spanish to you, you learned to speak Spanish. People can learn to speak more than one **language**. Maybe you or some of your classmates speak more than one **language**.

Your vocal cords grow as you grow. When you have shorter vocal cords, you tend to speak at a higher pitch. This is why small children have higher-pitched voices than adults. The pitch of your voice depends on the size of your vocal cords and **larynx**.

The volume of your voice, or how loudly you speak, depends on how much air is produced by your **lungs** and comes out of your mouth. When more air is pushed out of your mouth, your voice will be louder.

DATE: _____

What Inspires You?

The root word for inspiration is inspire. To inspire means to influence or produce a feeling or thought.

In the space below, write about something that inspires you.

[illegible]

NAME: _____

DATE: _____

Comprehension Questions

Answer the questions below. Write the page number where you found the answer.

1. What is a telegraph?

page _____

2. Why was the Massachusetts Institute of Technology so important to Aleck Bell?

page _____

3. Aleck Bell said that electric current could be used to carry sound. Why do you think people thought he was crazy?

page _____

4. Describe how an accident led to the invention of the first telephone.

page _____

5. Alexander Graham Bell felt that “self-education is a lifelong affair.” What does that mean to you as a student who is learning new things every day?

NAME: _____

DATE: _____

New Words Graphic Organizer

| | |
|------------------------|-----------------------|
| My word: | My definition: |
| Part of speech: | My symbol: |
| My sentence: | |

| | |
|------------------------|-----------------------|
| My word: | My definition: |
| Part of speech: | My symbol: |
| My sentence: | |

| | |
|------------------------|-----------------------|
| My word: | My definition: |
| Part of speech: | My symbol: |
| My sentence: | |

NAME: _____

12.4

ACTIVITY PAGE

DATE: _____

Conjunction *and*

*Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using the conjunction **and** to make a compound sentence. Draw two lines under the word **and** to show that it is a conjunction.*

Example: The beautiful fish swim in the bowl. They watch me carefully!

S

P

S

P

The beautiful fish | swim in the bowl, and they | watch me carefully!

1. Sally went to the circus to see the clowns. Her friends joined her there.

2. The sports car roared down the street. The police car with a siren was right behind it.

3. The goldfish swims around in its bowl. The children love to watch it swim in circles.

NAME: _____

DATE: _____

Practice the Conjunction *and*

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P

Example: Alan | entertained all of us. Eli | served snacks.
Alan entertained all of us, and Eli served snacks.

1. Alan sings wacky songs. Eli juggles apples.

2. Alan throws lots of parties. The neighbors always come.

3. Eli makes brownies. The neighbors enjoy them.

4. Alan likes to entertain. Eli likes to cook.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P

Example: Steve | wore a coat and gloves. No

1. Allen and John rode their bikes to the park. _____
2. Derek read a book and watched TV last night. _____
3. My mother cooked dinner, and my sister made dessert. _____

NAME: _____

13.1

ACTIVITY PAGE

DATE: _____

Planning a Research Article and Notes

What?

Who?

When?

Where?

Why is it important?

How does it work?

More interesting facts about the inventor:

List of resources:

NAME: _____

13.2

ACTIVITY PAGE

DATE: _____

Newspaper Article

Research and Writing Rubric

| | 4 | 3 | 2 | 1 |
|--------------|--|--|--|---|
| Research | There are accurate facts for each of the 5Ws and 1H. | Facts and details for five of the 5Ws and 1H. | Facts and details for only three to four of the 5Ws and 1H. May have some inaccuracies. | Facts and details for less than two of the 5Ws and 1H. Some inaccuracy. |
| Organization | Writing is organized logically, with a strong lead sentence, several details, and a conclusion. Headlines and text features enhance the article. | Writing is organized logically, with a lead sentence, some details, and a conclusion. Headlines and text features match the article. | Writing is organized logically, but may be missing a lead sentence, some details, or a conclusion. Headline or other text features do not enhance the article. | Writing is not organized logically, and may be missing a lead sentence, details, and a conclusion. Headlines and text features match the article. |
| Writing | Article is clear and interesting to read, with many descriptive words and details. There are at least three paragraphs with appropriate linking words. | Article is clear and easy to read, with some descriptive words and details. There are at least two paragraphs with some linking words. | Article is written unclearly or without supporting details. Paragraphs are incomplete or unclear. Few linking words to tie ideas together. | Article is difficult to read because of missing words or sentences, or incomplete ideas, and contains no paragraphs. Lack of linking words. |
| Conventions | Correct sentence structure, grammar, punctuation, and capitalization. | Mostly correct sentence structure, grammar, punctuation, and capitalization with one to two errors. | Mostly correct sentence structure, grammar, punctuation, and capitalization with three to four errors. | Sentence structure, grammar, punctuation, and/or capitalization are incorrect with more than five errors. |
| Spelling | There are fewer than two spelling errors. | There are three to four spelling errors. | There are four to five spelling errors. | There are more than six spelling errors. |

Unit Assessment

Tuning Forks

A tuning fork is not the kind of fork you use at the dinner table. It is a fork you might use if you play a musical instrument.

If you strike a tuning fork on a hard surface, the two prongs of the fork will begin to vibrate. That means they are moving back and forth very rapidly. As the prongs vibrate, they give off a sound.

Every tuning fork is designed to vibrate at a certain speed, or frequency. It's the frequency that determines the pitch of the sound the fork makes. A fork that vibrates fast makes a high-pitched sound. A fork that vibrates more slowly makes a sound with a lower pitch.

Tuning forks make a very pure kind of sound. Most other things do not. If you bang on a kitchen pot, it will make several sounds all at once. You will hear the sound of the thick metal on the bottom of the pot vibrating. You will also hear the sound of the thinner metal on the sides vibrating. You may even hear the sound of the handle vibrating. Each of these parts of the pan will give off a different pitch. The sound you will hear will not be a pure sound. It will be a mix of several different pitches. Tuning forks are not like that. They do not give off a mix of sounds. They emit, or send out, a single, pure sound.

Musicians use tuning forks to tune their instruments. A guitar player can play a note on her guitar. Then, she can compare that note with the note made by a tuning fork. If the note from the guitar sounds too high, she can loosen the string. If the note sounds too low, she can tighten the string. Then, she can try playing the note again.

Every tuning fork makes a specific pitch. For example, a tuning fork might vibrate at 440 hertz. That means the vibrating prongs go through a cycle of back-and-forth motion 440 times a second. Those vibrations make a note that musicians call “A.”

This kind of tuning fork is widely used. It makes the same pitch as one of the strings on a violin. It is used by musicians in orchestras to help them tune their instruments before they play.

Suppose you wanted a higher pitch. You would need to get a tuning fork with shorter prongs. The shorter the prongs, the higher the note.

Tuning forks also have other uses. Some ear doctors use them to check hearing. Here is how it works. The doctor asks her patient to listen for sounds. She then strikes a tuning fork where the patient can see her. She waits to see if the patient hears the tone. If the patient cannot hear the sound, that may mean there is a problem with the patient’s hearing.

Tuning forks are very useful tools.

NAME: _____

DATE: _____

Directions: Read the questions carefully before answering.

1. What is the selection mainly about?
 - A. Doctors use tuning forks to test hearing.
 - B. Playing a guitar is difficult.
 - C. Tuning forks are useful tools.
 - D. Musical instruments have different pitches.
2. What does the word *pure* mean in the following sentence from the selection?

“Tuning forks make a very pure kind of sound.”

- A. mixed with other sounds
 - B. not mixed with other sounds
 - C. beautiful sounds
 - D. not beautiful sounds
3. What determines the pitch of the sound a tuning fork makes?
 - A. the speed of vibration
 - B. the frequency of vibration
 - C. the length of the prongs
 - D. all of the above
4. Write *true* or *false* on the line following the sentence.

The shorter the prongs on a tuning fork, the higher the pitch. _____

5. What is the central idea of this paragraph?

“Musicians use tuning forks to tune their instruments. A guitar player can play a note on her guitar. Then, she can compare that note with the note made by a tuning fork. If the note from the guitar sounds too high, she can loosen the string. If the note sounds too low, she can tighten the string. Then, she can try it again.”

Go on to the selection on the next page.

NAME: _____

DATE: _____

Read the next selection and answer the questions.

The Bell of Atri

The town of Atri, in Italy, was famous for its bell. The bell hung in the town square, where it had been placed many years before by an ancient king.

“If any man has been wronged,” the king proclaimed, “let him ring this bell and a judge will appear.”

The people of Atri made use of the bell. Whenever a man felt he had been wronged, he would ring the bell. Then, the judge would put on his robes and make his way to the town square to investigate.

A braided rope hung from the bell. After a while, this rope began to wear out. The braid broke apart into cords, and the cords themselves began to fray.

A farmer saw that the rope was about to give way. He cut grapevines from his vineyard and wrapped the vines around the fraying rope.

While the farmer was mending the rope, an old knight was limping out to his stable. In his youth, this knight had been an avid hunter. He had spent many days on his favorite horse, sounding the horn and chasing wild boars.

These, however, were the pleasures of the knight’s youth. As he grew older, he lost interest in hunting. He turned into a bitter, old miser. The old knight was so stingy that he barely fed the horse who had served him so well for many years. The poor animal stood all day in his stall, neglected.

At last, the old knight decided to get rid of the horse.

“Why should I keep that old nag?” he said to himself. “He costs a fortune to feed, and I don’t even need a horse anymore.”

The old knight limped out to his stable. He threw open the stable door and drove the horse away.

“Get out!” he shouted. “Go and fend for yourself. I have no need for you anymore.”

The old horse limped into town. The dogs barked at him and nipped at his heels as he went. At last, he came to the town square, where the Bell of Atri hung. The horse sniffed the rope. He smelled the grape leaves wrapped around the old rope and began to nibble on the vines. The bell began to swing from side to side.

Ding, dong! Ding, dong! Ding, dong!

The judge heard the bell. He put on his robes and walked to the town square. When he arrived, he found a horse standing beneath the bell and an angry crowd gathered around.

“What is the meaning of this?” the judge asked.

“That’s the old knight’s horse,” said a man in the crowd.

“Just look at him!” said another. “It looks like the poor beast hasn’t been fed in weeks.”

“The old miser never feeds him!” called another. “But look! The horse has rung the bell! He is calling for justice!”

“Justice for the horse!” shouted the crowd. “Justice! Justice!”

The judge sent for the old knight.

NAME: _____

DATE: _____

The knight did not pretend he was sorry for his actions.

“It’s my horse,” he said, with a sneer. “I can do what I want with him. It doesn’t matter what the rest of you think.”

The knight turned to go, but the judge stopped him.

“Sir Knight,” said the judge, “Shame on you! Where is your sense of honor? Have you forgotten the code of chivalry? This horse served you loyally for many years. How can you neglect him in his old age? You have done him wrong and I order you in the king’s name to right that wrong. Take care of this animal. Give him food and shelter. Let him live out his last days in peace!”

The old knight scowled but he did as he was told. The crowd cheered as he led the horse away.

When the king heard what had happened, he was pleased.

“Other bells call men to church,” he said. “But the Bell of Atri calls men to justice. We should be proud of this bell of ours, for it pleads the victim’s case—be he man or beast!”

Directions: Read the questions carefully before answering.

6. What does the word *loyally* mean in the following sentence from the selection?

“This horse served you loyally for many years.”

- A. with respect
- B. faithfully
- C. correctly
- D. with speed

7. What happened when someone rang the bell in Atri’s town square?

8. What might have happened if the farmer had not fixed the rope that hung from the bell?

NAME: _____

DATE: _____

9. Why wasn't the old knight sorry for his actions toward his horse?
- A. He felt he owned the horse and could treat it as he wished.
 - B. He didn't like the judge who ruled that he should take the horse home and care for him.
 - C. He thought justice for a horse was silly.
 - D. He was deaf and could not hear the bell.
10. What happened in the selection to show that the whole town approved of the judge's ruling in favor of the old knight's horse?

Continue to Grammar and Morphology Section.

Grammar and Morphology

11. The selection, “Tuning Forks,” mentions that a guitar player can use a tuning fork. What is another name for a person who plays the guitar that includes the suffix *-ist*? _____

12. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

Dad set the hammer on the table there. _____

13. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

Sometimes I ride my bike to school. _____

14. Draw a triangle around the adverb and a wiggly line under the verb.
Write whether the adverb tells how, when, or where on the line following the sentence.

The girl screamed loudly. _____

NAME: _____

DATE: _____

15. Which of the following words would be on a dictionary page with the following guide words?

| | |
|----------|-------|
| ballroom | bingo |
|----------|-------|

- A. bell
- B. brush
- C. bunch
- D. baby

16. Write adjectives, adverbs, and synonyms in the appropriate boxes. Then write a new, more interesting sentence in the space provided using some of the words from the boxes.

| Starter Sentence: The child spoke. | | | |
|---|--|---|--|
| Adjectives to describe the child | Adverbs to describe how the child spoke | Adverbs to describe when the child spoke | Adverbs to describe where the child spoke |
| Synonyms for spoke | | | |

New sentence: _____

17. Circle the two words in the following sentences from the selection that have the suffix *-er*. Write their meanings on the lines.

“While the farmer was mending the rope, an old knight was limping out of his stable. In his youth, this knight had been an avid hunter.”

Word: _____

Meaning: _____

Word: _____

Meaning: _____

18. Write adjectives, adverbs, and synonyms in the appropriate boxes. Then write a new, more interesting sentence in the space provided using some of the words from the boxes.

| Starter Sentence: The puppy slept. | | | |
|---|--|---|--|
| Adjectives to describe the puppy | Adverbs to describe how the puppy slept | Adverbs to describe when the puppy slept | Adverbs to describe where the puppy slept |
| Synonyms for slept | | | |

New sentence: _____

NAME: _____

DATE: _____

Newspaper Article Draft

Lead Paragraph: What?

Paragraph 2: Who? When? Where?

Paragraph 3: How does it work?

Paragraph 4: Why is it important?

NAME: _____

DATE: _____

Conclusion:

Additional interesting facts about the inventor:

THE INVENTION GAZETTE

Fluency Assessment

Pupils

“Class,” said Mr. Brown, “today we are going to learn some
more about how our eyes work. James, would you please turn out
the lights?”

James walked to the door and switched off the lights. Mr.
Brown closed the blinds. It got darker in the classroom. It was not
completely black. Some light came through the blinds, but not very
much. The children giggled in the dimly lit room.

“Now,” said Mr. Brown. “I’d like all twenty-two of you to turn and
look at the person who sits next to you. Sally, you look at Mick. Jen,
you look at Stan. That’s it! Lean close and look your partner right in
the eyes. Can you see your partner’s pupils? Remember: the pupil is
the black part in the center of the eye. It’s the part that lets in light
from the outside world.”

Mr. Brown walked over to the door. “Can you all see your
partner’s pupils?”

“Yes!” said the students.

“Keep looking at your partner’s pupils!” said Mr. Brown.
Then, he turned on the lights. In an instant, the room went from
dim to bright.

Sally was staring at Mick’s pupils. She watched them shrink.

| | |
|--|-----|
| “Cool!” she called out. “Mick’s pupils got smaller when you | 207 |
| turned on the lights!” | 211 |
| “Sally’s did, too!” said Mick. | 216 |
| All around the room, students noticed the same thing. When the | 227 |
| lights came on, their partner’s pupils got smaller. | 235 |
| Mr. Brown explained: “The pupil’s job is to let light into the eye | 248 |
| and to keep it out. If it’s dark, your pupil opens wide to let in a lot | 265 |
| of light. If it’s bright, your pupil shrinks to let in less light. This is a | 281 |
| reflex. You don’t have to think, I believe I shall open my pupil a bit | 296 |
| wider. Your pupils work all by themselves, without you even thinking | 307 |
| about it. The pupil is like the gatekeeper of the eye. It decides what | 321 |
| gets in and what has to stay out.” | 329 |
| “Do it again!” shouted Mick. “Shut off the lights!” | 338 |
| “Okay,” said Mr. Brown. “Keep your eyes on your partner’s pupils.” | 349 |
| He threw the switch. Forty-four pupils grew larger in the dimness. | 361 |
| Mr. Brown waited a few seconds. Then, he turned the lights back | 373 |
| on. Forty-four pupils shrank in the bright light. | 382 |
| “So,” said Mr. Brown. “Do we understand what the pupils do?” | 393 |
| The students nodded their heads in agreement. | 400 |

NAME: _____

DATE: _____

14.3
CONTINUED

ASSESSMENT

W.C.P.M. Calculation Worksheet

Student: _____ Date: _____

Story: *Pupils*

Total words: 400

| | | | | | | | | | | | | | | | | |
|--|---|-----------------|---------|--|---|---|-------------|---|---|------------|---|--|--------------|---|--|-----------------|
| <p>Words</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 60px; height: 40px; margin-right: 10px;"></div> <div>Words Read</div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 60px; height: 40px; margin-right: 10px;"></div> <div>Uncorrected Mistakes</div> </div> <hr style="width: 100%; border: 0.5px solid black; margin: 5px 0;"/> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 60px; height: 40px; margin-right: 10px;"></div> <div>Words Correct</div> </div> | <p>Time</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; font-size: small;">Minutes</td> <td style="text-align: center; font-size: small;">Seconds</td> <td></td> </tr> <tr> <td style="text-align: center;"><div style="border: 1px solid black; width: 40px; height: 30px;"></div></td> <td style="text-align: center;"><div style="border: 1px solid black; width: 40px; height: 30px;"></div></td> <td>Finish Time</td> </tr> <tr> <td style="text-align: center;"><div style="border: 1px solid black; width: 40px; height: 30px;"></div></td> <td style="text-align: center;"><div style="border: 1px solid black; width: 40px; height: 30px;"></div></td> <td>Start Time</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <div style="border: 1px solid black; width: 40px; height: 30px;"></div> </td> <td>Elapsed Time</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <div style="border: 1px solid black; width: 40px; height: 30px;"></div> </td> <td>Time in Seconds</td> </tr> </table> <p style="margin-top: 10px;"> $(\text{ } \times 60) + \text{ } = \text{ }$ </p> | Minutes | Seconds | | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | Finish Time | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | Start Time | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | | Elapsed Time | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | | Time in Seconds |
| Minutes | Seconds | | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | Finish Time | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | Start Time | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | | Elapsed Time | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; width: 40px; height: 30px;"></div> | | Time in Seconds | | | | | | | | | | | | | | |
| <p>W.C.P.M.</p> <div style="display: flex; align-items: center; justify-content: center; margin-top: 10px;"> <div style="border: 1px solid black; width: 60px; height: 40px; margin-right: 10px;"></div> <div style="font-size: 2em; margin: 0 10px;">÷</div> <div style="border: 1px solid black; width: 60px; height: 40px; margin-right: 10px;"></div> <div style="font-size: 2em; margin: 0 10px;">×</div> <div style="font-size: 2em; margin: 0 10px;">60</div> <div style="font-size: 2em; margin: 0 10px;">=</div> <div style="border: 1px solid black; width: 60px; height: 40px; margin-left: 10px;"></div> </div> <div style="display: flex; justify-content: space-around; font-size: small; margin-top: 5px;"> Words Correct Time in Seconds W.C.P.M. </div> | | | | | | | | | | | | | | | | |

Compare the student's W.C.P.M. scores to national norms for Winter of Grade 3 (Hasbrouck and Tindal, 2006):

| W.C.P.M. | National Percentiles for Winter, Grade 3: |
|----------|---|
| 146 | 90th |
| 120 | 75th |
| 92 | 50th |
| 62 | 25th |
| 36 | 10th |

Comprehension Total ____ / 6

| Answers Correct | Level |
|-----------------|--|
| 6 | Independent comprehension level |
| 4-5 | Instructional comprehension level |
| 2-3 | Frustration comprehension level |
| 0-1 | Intensive remediation warranted for this student |

NAME: _____

DATE: _____

Spelling Assessment

As your teacher calls out the words, write them under the correct header.

'a' > /ae/

'a_e' > /ae/

Challenge Word: _____

Challenge Word: _____

Content Word: _____

Dictated Sentences:

1. _____

_____.

2. _____

_____.

NAME: _____

DATE: _____

Revision Checklist

Newspaper Article

Ask yourself these questions as you revise your paragraphs.

| | | |
|----|--|--|
| 1. | Do I have a good lead paragraph that grabs the reader's attention? | |
| 2. | Do I have a good concluding paragraph? | |
| 3. | Did I include accurate facts, details, and other information? | |
| 4. | Did I include linking words and phrases? | |
| 5. | Do my sentences flow well in this order? | |
| 6. | Are there any parts that do not make sense? | |
| 7. | Do I have a good variety of sentence structures? | |
| 8. | Do I have a good variety of descriptive words? | |
| 9. | Is this my best work? | |

NAME: _____

DATE: _____

Sharing and Feedback

| Three things I liked about your article |
|---|
| 1. |
| 2. |
| 3. |

| Two things I think you can improve |
|------------------------------------|
| 1. |
| 2. |

NAME: _____

DATE: _____

Newspaper Article

Second Draft

Lead Paragraph: What?

Paragraph 2: Who? When? Where?

Paragraph 3: How does it work?

Paragraph 4: Why is it important?

NAME: _____

DATE: _____

Conclusion:

Additional interesting facts about the inventor:

NAME: _____

16.1

ACTIVITY PAGE

DATE: _____

List of References

1.

2.

3.

4.

5.

NAME: _____

DATE: _____

Editing Checklist

Newspaper Article


Ask yourself these questions as you edit your paragraphs.

| | | |
|----|--|--|
| 1. | Do all of my sentences start with capital letters? | |
| 2. | Do all of my sentences end with the correct punctuation? | |
| 3. | Have I spelled all of my words correctly? | |
| 4. | Have I used grammar correctly? | |
| 5. | Does each sentence and paragraph provide a complete thought? | |
| 6. | Are the words and sentences I used appropriate for the writing task? | |

DATE: _____

THE INVENTION GAZETTE

| |
|--|
| |
|--|

[illegible]

| |
|--|
| |
|--|

[illegible]

[illegible]

16.3
CONTINUED

DATE: _____

[illegible]

NAME: _____

PP1

ACTIVITY PAGE

DATE: _____

Light and Photography

1. What does the word *photography* mean?

page _____

2. Describe a pinhole camera.

3. Louis Daguerre developed daguerreotypes that used _____ to make an image on a glass plate.

page _____

4. George Eastman invented _____ that replaced the glass plates used in earlier cameras.

page _____

5. The invention of _____ led to the creation of the box camera.

page _____

6. Describe how you would get your photos using a box camera.

page _____

7. Why were instant film cameras so popular?

page _____

8. Today's digital cameras don't use film but rather a

_____.

page _____

9. Write the central idea of this chapter.

NAME: _____

PP2

ACTIVITY PAGE

DATE: _____

Adverbs that Tell *how*

Write an adverb to describe the verb in the sentence. Do not use the same adverb more than once.

We ran quickly to the car when the storm started.

Adverb: quickly

Verb described by adverb: ran

1. The referee blew his whistle _____ after the play.

Adverb: _____ **Verb described by adverb:** _____

2. Our dog _____ sits in the doorway at night.

Adverb: _____ **Verb described by adverb:** _____

3. He searched _____ for his math homework.

Adverb: _____ **Verb described by adverb:** _____

4. We walked _____ into the kitchen for dinner.

Adverb: _____ **Verb described by adverb:** _____

5. The posters on the wall were placed _____.

Adverb: _____ **Verb described by adverb:** _____

Change the adjective under the blank to an adverb by adding -ly to complete the sentence. Answer the question after the sentence.

1. The storm _____ damaged the car.
(bad)

How was the car damaged? _____

2. The big baseball uniform hung _____ on Devon.
(loose)

How did the baseball uniform hang? _____

3. Dad _____ clapped when I scored a goal.
(proud)

How did Dad clap? _____

4. The music played _____ through the speakers.
(loud)

How did the music play? _____

5. She _____ walked into her new classroom.
(shy)

How did she walk? _____

NAME: _____

DATE: _____

Adverbs that Tell *when* and *where*

Choose the adverb that best fits in each blank and write it in.

| | | | | |
|--------|--------|------|-------|-----------|
| weekly | always | last | after | sometimes |
|--------|--------|------|-------|-----------|

We visit my grandfather _____. We _____ go on Sunday afternoon. I like to bring books _____ and read them to him. When I do bring books, he asks me to read my favorite book _____. He knows I will be excited about it and read it well at the end. _____ I read my books to him, we have dinner.

Write a sentence using each adverb.

1. *recently*

2. *tomorrow*

Choose the adverb that best fits in each blank and write it in.

| | | | |
|------|---------|------|---------|
| here | already | home | outside |
|------|---------|------|---------|

My brother and I ran _____ to look for our friends. We did not see anyone so we walked _____. When we got _____ we saw a note on the door. It was from David and said “Meet at my house, and we’ll go to the park together!” We got to David’s house and another note said he had _____ gone to the park. We found him at the park and played until it got dark!

Write a sentence using each adverb.

1. *never*

2. *inside*

NAME: _____

DATE: _____

Conjunction *and*

Begin with the simple sentence and first add another subject to it to make a compound subject. Write the letter A next to that sentence.

Next, begin again with the same simple sentence and add another predicate (remember another verb as well) to make a different compound predicate. Write the letter B next to that sentence.

Example: Connie sings a song.

- A. Connie and Carla sing a song. (compound subject)
- B. Connie sings a song and dances a jig. (compound predicate)

1. Matthew loves basketball.

2. The rusty bucket leaks on my foot.

3. The famous musician plays the piano.

4. Our class made shadows on the wall.

NAME: _____

DATE: _____

Write the letter 'S' over the subject and the letter 'P' over the predicate in each simple sentence. Draw a line to separate subject and predicate in each simple sentence. Then join the two simple sentences together using the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

Example: The silly kitten paws at the string. He plays joyfully!

S

P

S

P

The silly kitten | paws at the string, and he | plays joyfully.

1. The dentist uses a mirror to check my teeth. She is very gentle with me.

2. The “House of Mirrors” was so much fun to see. I hope I can go back to see it again.

3. The straw in the glass of water looks broken. I think that's very strange!

3. The puffy, white clouds float across the sky, and they make me feel good.

compound subject

compound predicate

compound sentence

What does the conjunction join in this sentence? _____

4. The white clouds and the dark clouds float by in the sky.

compound subject

compound predicate

compound sentence

What does the conjunction join in this sentence? _____

5. Clouds are beautiful, and the whole class loves to watch them.

compound subject

compound predicate

compound sentence

What does the conjunction join in this sentence? _____

NAME: _____

DATE: _____

Conjunction *but*

Create compound sentences by connecting the two simple sentences with the conjunction but and inserting a comma. Draw two lines under the conjunction, and label the subjects with the letter 'S' and the predicates with the letter 'P'.

1. Marshmallows are fun to melt. They can make a mess.

2. The day is sunny and beautiful. The sky is getting dark off in the distance.

3. My new kitten is very naughty. I laugh at her so often.

4. This grammar homework seems very easy tonight. I'm going to do my best and not hurry.

5. The salesman knocked on our door. We were out of town.

Create the second part of a compound sentence using the conjunction but.

1. David likes peanut butter and jelly sandwiches, but

(Hint: Think about a family member who likes a different kind of sandwich.)

2. Lulu loved the book she just read, but

(Hint: Think about a friend who read the same book but who had a different idea about it.)

NAME: _____

DATE: _____

Suffix Review: *-er*, *-or*, *-ist*, and *-ian*

This chart lists words with some of the suffixes studied in Grade 3. Some of these words are new to you. Use the chart to fill out Worksheet PP8.

| | <i>-er</i> | <i>-or</i> | <i>-ist</i> | <i>-ian</i> |
|---|------------|------------|-------------|--------------|
| a | | actor | artist | |
| b | builder | | | |
| c | climber | counselor | cellist | cosmetician |
| d | designer | dictator | | |
| e | | editor | | electrician |
| f | farmer | | | |
| g | | governor | guitarist | guardian |
| h | hunter | | | historian |
| i | | inspector | | |
| l | leader | | lyricist | librarian |
| m | | | | musician |
| n | | navigator | novelist | |
| o | | | organist | optician |
| p | player | | pianist | pediatrician |
| r | reporter | | | |
| s | speaker | sailor | stylist | |
| t | teacher | | | |
| v | | visitor | vocalist | |

NAME: _____

DATE: _____

Use the chart on Worksheet PP7 to fill in the blanks.

1. Which words on the chart are people who play musical instruments?

2. Which word on the chart is what Julius Caesar had himself appointed for life?

3. Which word on the chart names someone who can help you pick out books at the library?

4. Which words on the chart name people that might work together while they are on a boat?

5. Which word on the chart names someone who writes lyrics, or words to songs, for a vocalist to sing?

6. Which words on the chart name people who might work together to build a house?

7. Which word on the chart names someone that every team needs as someone to guide, or lead them?

8. Which words on the chart name people who might work at a school?

9. Which words on the chart name people who do things outside?

10. Which words on the chart name people who might work together to help someone look their best?

BONUS:

11. Alphabetize the words that begin with 'c'.

12. Count the number of words on the chart for each suffix and write the number here. Circle the suffix that has the most words.

-er: _____ -or: _____ -ist: _____ -ian: _____

NAME: _____

DATE: _____

Words with Suffixes *-y* and *-al*

Add the correct suffix to the root word provided. Write the new word in a sentence.

1. Root word: *nutrition*

Add *-y* or *-al* to make: _____

2. Root word: *leak*

Add *-y* or *-al* to make: _____

3. Root word: *curl*

Add *-y* or *-al* to make: _____

4. Root word: *tradition*

Add *-y* or *-al* to make: _____

5. Root word: *music*

Add *-y* or *-al* to make: _____

Circle the word that matches the meaning.

1. Meaning: full of soil

Word: dirty dirt

2. Meaning: the traditions, beliefs, and arts of a group of people

Word: culture cultural

3. Meaning: something that is untidy and dirty

Word: mess messy

4. Meaning: a power that allows people to do impossible things by saying special words or performing special actions

Word: magical magic

5. Meaning: full of a reddish brown substance that forms on certain metals when they are exposed to moisture

Word: rusty rust

6. Meaning: related to the land near the sea or ocean

Word: coast coastal

NAME: _____

PP10

ACTIVITY PAGE

DATE: _____

Practice Using Suffixes *-ous* and *-ly*

Choose the correct word to complete each sentence. Write the word and its part of speech below the sentence.

1. The mayor _____ denied he did anything wrong, but an investigation proved otherwise.
(famous, famously)

Word: _____ Part of Speech: _____

2. Marcus drew a _____ representation of the animal he wrote about for his report.
(humorous, humorously)

Word: _____ Part of Speech: _____

3. The road curved _____ when you got near the top of the mountain.
(dangerous, dangerously)

Word: _____ Part of Speech: _____

4. I heard a _____ sound coming from somewhere by the window, but I couldn't figure out what it was.
(mysteriously, mysterious)

Word: _____ Part of Speech: _____

5. The crew who worked to clean up hazardous materials kept the _____ items in a special container when they collected them.
(poisonous, mountainous)

Word: _____ Part of Speech: _____

6. The passenger _____ ran through the terminal, upset that the security line had been so long and worried he would miss his flight.
(furious, furiously)

Word: _____ Part of Speech: _____

7. The class responded _____ when they found out they had won the attendance prize for the month.
(joyous, joyously)

Word: _____ Part of Speech: _____

8. If you are outside and have no shelter when a thunderstorm hits, you are in a _____ situation.
(dangerous, humorous)

Word: _____ Part of Speech: _____

Bonus: Circle the correct answer and write the part of speech

1. Which of the following words means “full of danger and excitement”?

adventurously adventurous

Part of Speech: _____

2. Which of the following words means “in a courteous way”?

courteously courteous

Part of Speech: _____

3. Which of the following words means “full of the feeling of wanting what someone else has”?

envious enviously

Part of Speech: _____

NAME: _____

PP11

ACTIVITY PAGE

DATE: _____

Practice Dictionary Skills

Use the following portion of a dictionary page to answer the questions below.

preschool

prod

present 1. *verb* To give a gift. 2. *verb* To introduce a person.

3. *adjective* To be in a place.

private 1. *noun* A soldier of a low rank. 2. *adjective* Not for sharing.

3. *adjective* Belonging to one person and no one else.

1. What are the two guide words on the page?

2. What are the two entry words on the page?

3. Would the word *presentation* be on this page? _____

4. Circle the word(s) that would come before the word *preschool* in the following list: presently, prescribe, prepare

5. Which definition of *present* matches the use of the word in the sentence:

May I *present* the governor of our state? _____

What part of speech is *present* in this sentence? _____

6. Which definition of *present* matches the use of the word in the sentence:

Every student is *present* today. _____

What part of speech is *present* in this sentence? _____

7. Write a sentence using the definition of *present* not already used in the sentences above. _____
- _____

8. Which definition of *private* matches the use of the word in the sentence:
My diary is *private* property and should not be read by anyone else.

What part of speech is *private* in this sentence? _____

9. Which definition of *private* matches the use of the word in the sentence:
The *private* saluted the general when he walked by. _____
What part of speech is *private* in this sentence? _____

10. Write a sentence using the definition of *private* not already used in the sentences above.
- _____
- _____

NAME: _____

DATE: _____

Conjunction *and*

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using a comma and the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P

Example: Carla | sings a song. Connie | dances a jig.
Carla sings a song, and Connie dances a jig.

1. Matthew loves basketball. Tina enjoys tennis.

2. The bucket is rusty. It leaks on my foot.

3. The silly kitten paws at the string. He plays joyfully!

4. The dentist uses a mirror to check my teeth. She is very gentle with me.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P

Example: Tom | fixed breakfast and dinner for his family. _____ No _____

1. Lindsay and Tony walked to the library. _____
2. Linda jumped rope and played soccer yesterday. _____
3. Tina chose the movie, and Jeff picked out the candy. _____

NAME: _____

DATE: _____

Conjunction *and*

Write the letter 'S' over the subjects and the letter 'P' over the predicates in each simple sentence. Draw a line to separate the subject and predicate in each simple sentence. Then, join the two simple sentences together using a comma and the conjunction and to make a compound sentence. Draw two lines under the word and to show that it is a conjunction.

S P S P

Example: The straw | is broken. I | can't drink out of it.
The straw is broken, and I can't drink out of it.

1. The beavers are playful. Their babies splash around in the lake.

2. We watched the beavers. We took pictures of them.

3. The white clouds float across the sky. They make me feel good.

4. Clouds are beautiful. The whole class loves to watch them.

Challenge: Mark subject(s) and predicate(s) and underline the conjunction and with two lines in the following sentences. Write 'Yes' on the line if the sentence is a compound sentence with two independent clauses and 'No' if it is not a compound sentence.

S P

Example: Steve | wore a coat and gloves. No

1. Emma and Ryan visited the zoo. _____
2. Amy painted a picture and read a book on Saturday. _____
3. Kate washed the dishes, and Sam cleaned the sink. _____

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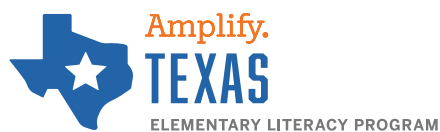
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Grade 3 | Unit 5 | Activity Book
Flash, Bang, Boom! Exploring Light and Sound

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Grade 3

Unit 5 | Reader

Adventures in Light and Sound

Grade 3

Unit 5

Adventures in Light and Sound

Reader

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Chapter

1 What Is Light?

Did you know that the sun is the greatest **source** of light for our planet, Earth? But what is light? Why is it so important?

Hot gases of the sun give off both light and heat **energy**. Light carries **energy**, with the long **wavelengths** carrying the least and the short **wavelengths** carrying the most. When you think of something with lots of **energy**, what comes to mind?

Do you think of something fast like a race car? Do you think of something with great force like a very strong wind knocking down a tree?

Believe it or not, light can be many times more energetic than a car or the wind.



*The sun is the greatest **source** of light for Earth.*

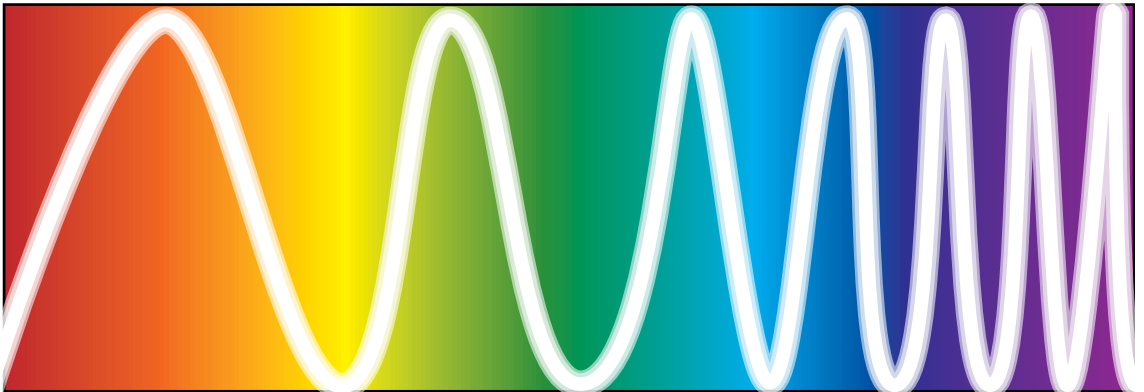
Light travels at 186,000 miles every second in a **vacuum**. At that **speed**, light can go around Earth more than seven times every second! No human-made machine can go that fast—not even a jet plane or rocket!

One way that light travels, including light from the sun, is in the form of **waves**. Scientists can measure how long light **waves** are. **Waves** can be different sizes—some are long and some are short. Some light **waves** are visible and some are invisible. Whether you can see light or not depends on the length of the **wave**. The longest **wavelength** of visible light is seen as red and the shortest **wavelength** is violet. Short **wavelengths** carry the most **energy**.



Long **Wavelengths**

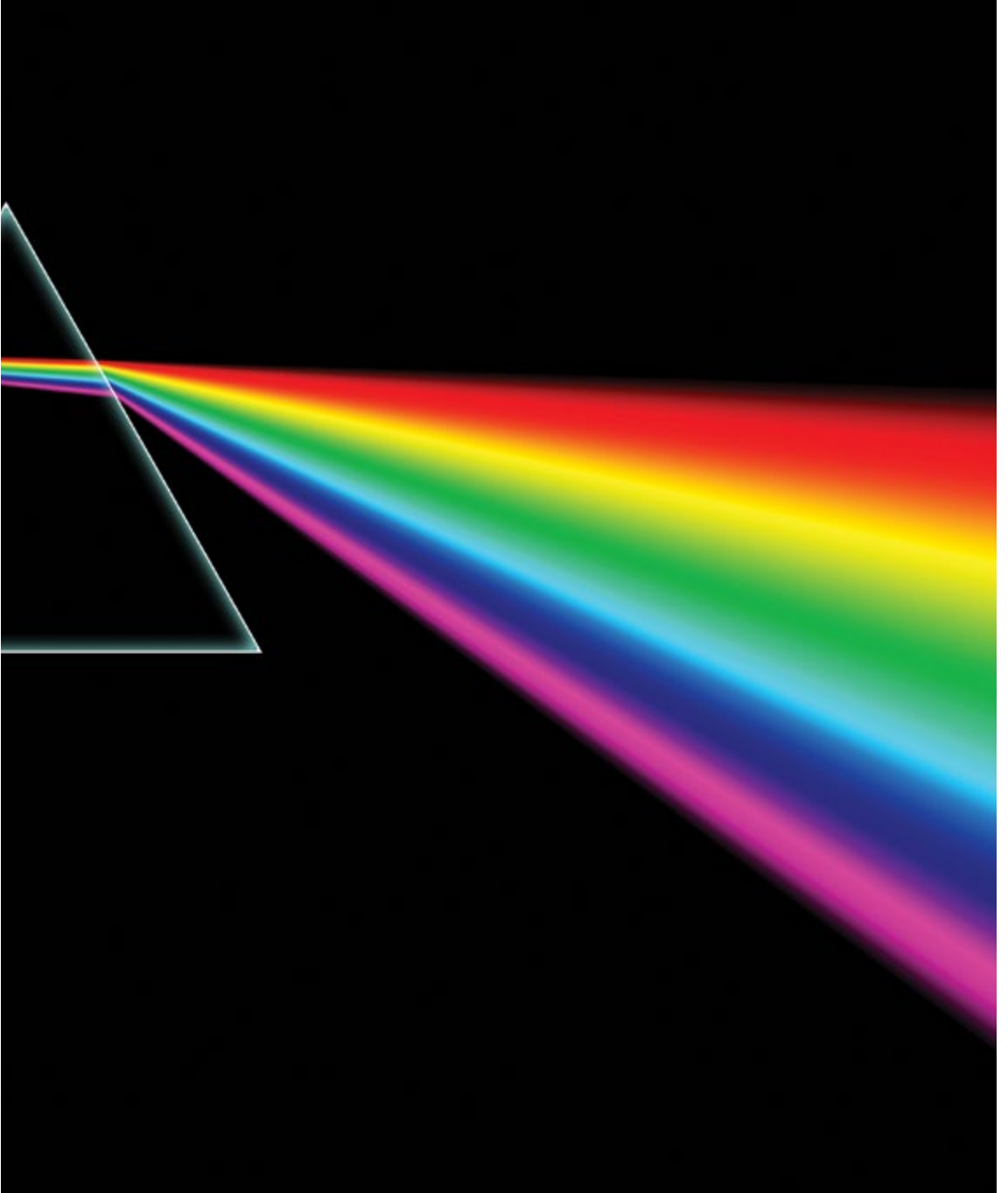
Short **Wavelengths**



*One way light from the sun travels is in **waves**. **Waves** can be different sizes. Short **wavelengths**, like those at the far right, carry the most **energy**.*

The sun gives off what is called **white light**. Perhaps you think of the light from the sun as having no color at all. Maybe you think the light from the sun is more yellow in color. It may surprise you to know that the sun's light, **white light**, is made up of all the colors of the rainbow. **White light** includes light of different **wavelengths**, including all the colors we can see.

Of all the **wavelengths** in the sun's light, there is just a little more of the yellow **wavelengths** than the other colors. This is why the sun looks yellow when we see it against the blue sky. Still, the light from the sun includes all of the other colors and **wavelengths**. You will learn more about **white light**, visible light, and colors in a later chapter in this Reader.



White light is a well-balanced mix of different wavelengths.

Although the sun is the greatest **source** of visible light, there are also other **sources** of light. What else in the sky provides light? The other stars in the night sky provide light, though it is not as bright as the light from the sun during the day. The moon is not a star and does not give off its own light.

Can you think of other **sources** of light? Is there light in your classroom right now? Perhaps it is from the sun shining through the windows. Chances are good, though, that some of the light in the room may be coming from light bulbs. Like the sun, most light bulbs give off **white light**. **Electric** lights are such a part of our everyday life, we don't even think about them—unless the **electricity** goes off! This doesn't happen often, but sometimes it does during a bad storm. When the electricity goes off and we do not have light from light bulbs, people sometimes use other **sources** of light, like flashlights or candles.



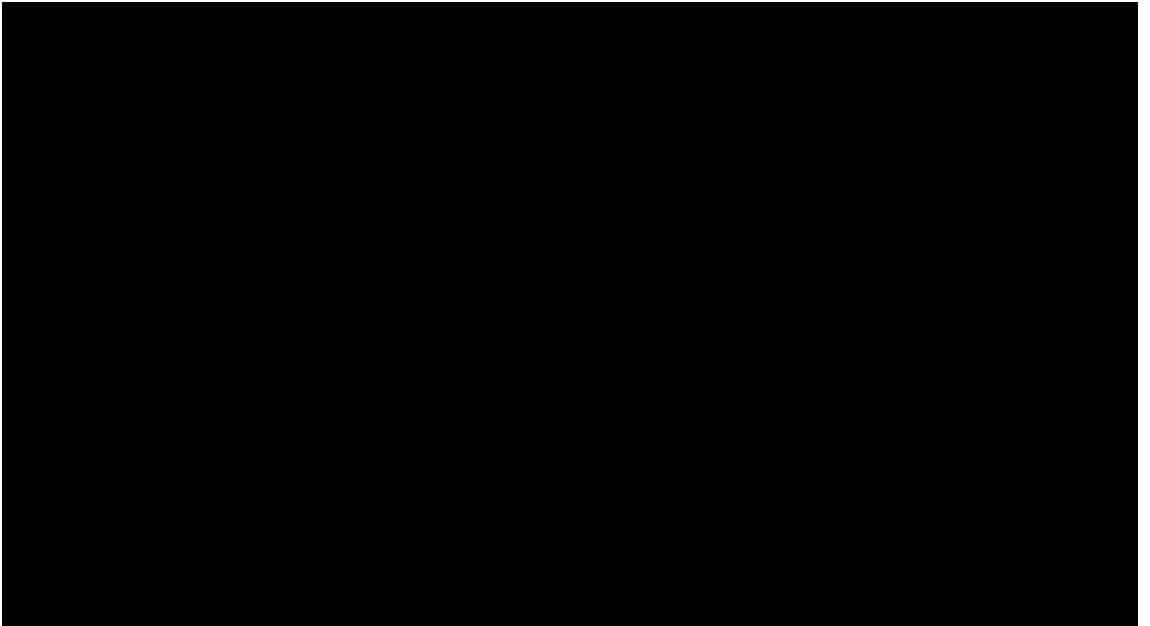
*Can you think of **sources** of light other than the sun?*

Light is important for many reasons. Light and heat **energy** from the sun warms Earth. Without the light and heat **energy** from the sun, Earth would be freezing cold. You also learned back in kindergarten that the sun's light is needed for plants to grow. Also, without light, there would be no colors. Can you think of another reason that light is important?

Try to imagine a world in which there is no light—no sun, no stars, no candles, and no light bulbs. What would be different? If you just said that it would be dark, you are only partly right. What else would change? Without light, you would not be able to see anything! A world without light is almost impossible to imagine.



Here is a scene with lots of light.



Here is the same scene without any light.

How Are Shadows Made?

Do you remember any interesting facts about how light travels? In the last chapter, you learned that it travels in waves that can be measured as wavelengths. You also learned that it travels at a very high rate of speed. Here's another interesting fact—light waves travel from a source in straight lines that spread out in all directions, like rays.

Take a look at the image on the opposite page. In this image, there are several light sources. Each source or dot of light has several rays of light shooting out. Put your finger on the source you can see. Now, using your finger, trace the lines of light coming out from that source. Each ray of light is a straight line.

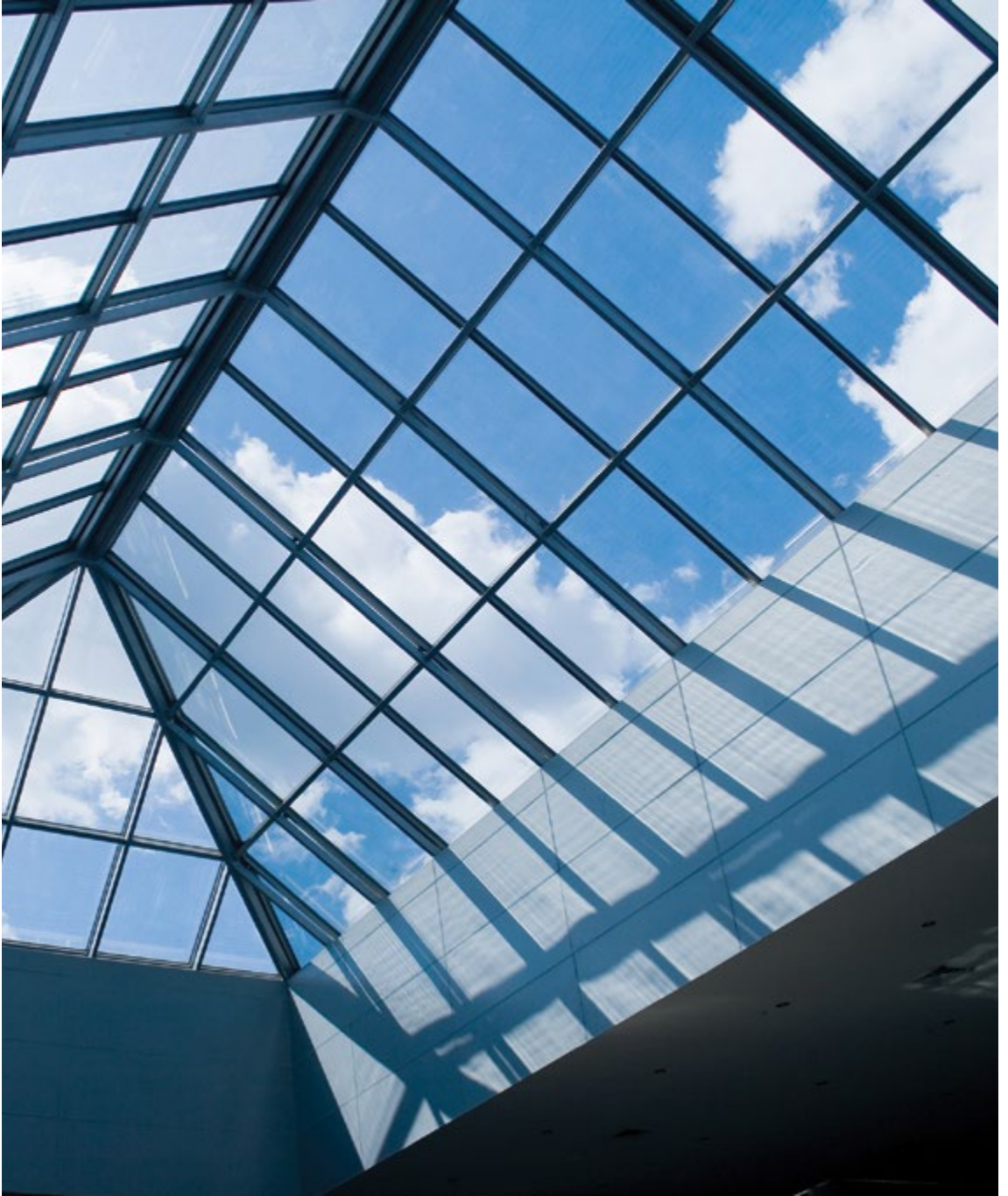


Light travels in straight lines like rays from its source.

Have you ever wondered what happens when a line or path of light bumps into something in its way? Different things may happen depending on what exactly is in the light's path.

If a path of light hits something that is **transparent**, most of the light will pass right through. Air, water, and glass are all **transparent**. When light hits these **transparent** objects, it passes through to the other side. It is almost as if the object isn't there.

Most buildings have glass windows so that natural sunlight can travel from the outdoors inside. Have you ever been in a building that has a glass roof or **skylight**? Sometimes you can even see blue sky and clouds through the **skylight**!



*How do you know that the glass in this **skylight** is **transparent**?*

Light cannot travel through all materials. If a path of light hits something that is **opaque**, the light is **absorbed** and blocked by the object. It cannot continue in a straight line through the object. Wood, cardboard, and even a person's body are all **opaque** objects. Light cannot pass through to the other side. Instead, a **shadow** is created because the light is **absorbed**.

Look around your classroom. Do you see **transparent** objects through which light is passing? Can you also find **opaque** objects? You will probably find that your classroom has many more **opaque** objects than **transparent** objects. Do you see any **shadows**?



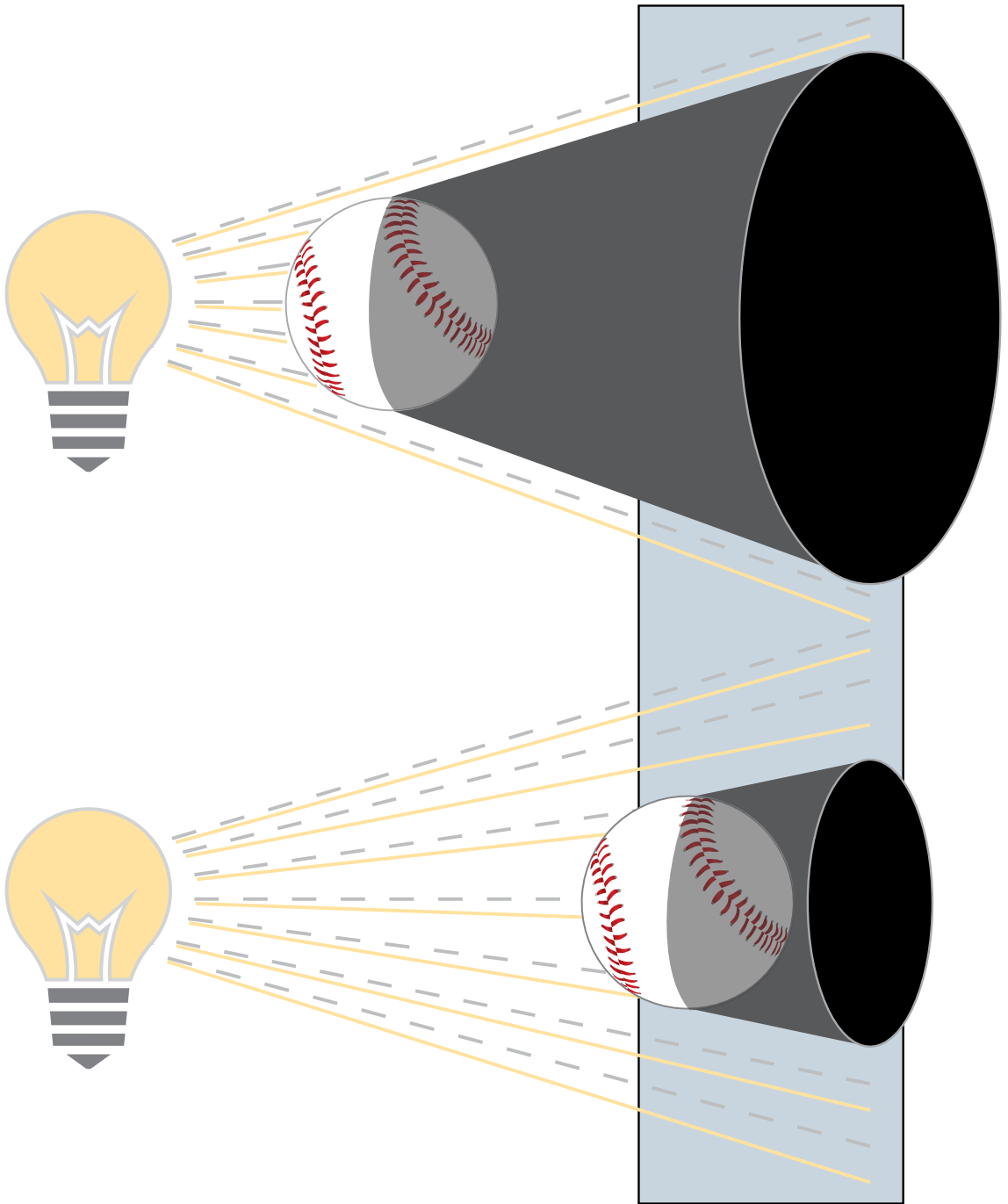
*Are people's bodies **transparent** or **opaque**? How do you know?*

The **shadow** created by blocked light takes on the shape of the object. Can you guess the object or objects that are making the **shadows** in these images?



What objects created these ***shadows***? Are these objects ***opaque*** or ***transparent***?

The size of a **shadow** depends on several different things. The closer an object is to a light source, the larger the **shadow** will be. If you move the same object farther away from the light source, the **shadow** will become smaller. So the size of the **shadow** changes, even though the size of the object does not. What makes the **shadow** larger or smaller is the distance of the object from the source of light.



***Shadows** can be different sizes. What causes the size of a **shadow** to change?*

You can experiment making larger and smaller **shadows** just by using your hand. You will need:

- a light source, such as a flashlight or **projector**
- several sheets of large white paper and a marker
- masking tape
- a blank wall
- several helpers
- a cardboard cutout of a tree

First, tape a piece of white paper to the wall. Then, mark a spot on the floor and tell a classmate to stand on that spot to **project** the light. He or she should not move. Now, try holding the cutout of the tree in front of the light so that a shadow is **projected** onto the white paper. Have one classmate put a piece of masking tape marked “1” on the floor next to where you are standing. At the same time, another classmate should trace the **shadow** of the tree on the white paper. Mark this tracing of your **shadow** with a “1.”



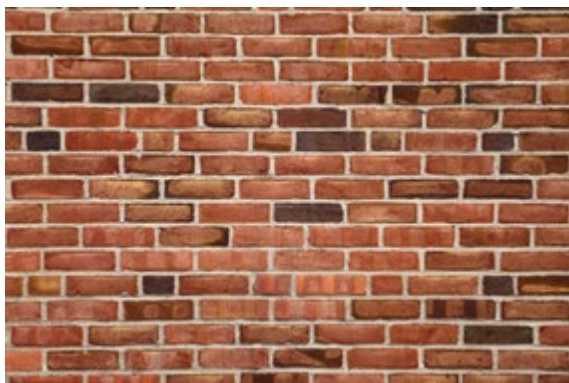
a light source



masking tape



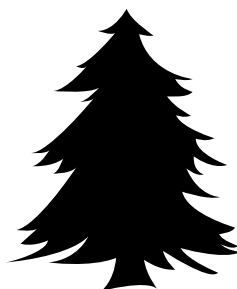
paper and marker



a blank wall



helpers



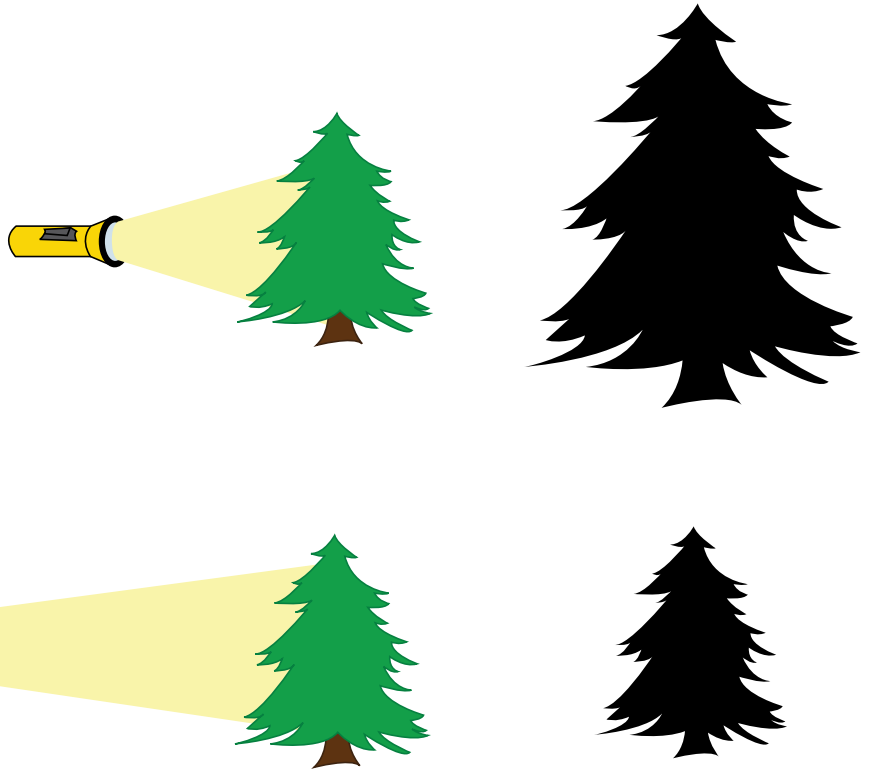
tree cutout

*Here's what you need to experiment with **shadows**.*

Next, tape up another sheet of white paper. This time, move away from the light, closer to the sheet of paper. Have your classmates mark the floor and **shadow** tracing with a “2.”

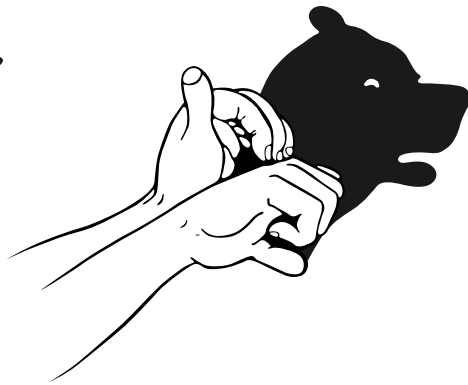
Last, try it one more time. This time move closer to the light—even closer than the spot marked “2.” Have your classmates mark the floor and **shadow** tracing with a “3.”

Now, compare the tracings. Which is the biggest? Where were you standing in relation to the light when the tree made the biggest **shadow**? Where were you standing when the tree made the smallest **shadow**?



*Is the cutout of the tree making these **shadows** closer to the light in the top image or bottom image?*

You can have even more fun making **shadows** with your hands. Try making the **shadows** in these drawings. Look carefully at one drawing at a time. Try placing your hands exactly as shown in the drawing. Practice several times. When you think you have it right, try making the shape in front of the light. If you get really good, you might want to put on a show for your family!



*You can make **shadow** puppets with your hands.*

Mirrors and Reflections

Have you been to the dentist recently? Do you remember if they used a tool with a **mirror** to look at your teeth? Think for a minute about how useful that **mirror** is. Why does the dentist use it? This simple tool allows them to see the back of your teeth. They can also see teeth way in the back of your mouth. Without it, they couldn't do their job nearly as well! Ask to see this tool the next time you're at the dentist.

So what is a **mirror**? A **mirror** has a smooth, shiny **surface** that **reflects** light. Light that is **reflected** bounces off of something in its path. You have already learned that light travels in a straight line, unless it runs into something in its way. If light hits a transparent object, it passes right through the object. If it hits an opaque object, the light is absorbed and blocked so a shadow is made. If light hits a smooth, shiny surface like a **mirror**, it is **reflected**.



*Light **reflected** from the surface of this **mirror** allows the dentist to see the back of this person's teeth.*

When a **mirror** is made, glass is coated with hot, **silvery** metals and then cooled. This coating makes the **mirror** shiny so it **reflects** back all the light that hits it.

Did you know that there are different types of **mirrors**? You probably use a **plane mirror** every morning when you get ready for school. A **plane mirror** has a more or less flat **surface**. The **reflection** of something in a **plane mirror** is almost the same size as the real object.



*This little girl is looking at her **reflection** in a **plane mirror**.*

Plane mirrors are used in many tools. Cameras, telescopes, and microscopes sometimes use **plane mirrors**. Some toys even use **plane mirrors**. Have you ever looked through a toy called a **kaleidoscope**? A **kaleidoscope** is a tube with **plane mirrors** inside. There are also tiny bits of colored glass and beads sealed up inside the **kaleidoscope**. You look through a small hole at one end of the **kaleidoscope** and point it toward the light. As you rotate the tube, you will see beautiful, colored patterns.



*Here's what the outside tube of a **kaleidoscope** looks like.*



*Here's what you might see if you looked inside a **kaleidoscope**.*

There are two other types of mirrors that are different from **plane mirrors**. **Plane mirrors** have flat surfaces, but **concave** and **convex** mirrors have **curved** surfaces. The smooth, shiny side of a **concave mirror** **curves** inward like a spoon. The smooth, shiny side of a **convex mirror** **curves** outward.

Here's another way that **concave** and **convex mirrors** are different from **plane mirrors**. Remember that in a **plane mirror**, the **reflection** of an object is about the same size as the object. In **concave** and **convex mirrors**, the **reflection** can look larger or smaller than the real object.

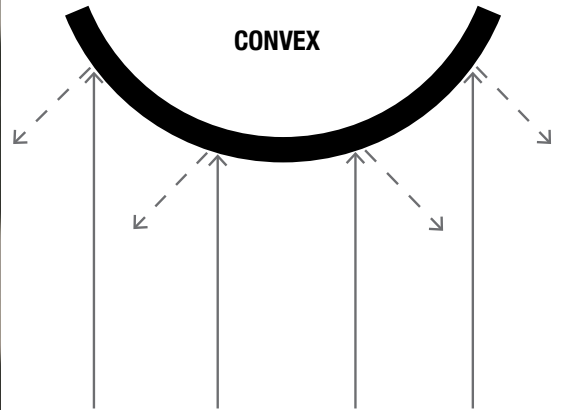
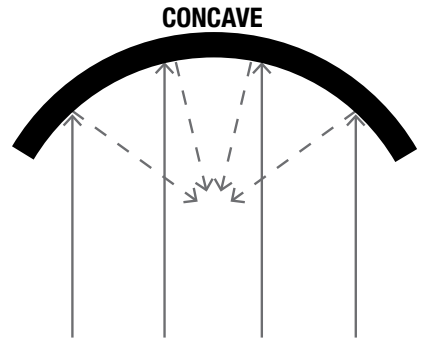
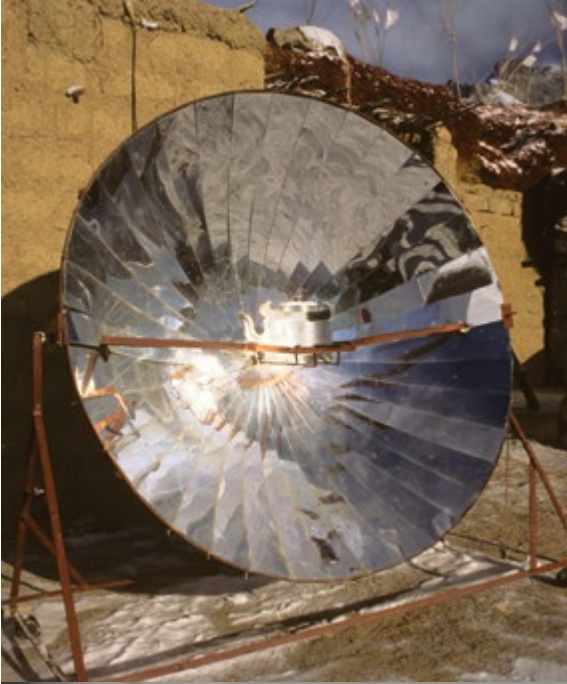


*Three types of **mirrors***

Concave and **convex mirrors** are also useful.

Concave mirrors can be used to provide heat using the light from the sun. Remember that sunlight is a form of light and heat energy. The large **concave mirror** in the image on the next page **reflects** the sun's energy so that people can warm their hands or bodies outside.

What about **convex mirrors**? The next time you get on a bus, take a look at the mirrors on the sides of the bus. Most buses and large trucks have a small, extra **convex mirror** on the side-view **plane mirror**. The **convex mirror** makes objects look smaller but shows a wider area so you can see more. It helps drivers avoid hitting something they might not see in the regular **plane mirror**.



Curved mirrors change the look of things because of the ways they bounce light rays back.

So now you see how useful **mirrors** are in our everyday lives. **Mirrors** can also be a lot of fun. A circus or carnival sometimes has a place called the “Funhouse,” or “House of **Mirrors**.” If you go in, there are lots of **concave** and **convex mirrors**. When you look in these **mirrors**, you might not recognize yourself! Your **reflection** is **distorted**. What makes that happen? Now you know it’s **concave** and **convex mirrors**.



*Concave and convex mirrors can **distort** the reflection of an object.*

Refraction and Lenses

In the previous chapters, you have been reading about how light travels. You already know that light travels at a very fast speed—faster than any machine made by humans.

You also know that light travels in a straight line, unless it runs into something in its way.

When light hits a transparent object, it passes right through the object.



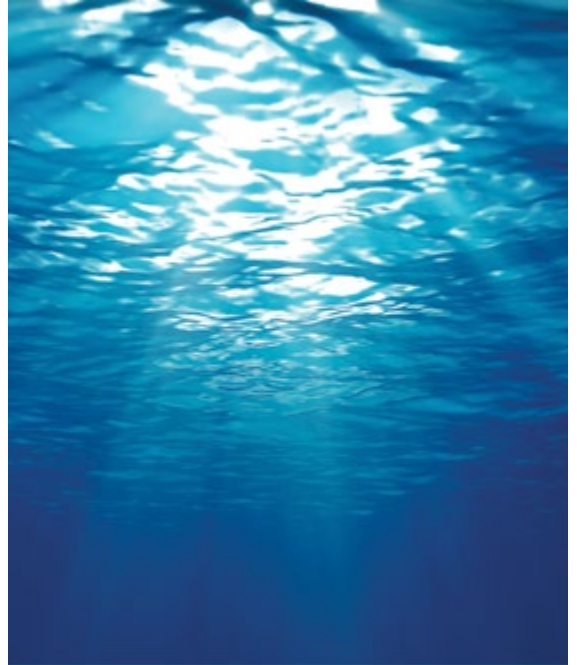
When light hits an opaque object, the light is absorbed and blocked so a shadow is made.



When light hits a smooth, shiny surface like a mirror, it is reflected.



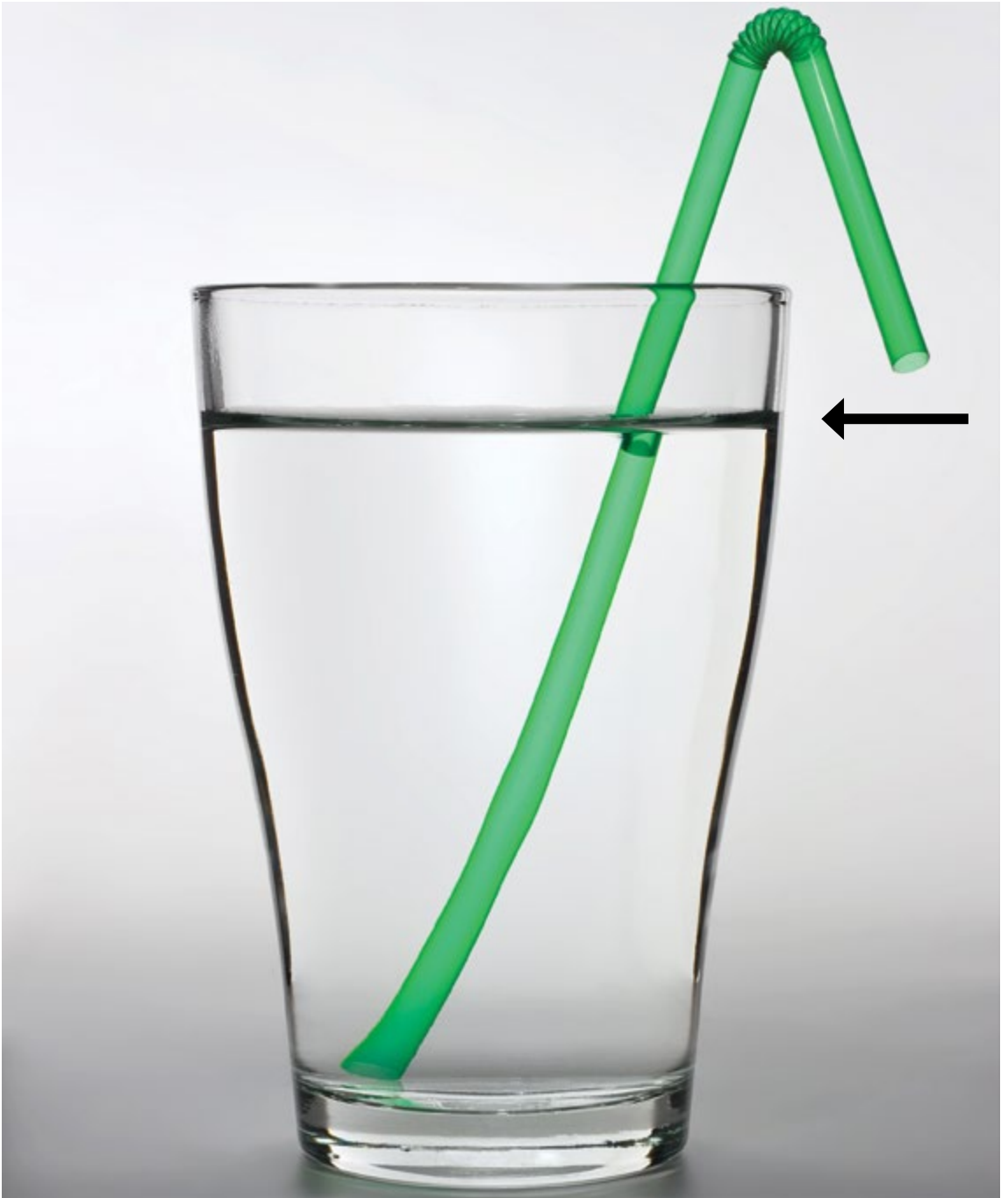
One of the things we haven't studied yet is what happens to the speed of light when it passes through something transparent. As fast as light is, when it passes through something transparent, it does slow down. So, when light passes through windows, water, and even air, it slows down. The **denser** or heavier something is, the slower light travels through it. For example, light travels more slowly through glass than it does through water or air. It travels more slowly through water than it does through air.



Does light travel fastest through glass, water, or air?

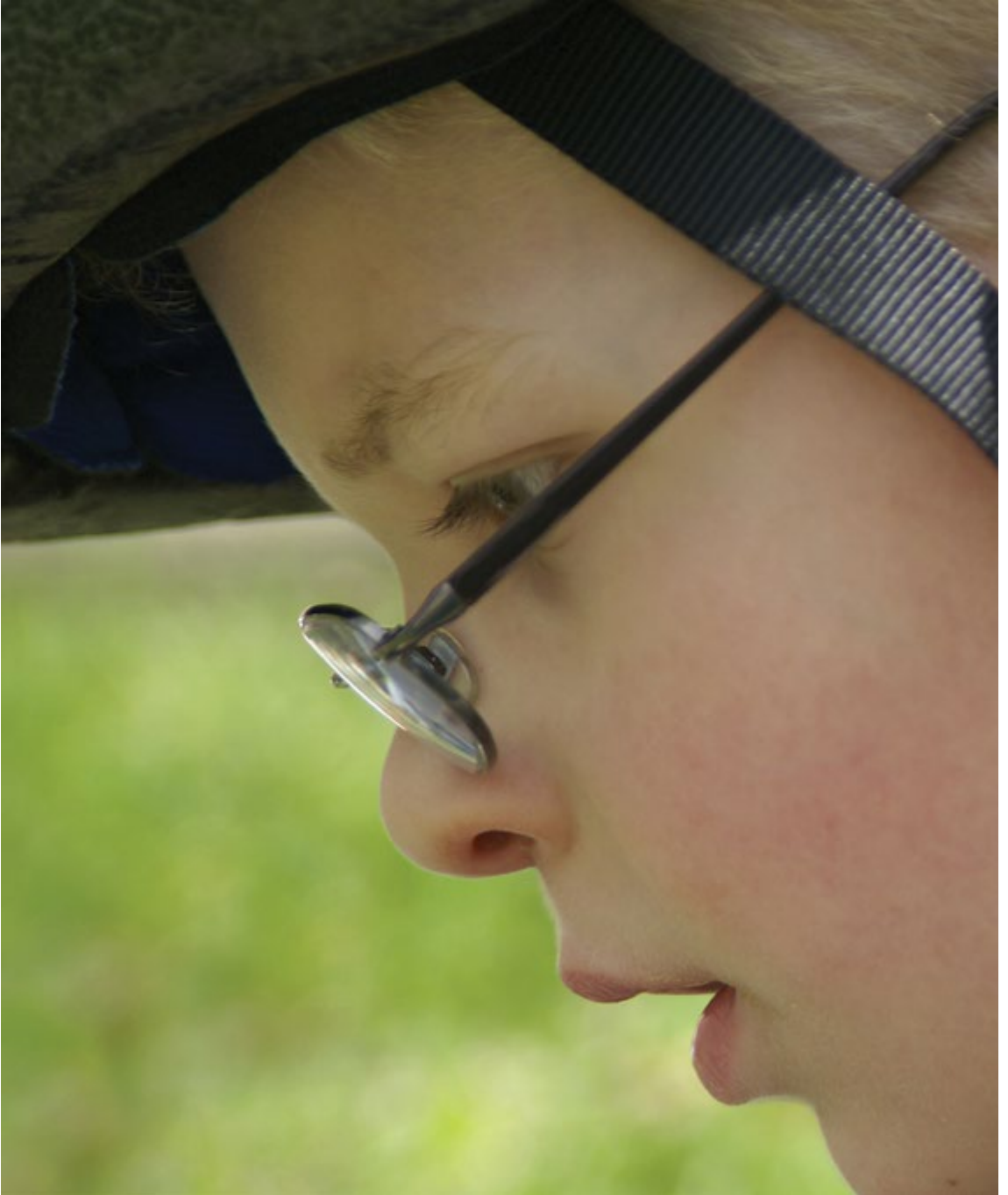
When light moves through one thing that is transparent to something different that is transparent, it changes speed. When light changes speed, the **angle** of the light rays change and appear to bend.

Take a straw and put it in a glass of water. Now, look at the straw where it enters the water. Can you see that it appears to be at a different **angle**? That is called **refraction**. It's caused by the slowing down of light as it moves from air to water. As the light enters the water, it changes **angle** direction because it slows down. It seems like magic, but it's really just how light travels—no trick.



Why does the **angle** of the straw look different after it enters the water?

You may be surprised to learn that there are many ways that we use light **refraction** every day. Do you or any of your classmates wear eyeglasses? The **lenses** in eyeglasses correct different kinds of vision problems by **refracting** light. Transparent glass or plastic **lenses** are made to **refract** light in different ways. Like mirrors, these **lenses** can be convex **lenses** or concave **lenses**.

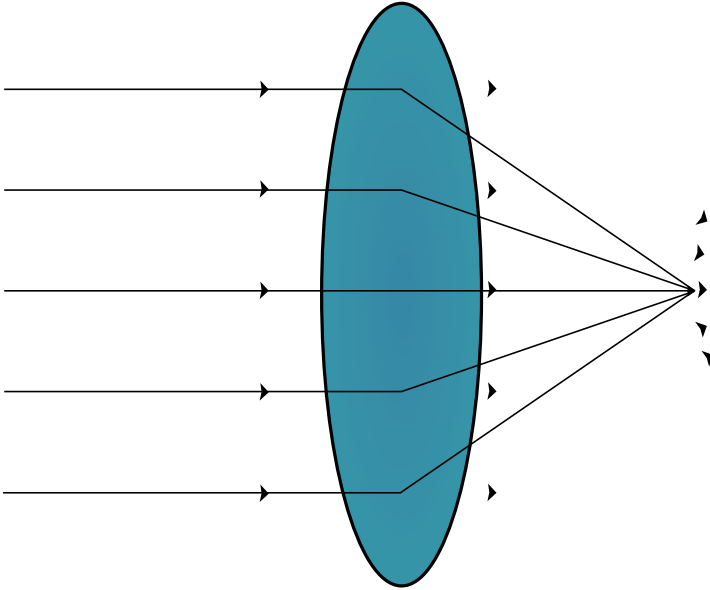


***Lenses** can be used to **refract** light to correct vision problems.*

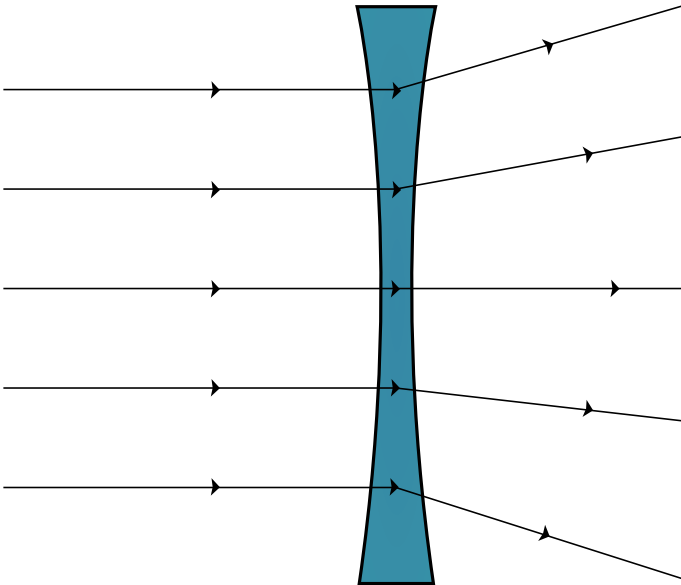
Remember that something convex curves outward. A convex **lens refracts** and bends light rays closer together. When you look through a convex **lens**, an object will look larger and closer. It looks **magnified** because the light rays are closer together.

A concave lens curves inward. A concave **lens refracts** and spreads light rays apart. If you look through a concave **lens**, an object will look smaller. It looks smaller because the light waves are spread apart.

CONVEX



CONCAVE



*Convex and concave **lenses** bend light in different directions. Do objects look larger or smaller through a convex **lens**? What about through a concave **lens**?*

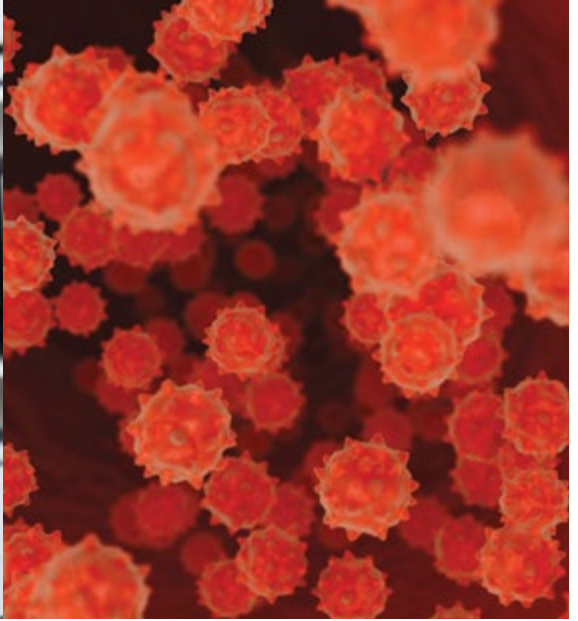
A **magnifying glass** is an example of a simple convex **lens**. If you hold and look at something closely through a magnifying glass, it will look larger. People use a **magnifying glass** to more clearly see the details of something small.



*A **magnifying glass** has a **convex lens** that makes small details appear larger if you hold the **magnifying glass** close to the object you are looking at.*

Convex **lenses** are also found in scientific instruments. A scientist might look through a microscope with a convex **lens**. The **lens magnifies** very small things that cannot be seen with the naked eye.

Scientists study outer space with telescopes. Telescope **lenses** are also convex. They make the moon, stars, and planets look larger and closer so scientists can learn more about them.



*Scientists look through microscopes with a convex **lens** to see tiny things that are not visible to the naked eye, like these germs.*



*Scientists also use telescopes with convex **lenses** to study outer space.*

Concave **lenses** are also useful. Remember that concave **lenses** spread out light rays. Concave **lenses** are used in **security cameras** because they provide a wider view of a place.

Do you have a peephole in your door at home? If so, you may have a concave **lens**. In many homes and apartments, the peepholes of doors have two lenses, one of which is concave. The other lens is convex and magnifies the image made by the concave **lens**. The people looking in from the outside can barely see what's inside. (Remember, concave **lenses** make things look smaller.) However, if you are looking from the inside out, you can see who is standing in front of your door.

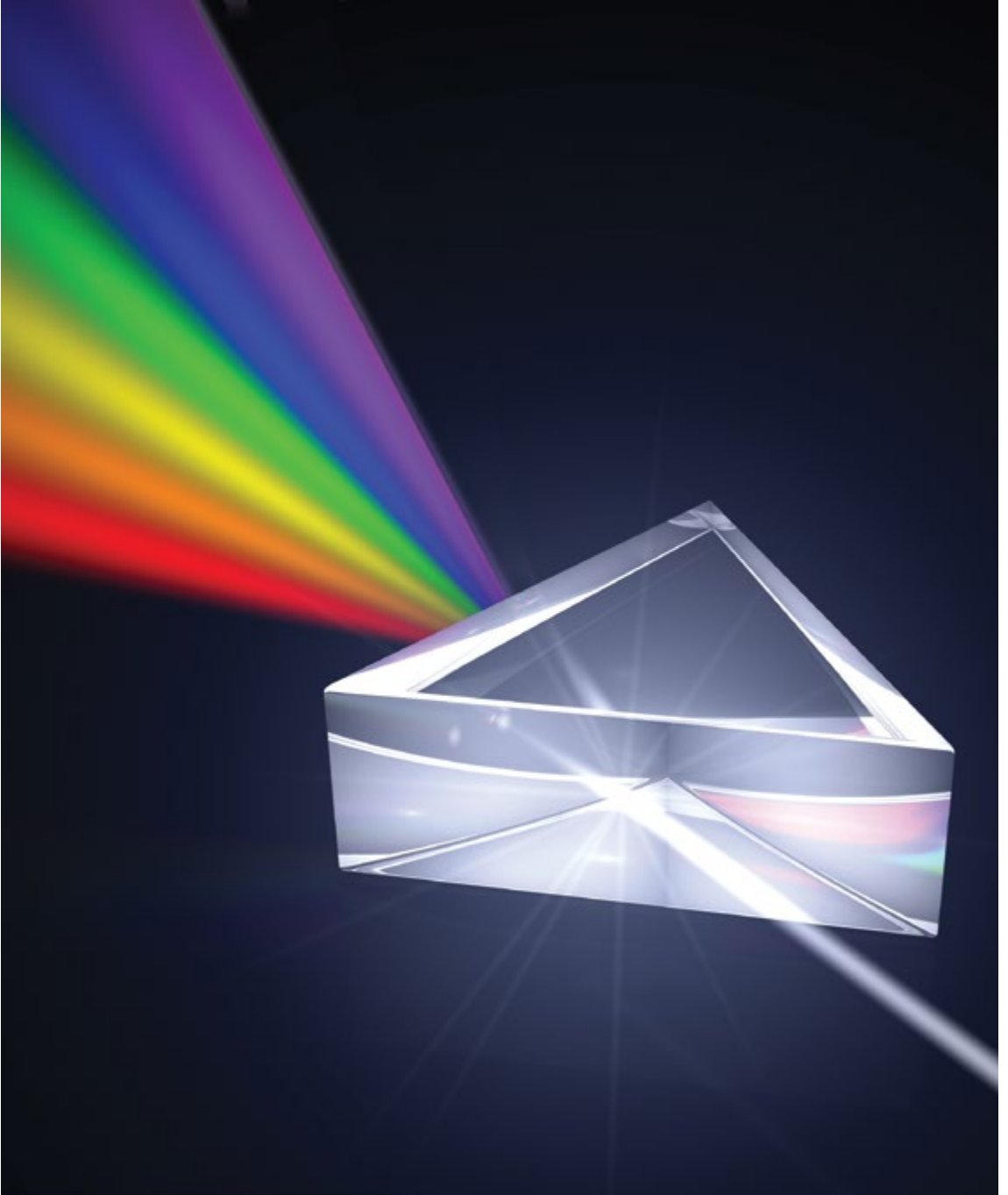


*Concave **lenses** that spread out light rays are useful for **security** purposes.*

Color and Light

Do you remember what color sunlight is? Hopefully, you didn't say, no color! You learned that sunlight is white light. You also learned that instead of being "no color," white light is made up of all the colors of the rainbow. Remember, the sun looks yellow because it gives off more yellow light than it does the other colors.

You can prove that white light is really many colors if you have a wedge-shaped piece of transparent glass called a **prism**. If you hold a **prism** near a sunny window, light will shine through and make a rainbow-like band of colors. This shows that white light is really made up of all colors.



*A **prism** refracts white light into all of the colors of a rainbow.*

Do you remember what you learned about refraction? What happens to light when it passes through something transparent like glass? The light slows down and changes its path. A **prism** has a special shape that refracts white light into all of the colors of the rainbow.

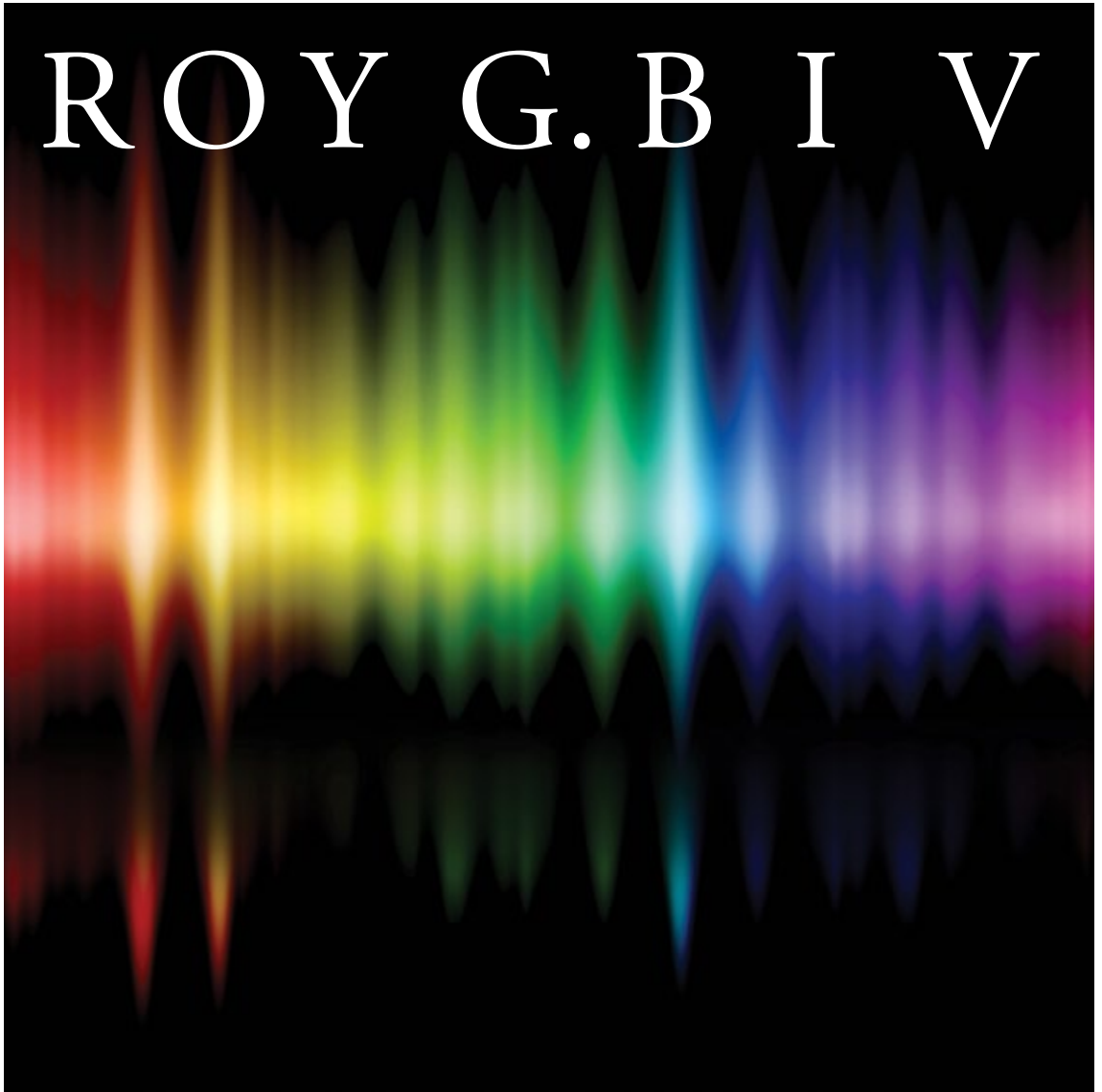
Have you ever seen a rainbow in the sky when the sun comes out after it rains? Raindrops in the sky refract the light, just like a **prism**. This is what creates the rainbow.



A rainbow occurs when raindrops refract sunlight into all of the colors of visible light.

When white light is refracted, it often separates into a combination of colors called the **spectrum**. The colors in the **spectrum** always appear in the same order: red, orange, yellow, green, blue, **indigo**, and violet. These colors are part of the visible light **spectrum**. They are the light waves that humans can see. The colors of visible light are a result of differences in wavelength. Red light has long wavelengths and violet light has short wavelengths.

You can remember the names of the colors in the visible light **spectrum** in the right order if you can remember this funny name: “Roy G. Biv.” Each letter in that name stands for a color in the rainbow. Say it out loud. Try to remember it!



*You can remember the order of the colors in the visible light **spectrum** if you remember “Roy G. Biv.”*

Did you know that the color of any object depends on what light wavelengths it reflects? Different objects absorb light wavelengths of some colors, but reflect others. This is what creates color.

Blue jeans appear blue because something in the **material** reflects blue light and absorbs all of the other light colors. Do you see anyone in your class today wearing a red sweater? The sweater appears red because something in the **material** reflects red light and absorbs all of the other light.

What about things that appear to be white? They look white because the object reflects all of the white light wavelengths and doesn't absorb any light. Can you guess why something looks black? Things that appear black do not reflect any light. They absorb all of the light wavelengths.



Can you explain why each thing appears to be the color it is?

Remember that the colors we see are from light of specific wavelengths. But, there is much more to light than just the wavelengths we can see. In fact, visible light is only a small part of the energy waves that come from sunlight.

For example, on the shorter wavelength end of the light **spectrum**, there are invisible **ultraviolet** light waves that cause sunburn. X-rays are even shorter wavelengths of light. We can't see these light x-rays but they can travel through the human body. You learned in *How Does Your Body Work?* that x-rays are used to create black and white photos of what's inside the body. Do you know of any other ways that x-rays are used?



We can't see x-ray wavelengths but these light waves can pass through your hand and create an image of your bones on special x-ray film.

Another type of invisible light is **infrared** waves. The wavelengths of **infrared** light are longer than those of red light. These are the type of light waves that you use when you click on the **remote control** to change television channels!



*Certain wavelengths of light are invisible. We can't see the **infrared** light from a **remote control** but we can see its effect when a channel is changed.*

6 What Is Sound?

An alarm clock rings, a dog barks, a voice calls, “Time to get up!” Every day is full of familiar sounds but what exactly is sound?

Sound is caused by a back and forth movement called vibration. Try this. Close your lips and hum. While you are humming, feel your throat under your chin. Do you feel something buzzing or vibrating? What you feel is caused by something moving back and forth very fast. When you hum, the **vocal cords** in your throat vibrate back and forth. This makes the air around them vibrate, which then creates the sound you hear.



*When you hum, your **vocal cords** vibrate to make sounds.*

Sound, like light, is a form of energy. Also like light, sound moves in waves. **Sound waves** move out from a vibrating object, making the air move back and forth in a way that we can't see.

Two things must happen to create a sound. First, something needs to vibrate and create **sound waves**. Then, something like air or another **medium** needs to carry the **sound waves**. You hear sounds more clearly if you are close to whatever is vibrating and making the **sound waves**. The farther away that the **sound waves** spread out, the weaker they get. That is why you can hear a friend standing right next to you better than if they are calling to you from across the street.



*This is what a **sound wave** might look like if we could see it.*



The next time you turn on your radio or TV, lightly put your fingers on the speakers. Do you feel the sound vibrations?

Sound travels not only through air, which is a gas, but through other **mediums**. In fact, sound can travel through solids, liquids, and gases.

Think about sound traveling through solids, like a window or even a closed door. If you are close enough, you can still hear sounds on the other side of a window or door.

How about liquids? Have you ever been underwater in a swimming pool when you have heard someone's voice or another sound? It probably sounded different than it would if you were not under water, but you were still able to hear it. This is an example of sound traveling through a liquid—the water in the pool.

One place that sound cannot travel is in outer space. Sound cannot travel through the emptiness, or vacuum, of space. There is no sound in outer space because there is no **medium** to carry it.



Sound travels through solids, liquids, and gases (air).

You might wonder about the speed at which sound travels. **Sound waves** travel much slower than light waves. **Sound waves** travel at about 750 miles per hour. That's fast, but not close to the 186,000 miles per second that light can travel. It would take a sound 33 hours to travel around Earth once. Remember that light can go seven times around Earth every second!

Here's an example to prove that light travels faster than sound. Think about the last time you were around a storm with thunder and lightning. Did you notice that you saw each flash of lightning before you heard the clap of thunder? That's because light travels faster than sound!



During a storm, you will see lightning before you hear thunder. That is because light travels faster than sound.

The **medium** through which sound travels affects its rate of speed. Interestingly, **sound waves** travel fastest through solids. In old western movies, you may have seen a cowboy put his ear down to the steel railroad tracks to hear if a train is coming. That is because the sound travels faster through the steel than through the air.

Try this. Listen while you drum your fingers on your desk. Now, rest your ear right on the surface of the desk and drum your fingers again. Which way sounded louder?

The sound was louder when you put your head on the desk. This is because the sound traveling through the solid wood of your desk traveled faster than if it had first traveled through the air. Every time sound changes **mediums**, it loses some of its loudness.



Sound travels fastest through solids, such as the wood of your desk or a wall.

Characteristics of Sound

Let's review what you have learned so far about sound by comparing it to light. How is sound different from light? Sound must have a medium to travel through—a solid, liquid, or gas. Light does not need a medium. Remember, light can travel through the emptiness, or vacuum, of outer space. Sound cannot.

The speed at which light and sound travel is also different. Light travels much faster than sound.

There are important ways that light and sound are similar. They are both forms of energy that travel in waves. There are also other similarities.

sound waves



light waves



Both light and sound are forms of energy that travel in waves.

When you learned about light, you learned that light waves can be different lengths. Some are long and some are short. It is the length of a light wave that makes it appear to be a particular color.

Perhaps you are wondering whether sound waves differ from one another. Imagine these two sounds—a baby crying for its mother and an adult yelling. Both of these are sounds. The sound waves of each travel through the same medium, air, so they are alike in that way. But a baby crying surely sounds different than an adult yelling! The baby makes a high-**pitched**, “screeching” sound. When an adult yells, it is a low-**pitched**, deep tone. Could this difference in **pitch**, or how high or how low a sound is, come from different kinds of sound waves?

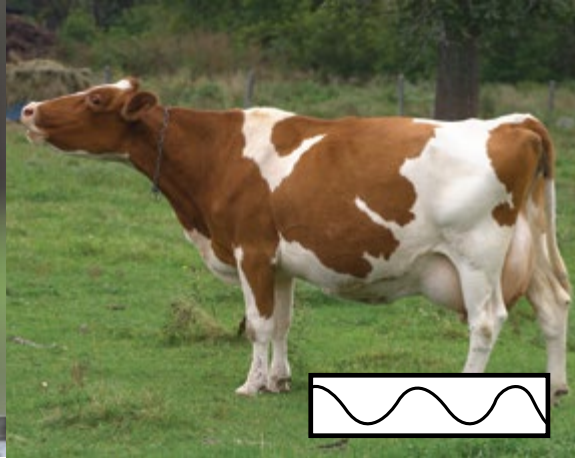


Both of these sounds travel through air. How are they different?

The answer is yes and it has to do with the length of the sound waves! It helps if we first understand how vibrations affect sound waves. Faster vibrations produce shorter sound waves, which make sounds with a higher **pitch**. The baby's screeching sound vibrates very rapidly, making shorter, but more, sound waves. Can you think of some other sounds that have a high **pitch**?

Slower vibrations produce longer waves, which make sounds with a lower **pitch**. A yelling voice makes longer, fewer waves so you hear a lower **pitch**. **Pitch** describes the highness or lowness of a sound. Can you think of some sounds that have a low **pitch**?

Try changing your voice **pitch**. Can you speak in a high, squeaky voice? Can you speak in a low, rumbling voice?

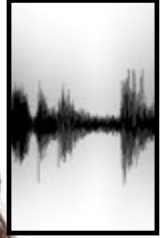


Which sounds are high-pitched? Which are low-pitched?

Sound also varies in loudness. If you're listening to the radio and a favorite song comes on, you might say, "Turn it up!" and reach for the knob marked **VOLUME**.

When you turn up the **volume**, you are making the sound louder. A scientist might say that you are increasing the sound's **intensity**. More **intense** sound waves carry more energy and make louder sounds.

How far away you can hear a sound depends on its **intensity**. A quiet sound, like a whisper, doesn't travel very far. A really loud sound can travel for hundreds of miles. When fireworks are set off, the sound can be heard miles away.



*Sounds with greater **intensity** are louder and travel greater distances.*

Very loud sounds can **damage** your hearing. People who work around loud sounds all day long often wear ear coverings or plugs to protect their hearing. You should be careful, too, not to turn the **volume** too loud if you like to listen to music.



*Listening to loud sounds repeatedly can **damage** your hearing.*

The Human Voice

Have you ever noticed how well you know your mother or grandmother's voice? You have heard it so often that you can tell right away who it is. Each person has a distinct voice. It's a voice that can make many sounds with different pitch and intensity. It can make high- and low-pitched sounds, loud and soft sounds.

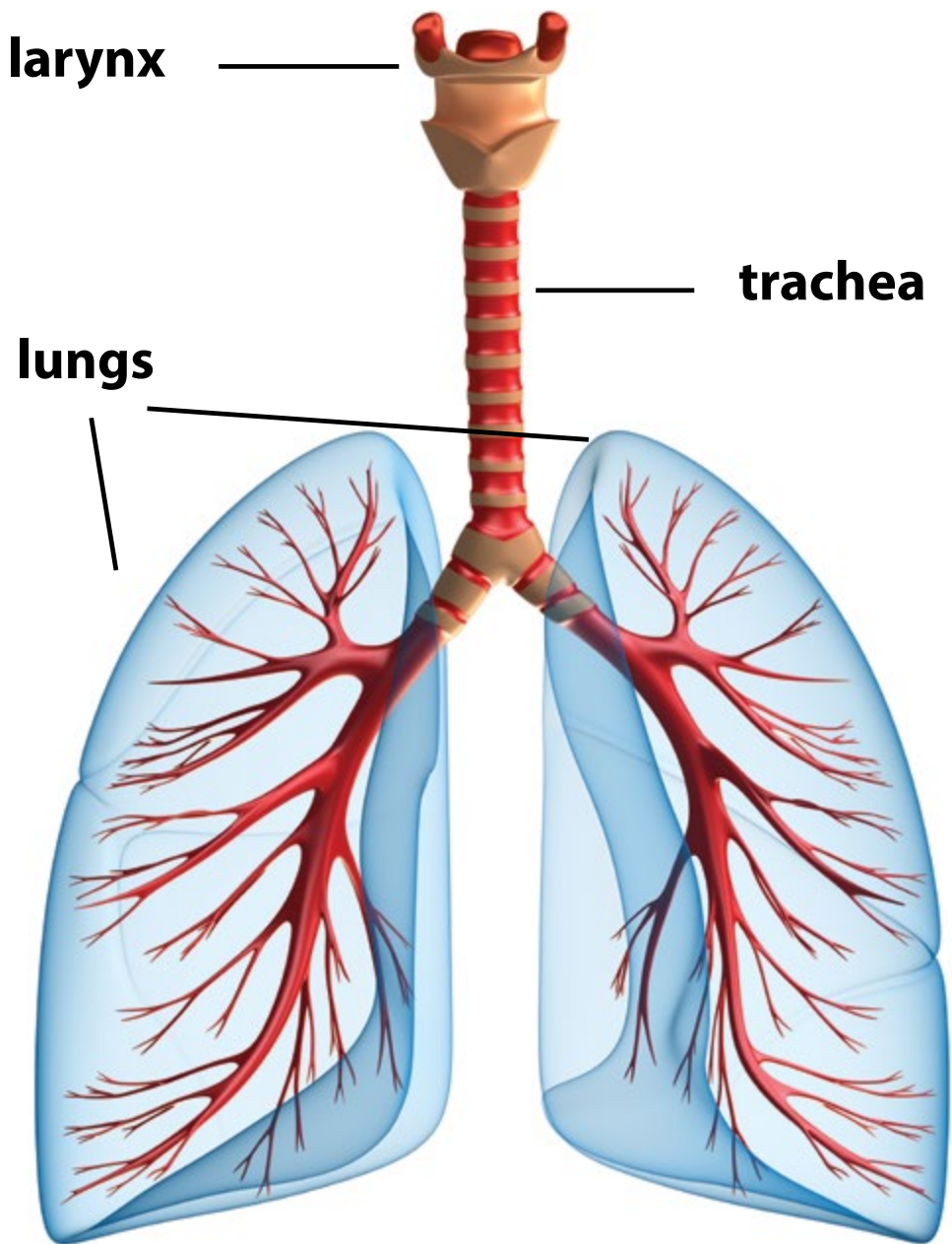


Do you recognize the voices of your friends and people in your family?

So how does your body make all of those different sounds? You already know that something needs to vibrate to create sound waves. You also know that sound needs a medium, like air, to travel through. Here's how it works in the human body.

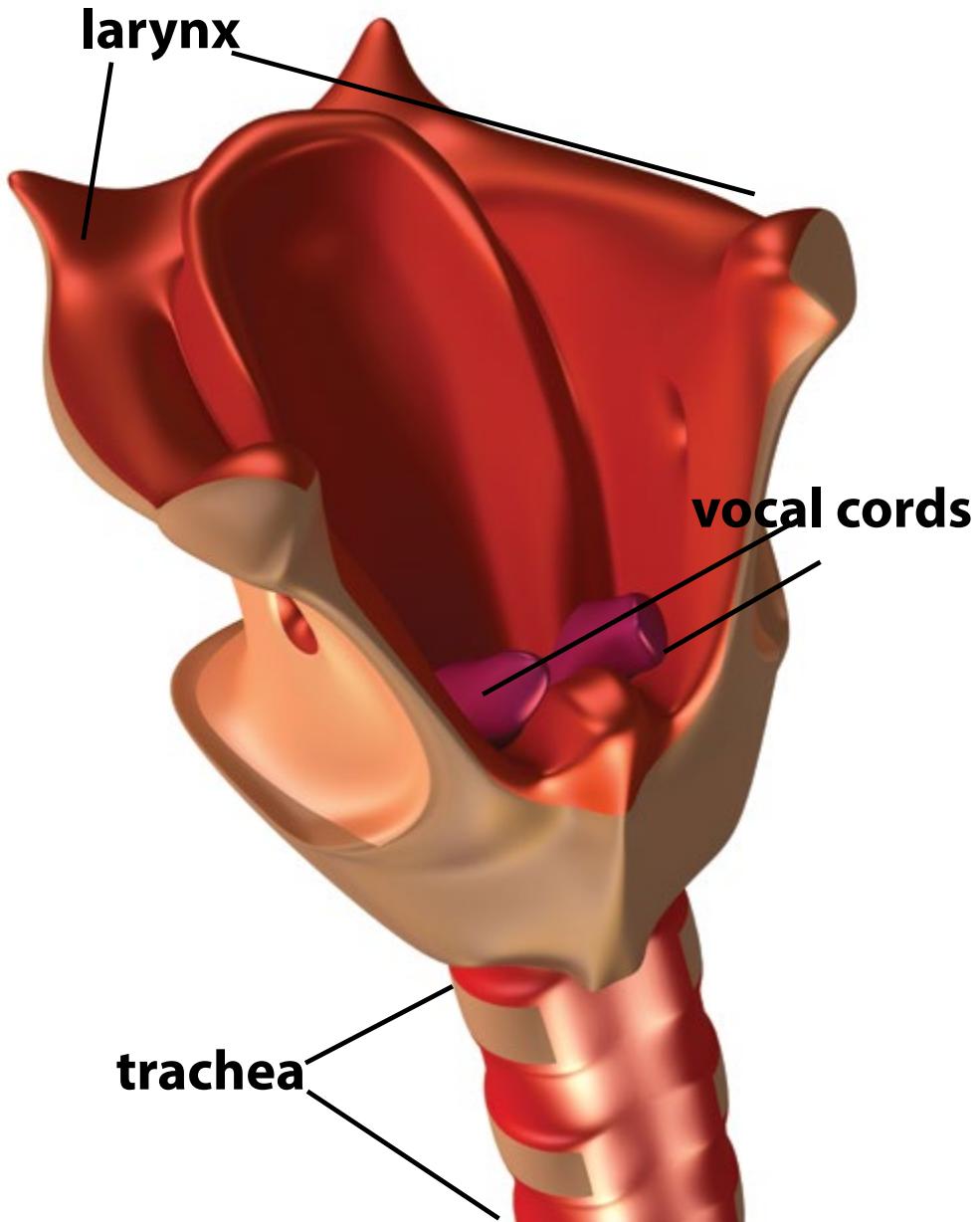
Air passes in and out of your body all of the time when you breathe. Inside your chest, your **lungs** expand to take in air and then contract to let it out.

Leading out of your **lungs** is a long tube called the **trachea**, or “windpipe.” At the top of your trachea is another part of your body called the **larynx**, or “voice box.”



*Air passes in and out of your body through the **larynx**, **trachea**, and **lungs**.*

Inside the **larynx** are two bundles of muscle that are known as vocal cords. When you breathe in, the vocal cords relax so that air can move past them and into your lungs. When you speak, you force the air out of your **lungs** and over the vocal cords in your **larynx**. The vocal cords vibrate to make waves in the air that continue up your throat and out of your mouth.



*When you speak, air is forced from your **lungs** and **trachea** to your **larynx**. The vocal cords in your **larynx** vibrate to make waves in the air. These vibrations make sounds.*

When you were a baby, you did not need to learn how to breathe. Your **lungs** worked **automatically**, bringing air into and out of your body. You also did not need to learn how to use your vocal cords to make sounds. When you were a baby, you made lots of funny noises and grunts. Ask your parents!

You did, however, need to learn how to change those grunts and noises into words so you could talk. You did this by listening to the people who talked to you when you were a baby. You practiced saying the same sounds and words. You learned to speak whatever language all of those people were speaking to you. If your family spoke only English to you, you learned to speak English. If your family spoke only Spanish to you, you learned to speak Spanish. People can learn to speak more than one language. Maybe you or some of your classmates speak more than one language.



When you were a baby, you learned to speak the same language that the people around you were speaking.

Your vocal cords grow as you grow. When you have shorter vocal cords, you tend to speak at a higher pitch. This is why small children have higher-pitched voices than adults. The pitch of your voice depends on the size of your vocal cords and **larynx**.

The volume of your voice, or how loudly you speak, depends on how much air is produced by your **lungs** and comes out of your mouth. When more air is pushed out of your mouth, your voice will be louder.



Who do you think has shorter vocal cords and speaks in a higher-pitched voice?

Light and Photography

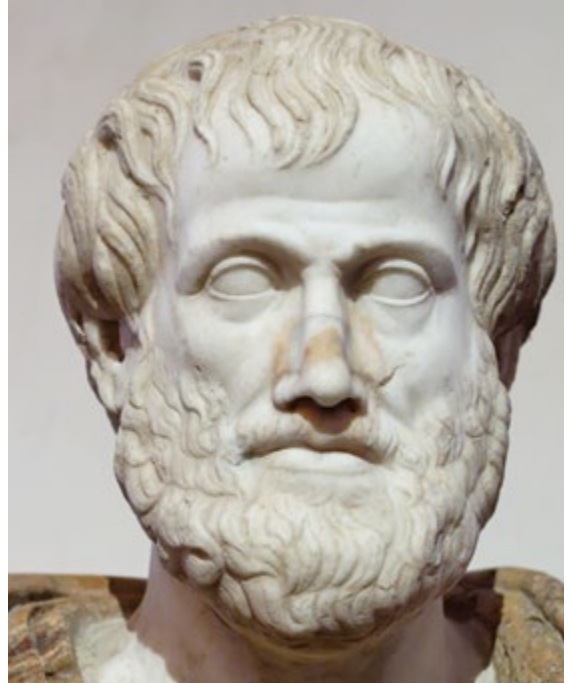
The word **photography** comes from two Greek words. *Photo* means “light” and *graphein* means “to draw.” So you might say that **photography** means “to draw with light.”

The earliest ideas for making pictures using light came in the 4th century BC from a Greek man named **Aristotle**. He observed and made notes about how light acts.

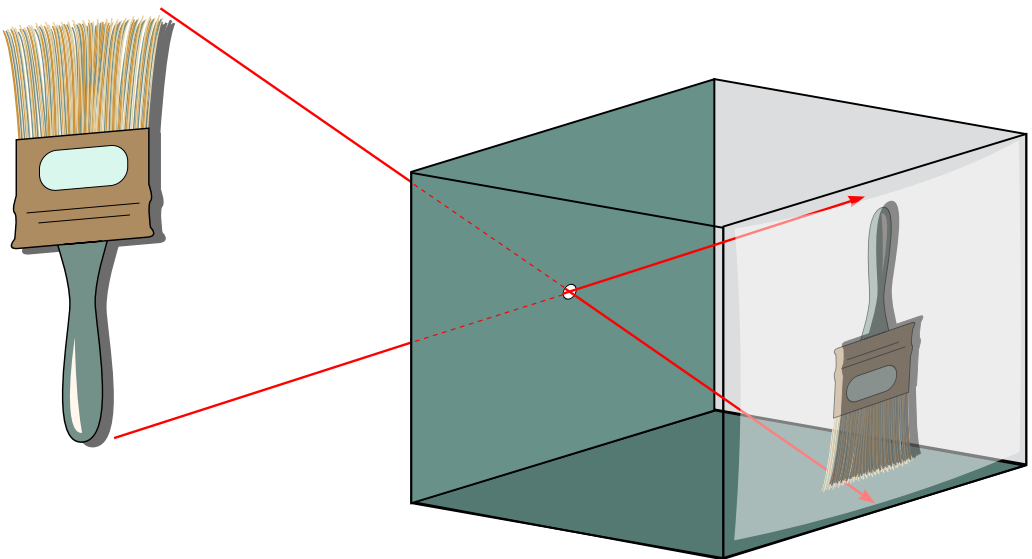
The first person to put **Aristotle’s** ideas into practice was an Arab scientist, Alhazen, around 1000 AD. He made the first pinhole camera. It was a box with a small hole in one side. Light from the outside came through this little hole and projected an image on the opposite side of the box. Alhazen used it to help him draw. His camera did not take **photographs** as we know them today. Others continued to experiment with and improve pinhole cameras. Even today, some people still enjoy making



Alhazen



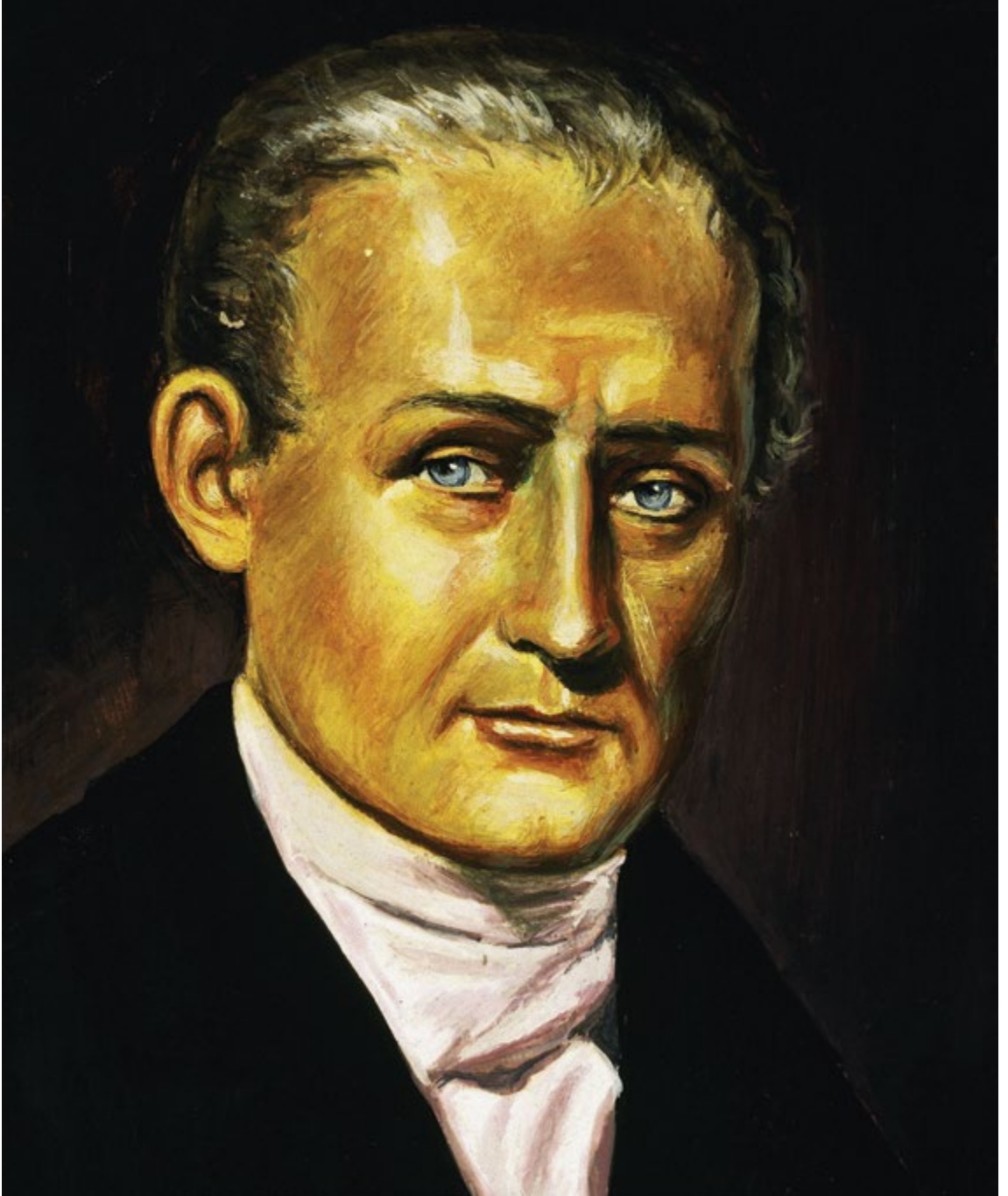
Aristotle



Pinhole cameras do not have lenses. There is just a small hole on one side of the box that lets light into the box. A figure is projected on the opposite side of the box.

their own simple pinhole cameras.

The first thing similar to a **photograph** was made in 1826 by a Frenchman named Joseph Niepce [NEEP-see]. He **invented** what were called **heliographs**. *Helio* is the root for “sun.” He used sunlight to create images. The sunlight mixed with a form of coal and some other natural chemicals on a square, glass plate to make an image. It took eight hours in the sunlight before the image appeared! Then, it faded.



Joseph Niepce invented heliographs.

Another Frenchman named Louis Daguerre [Də-GAIR] took Niepce's ideas and improved them. He was able to use light to create an image in less than thirty minutes. His images were called **daguerreotypes**, named for their **inventor**. **Daguerreotypes** used light-sensitive chemicals like silver and iodine to make an image on a metal plate. These became popular around the world.

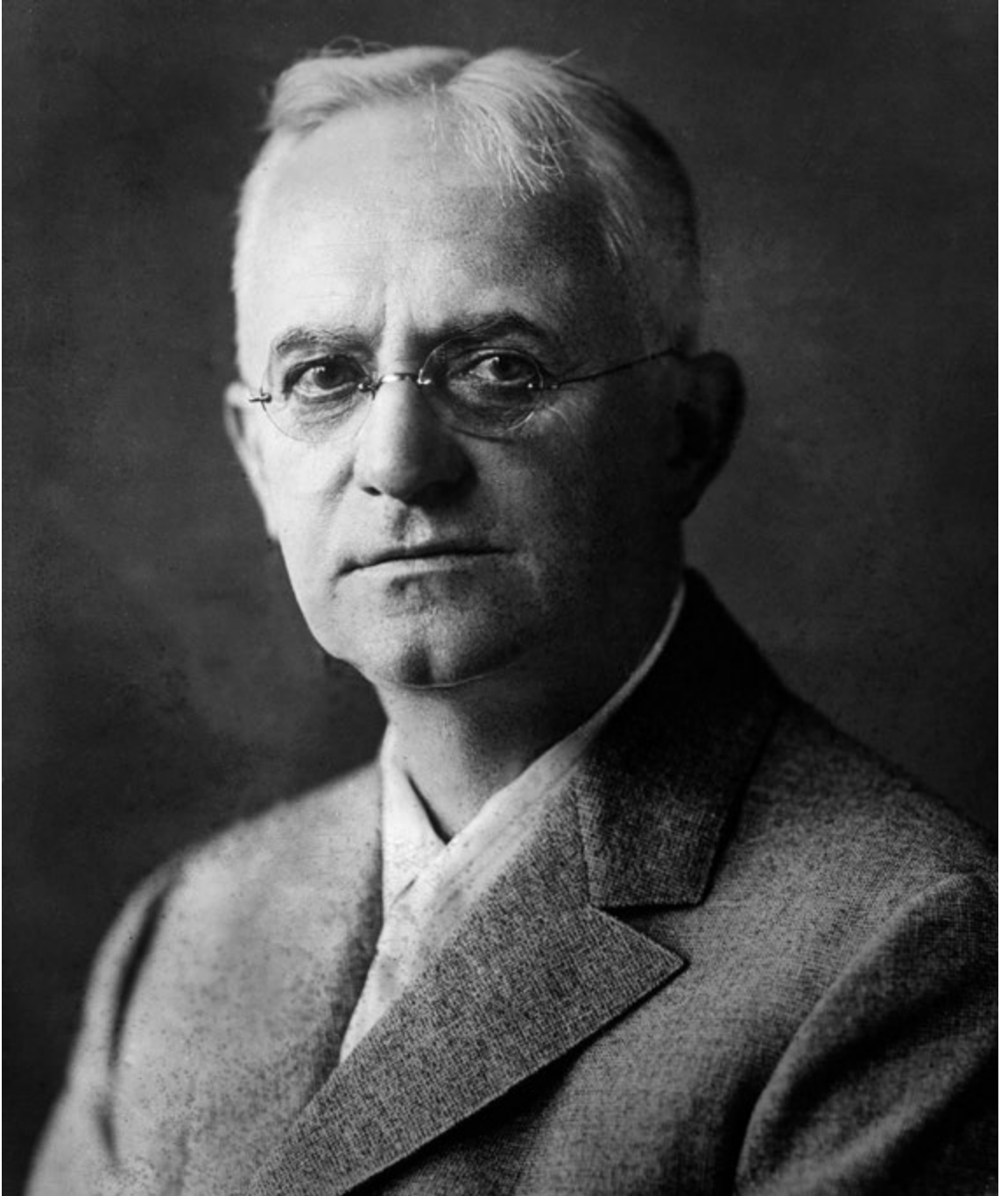


Louis Daguerre



*Here is an 1850 **daguerreotype** of a young woman.*

The late 1800s brought even more improvements to **photography** thanks to some very creative **inventors**. One such **inventor** was the American George Eastman. In 1888, he **invented** flexible, rolled film that could replace the glass plates that were used in earlier cameras.



*George Eastman **invented** film for use in cameras.*

The **invention** of film led to the creation of the box camera, which was a tight box with a simple lens. The camera had film that could take as many as 100 **photos**. People could take **photos** and then send the camera back to Eastman's company to print the **photos**. The company then sent both the **photos** and camera back to you. Ask to see your family's older **photo** album. Chances are that some of the much older **photos** may have been taken with a box camera.



An early box camera and a roll of film

Color films were not **invented** until the late 1930s and early 1940s. By then, most families owned at least one camera and **photo** albums became a common, household item.

Cameras improved at a fast rate around the 1950s. Instant **photography** was **invented** by Edwin Land, who sold his first camera in 1948. With his camera, one minute after you took the **photo**, you would have a fully developed **photograph** from the camera. These cameras were popular because people did not have to wait to get their **photos**. They had them right after they shot the **photo** with their camera.



With the **invention** of the instant film camera, a fully developed **photo** was ready one minute after you took the picture.

Chances are that if you or your family has a camera now, it is a digital camera. Digital cameras do not use film like the early cameras described previously. Digital cameras have a special computer “chip” that takes the place of film. In fact, many cell phones now also have digital cameras. Imagine how amazed the early **inventors** would be to see all of the cameras we have today!



A digital camera



A digital memory card in a digital camera takes the place of film.

Chapter 10 Alexander Graham Bell, Part I

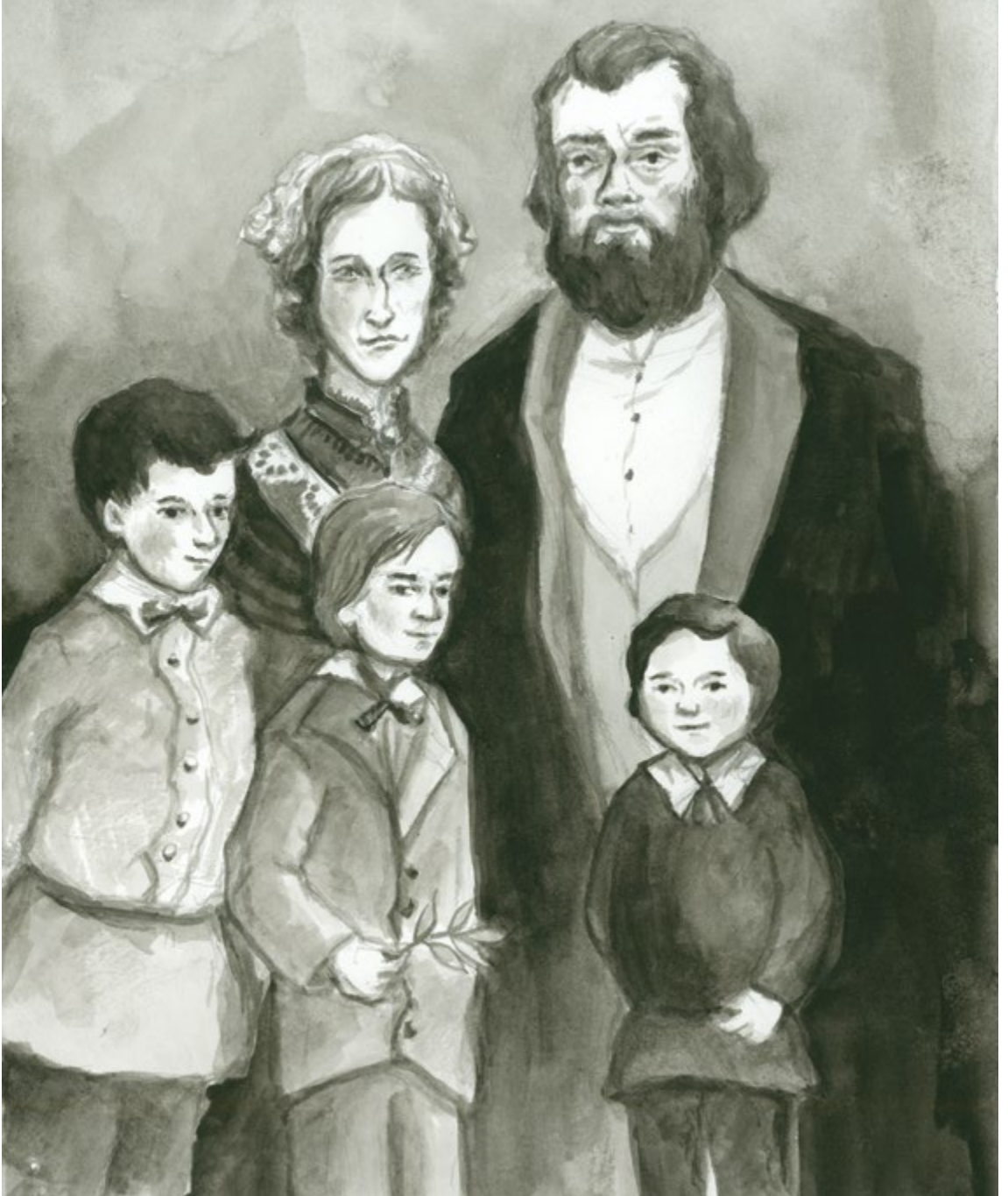
What makes someone famous? Who would you think of if you were asked to name someone famous today? Would you name a famous athlete? An actor or musician? Maybe you would think of a president or famous leader. One of the most famous inventors of all time lived over 100 years ago. His name was Alexander Graham Bell.



Alexander Graham Bell

Alexander Bell was born March 3, 1847. He was the middle of three sons born to Alexander and Eliza Bell of Edinburgh, Scotland. His parents nicknamed him “Aleck” as a young boy. Aleck’s childhood was happy. He lived the best of both worlds by spending time at his home in the city of Edinburgh and also in the country on the weekends. More than anything, Aleck loved to learn new things.

At Milton Cottage near Edinburgh, young Aleck enjoyed exploring nature. He collected plants and studied animals.



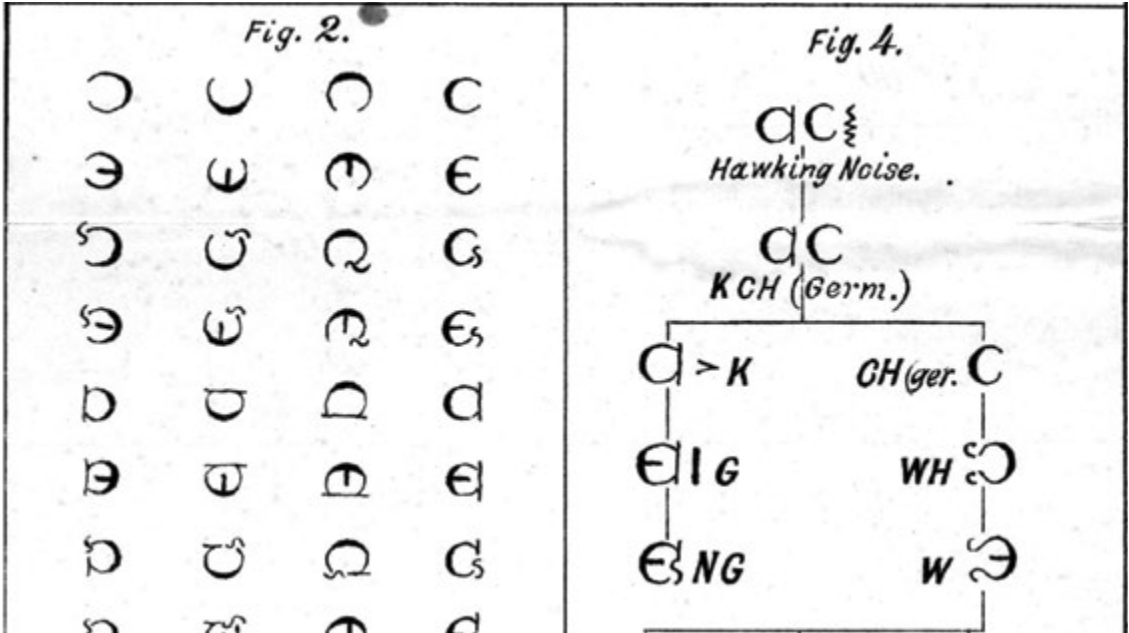
Aleck as a child with his family

In school, Aleck's best subjects were science and music, which he learned from his mother. Aleck's mother was nearly deaf, so she played music mostly by feel. To hear the music, she would put a **hearing trumpet** to the strings of the instrument. The **trumpet** magnified the sound.

Aleck's father was an important speech **professor**. He studied the sounds of the English language, similar to the phonics you studied to learn to read. He very much wanted to help his wife, Eliza, and other deaf people. In 1864, he invented a "sound alphabet" called **Visible Speech**. He spent years coming up with **symbols** to stand for any sound the human voice could make. The **symbols** that he used looked the way a person's mouth looked when making certain sounds. **Visible Speech** helped deaf people learn how to talk better so that they could communicate with others.



Aleck's parents, Alexander and Eliza Bell. Do you see the **hearing trumpet** that Mrs. Bell is using to listen to her granddaughter?



A **Visible Speech** poster showing the **symbols** invented by Aleck's father to help the deaf.

The example of both his mother and father was an **inspiration** for Aleck. He became interested in inventing things on his own. He especially wanted to invent things to help other people. Aleck and his brother actually made a “speaking machine.” The machine used the voice box (larynx) of a dead sheep. Part of the machine acted like a mouth and throat and could say the word “mama.”

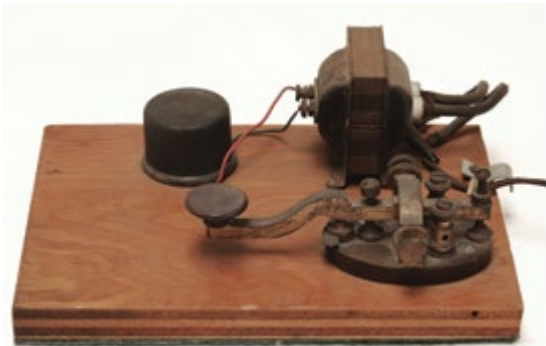
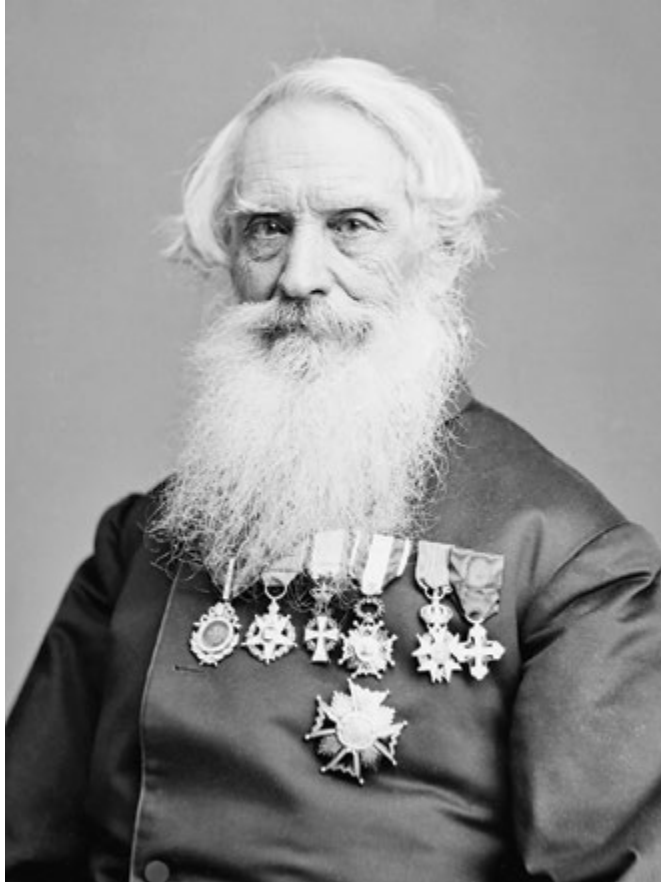
As an adult, Aleck worked with deaf students. He later took a job as a **professor** at Boston University. Inventing things was a big part of Aleck’s life. After one invention, he set his mind on others, never satisfied with the past invention. The invention that he is most famous for, however, was yet to come.



When he was young, Aleck and his brother invented a “speaking machine.”

Chapter 11 Alexander Graham Bell, Part II

Aleck Bell loved thinking of new things to invent more than anything else in the world, especially to help other people. In 1837, another inventor, Samuel Morse, created a machine called the **telegraph**. The **telegraph** was a way to send messages long distances across wires. It was limited to dots and dashes and could not **transmit** human sounds. Aleck began to think about ways that he might improve upon this new invention. “I used to tell my friends that one day we should speak by **telegraph**,” said Bell. He devoted all his time to this new goal. So did many others and the race for a new invention was on.



With the invention of the **telegraph** by Samuel Morse, people could send messages long distances. A system of dots and dashes called **Morse Code** was used to tap out the messages on the **telegraph**. Three dots, followed by three dashes, followed by three more dots stands for SOS, code for "Help!"

Boston, Massachusetts became an important place for many inventors. The Massachusetts Institute of Technology (MIT) made space in one of its labs for Aleck to do his experiments. His days were filled with teaching and then trying over and over to make human sound travel across a wire. All of his energy was spent on this creative idea. He wrote that his idea of using **electric current** to carry a sound would likely make others think him “crazy.” So, he kept most of his ideas and experiments secret.

Aleck hired a young mechanic to help him. Thomas Watson knew how electricity worked. At first, their experiments failed more than they succeeded. Aleck thought they were getting closer to success. “I think the **transmission** of the human voice is much more nearly at hand than I thought.” On June 2, 1875, his dreams came true.



*Alexander Graham Bell and Thomas Watson worked together to try to **transmit** sound using electricity.*

Like many inventions, an accident led to an important **discovery**. With the electricity turned off, Watson sent a message to Aleck that Aleck could hear. He heard tones, not just one single-pitched sound. He knew instantly it was a huge step forward! “I have (by accident) made a **discovery** of the very greatest importance,” wrote Bell.

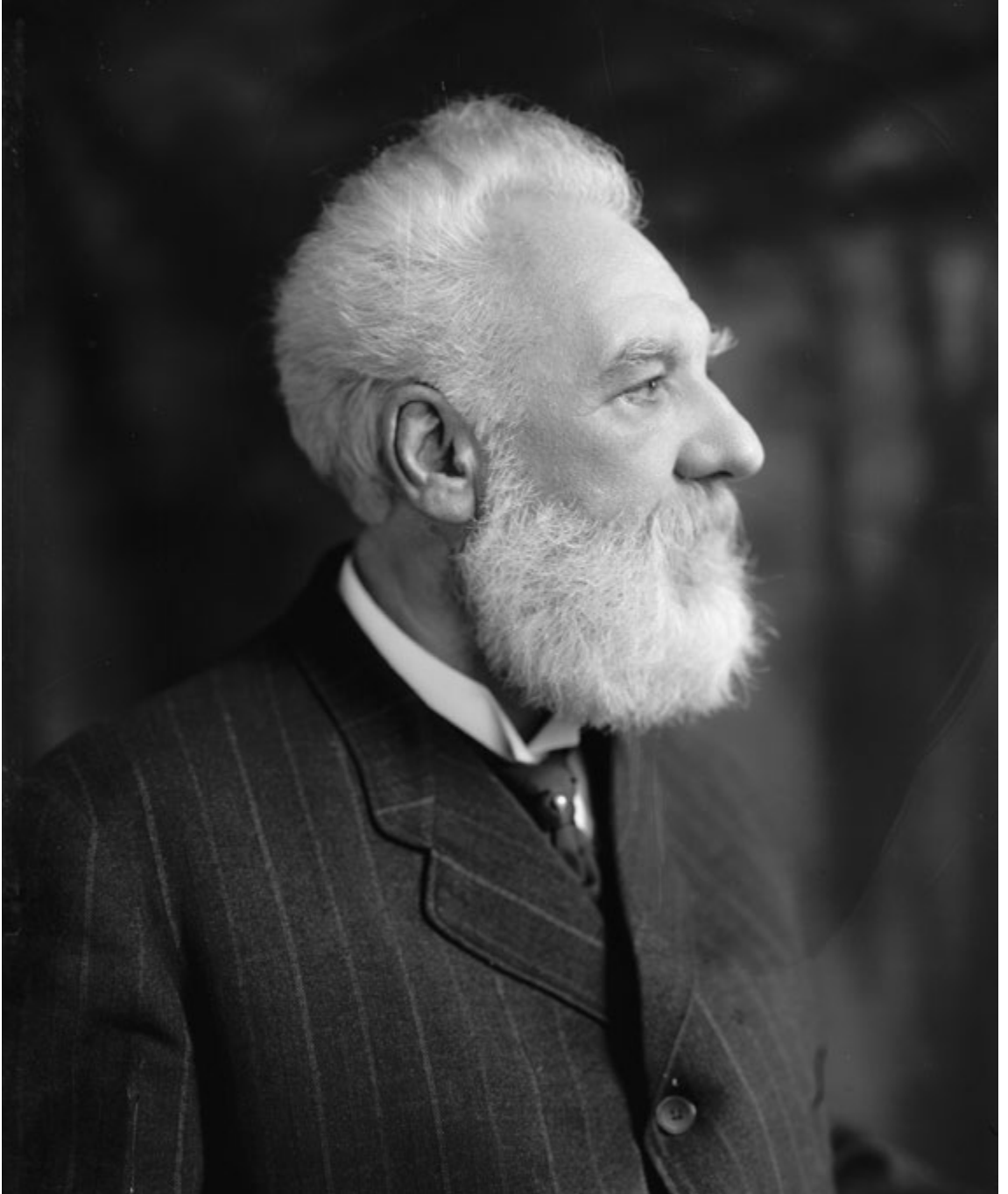
Three days later, the first telephone recorded, “Mr. Watson, come here, I want to see you.” To Bell’s great joy, Watson had heard and understood what Bell had said!

Fame and fortune came to Alexander Graham Bell and Thomas Watson. They soon formed the Bell Telephone Company to make and sell their new invention.



Bell's first telephone

Bell continued to invent the rest of his life. “Self-education is a life-long affair,” said Bell. “There is no failed experiment,” he said to convince people to keep going with their ideas. He passed his love of learning on to his grandchildren and inspired a whole group of new inventors.



"There is no failed experiment," said Alexander Graham Bell.

Chapter

12 Thomas Edison: The Wizard of Menlo Park

Have you figured out why inventors are so important? They have helped every person's life in one way or another. Shouldn't there be an inventors' "Hall of Fame?" If there were, then a man named Thomas Alva Edison would be quickly voted in.

Thomas Alva Edison was born February 11, 1847, in a small, northern Ohio town. He was the last of seven children born to Sam and Nancy Edison. Al, the nickname his friends gave him, was a sickly child. He didn't even attend school until he was eight years old. Because of **scarlet fever** as a child, Al was left more than partially deaf. His illnesses did not stop his interest in nature. He asked questions that teachers didn't know how to answer: "Why is the sky blue?" or "How does fire work?" He was curious about everything and liked to figure out things on his own.

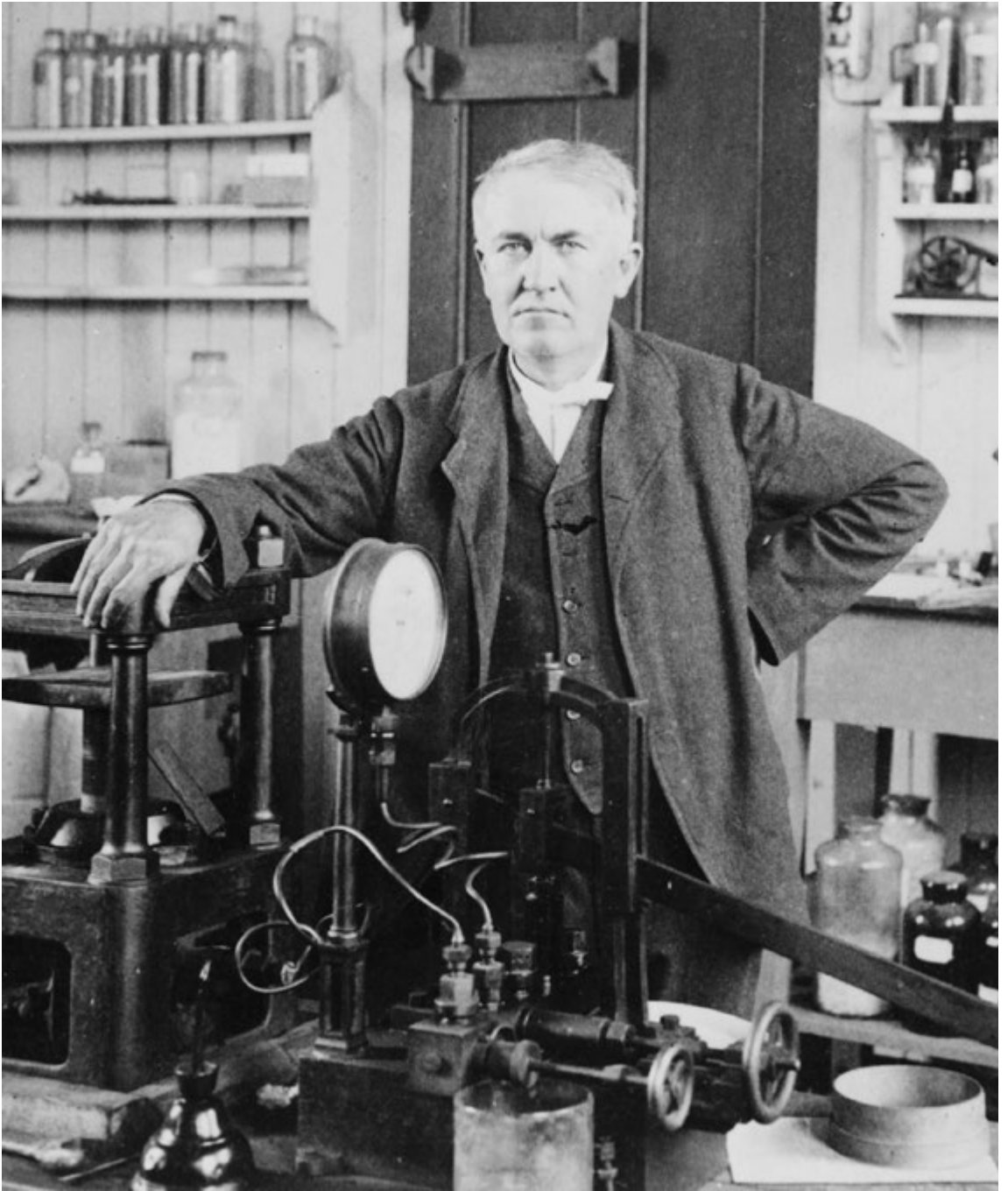


A photograph of Thomas Edison

At the age of 12, he worked selling newspapers on the railroad near his home. On the train, he heard people talking about many new ideas and inventions. He learned by listening to their stories. At 15, Al landed a job working the telegraph machine. He became an expert telegraph operator over the next six years. Even though he was deaf, he could feel the vibration of the wire.

Al liked to work with electric machines. He found a way to make the telegraph faster and sold the idea to Western Union Telegraph Company for \$40,000. With the money he made from the sale, he set up his first lab to continue his experiments.

When the work Al was doing outgrew this lab, he built a bigger lab in Menlo Park, New Jersey. He hired some of the smartest scientists and engineers from around the world to work with him. Much of his early work was on sound. They called him the Wizard of Menlo Park because some of the inventions seemed magical.



Edison in his lab at Menlo Park

In this new lab, he discovered a way to make Alexander Graham Bell's new telephone louder. He sold the **patent** for his new invention for \$100,000. That was a huge sum of money at the time.

His next invention was the **phonograph**. He was able to record sound on a cylinder wrapped in tinfoil. He played a version of "Mary Had a Little Lamb" to his fellow scientists. This was the first time anyone was able to listen to recorded music.

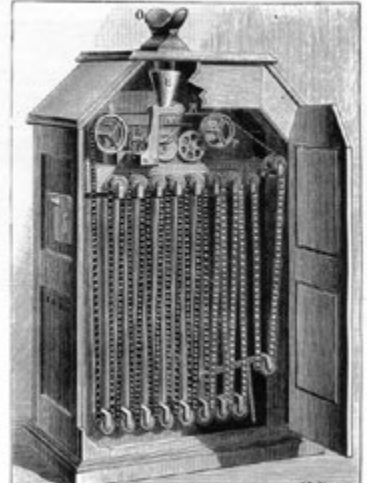


*Thomas Edison with a **phonograph**, 1878*

The invention that Edison is best known for came next. In 1879, he invented the first **incandescent** (glowing) electric light bulb. Three years later, he lit up 85 homes at once in New York City and the age of electric light began.

By the time Edison “retired,” he had **patents** on over 1,000 inventions. They include the **kinetoscope**, which is a machine for showing movies, and the **microphone**.

What people sometimes forget is that many of Edison’s experiments “failed” at first. He caused explosions at his labs and was forced to start all over many times. However, he kept moving forward each time. He always had a positive attitude. He knew he was closer to his next success!



*Thomas Edison in 1928 and two of his inventions, the **kinetoscope** and the light bulb.*

Glossary for *Adventures in Light and Sound*

A

absorb—to take in or soak up (**absorbed**)

angle—the space formed when two lines or surfaces meet

Aristotle—a Greek philosopher who made notes about how light acts; His notes later helped inventors make cameras.

automatically—operating on its own without direct control

C

camera—an instrument for taking photographs
(**cameras**)

concave—curved inward, like a spoon

convex—curved outward

curve—to bend (**curved**, **curves**)

D

daguerreotype—a type of early photograph invented by Daguerre; It appeared in less than 30 minutes and did not disappear as quickly as a heliograph.
(**daguerreotypes**)

damage—hurt, harm

dense—thick, heavy (**denser**)

discovery—an event in which someone finds or learns something for the first time

distort—to twist out of normal shape (**distorted**)

E

electric current—the flow of electricity

electricity—energy carried over wires (**electric**)

energy—a supply of power

H

hearing trumpet—a cone-shaped tool that helps a person hear better by placing the small end in one ear

heliograph—a type of early photograph made by mixing coal and other natural elements that are then left in the sun to make the images; They took a long time to appear and disappeared quickly. (**heliographs**)

I

incandescent—glowing

indigo—a dark purplish-blue color

infrared—long light waves, beyond red on the spectrum, that can only be seen with special instruments

inspiration—something that gives a person an idea about what to do or create

intense—strong (**intensity**)

invent—to make something new that no one else has ever made (**invented**, **inventor**, **inventors**, **invention**)

K

kaleidoscope—a tube with plane mirrors and pieces of colored glass that you hold up to the light and rotate to make colorful patterns

kinetoscope—an early machine for showing movies

L

larynx—the organ in your throat that holds the vocal cords and makes it possible to speak; voice box

lens—a clear piece of curved glass or plastic that is used to make things look clearer, larger, or smaller (**lenses**)

lung—one of a pair of organs that allows animals to breathe by filling with air (**lungs**)

M

magnify—to make something look larger or sound louder (**magnified**, **magnifies**)

magnifying glass—a convex lens that makes things look larger when they are held close to the lens

material—cloth or fabric

medium—a substance that light or sound can travel through, like a solid, a liquid, or a gas (**mediums**)

microphone—an instrument for recording sound or making sound louder

mirror—a shiny surface that reflects light (**mirrors**)

Morse Code—a way of communicating with dots and dashes using the telegraph

O

opaque—not clear, blocking all light so that none gets through

P

patent—the rights to make and sell something (**patents**)

phonograph—an instrument that reproduces sounds that have been recorded on a grooved disk

photograph—a picture made with a camera (**photography, photographs, photos, photo**)

pitch—how high or low a sound is (**pitched**)

plane—a more or less flat surface

prism—a wedge-shaped piece of transparent glass that breaks up light into all the colors of the spectrum

professor—a college teacher

project—to cause light to appear on a surface (**projected, projector**)

R

reflect—to throw back light, heat, or sound from a surface (**reflections, reflects, reflected, reflection**)

refract—the appearance of light bending when it moves from one medium to another (**refraction, refracting, refracts**)

remote control—a device that uses infrared waves to operate equipment, such as a TV, from a distance

S

scarlet fever—a disease that causes a fever, sore throat, and a red rash

security—protection from danger

shadow—a dark shape or outline of something that is made when light is blocked (**shadows**)

silvery—shiny or silver in color

skylight—a window in a ceiling or roof that lets in light

sound wave—a series of vibrations that can be heard (**sound waves**)

source—a starting place, where something comes from (**sources**)

spectrum—the distribution of all the colors that make up the light we see

speed—how fast or slow something moves

surface—the outside layer of something

symbol—an object or picture that stands for something (**symbols**)

T

telegraph—a tool for communicating by sending electrical signals by wire or radio

trachea—a tube that air passes through going to and from the lungs; windpipe

transmit—to move or send something from one place to another (**transmission**)

transparent—clear, see-through so light gets through

U

ultraviolet—short, invisible light waves, beyond violet on the spectrum, that cause sunburn

V

vacuum—emptiness

Visible Speech—a system of communication used by deaf people in which symbols represent sounds

vocal cords—muscles that produce sound when air passes over them

volume—the loudness or intensity of a sound

W

wave—an amount of energy that moves in a rippling pattern like a wave (**waves**)

wavelength—how long a wave is, the distance from the top of one wave to the top of the next wave (**wavelengths**)

white light—light that is made up of waves with different wavelengths and includes all the colors we can see

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ELEMENTARY LITERACY PROGRAM

Grade 3 | Unit 5 | Reader

Adventures in Light and Sound

860L

ISBN 9781643837277



9 781643 837277



Grade 3

Unit 5 | Digital Flip Book

Flash, Bang, Boom! Exploring Light and Sound

Grade 3

Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

Digital Flip Book















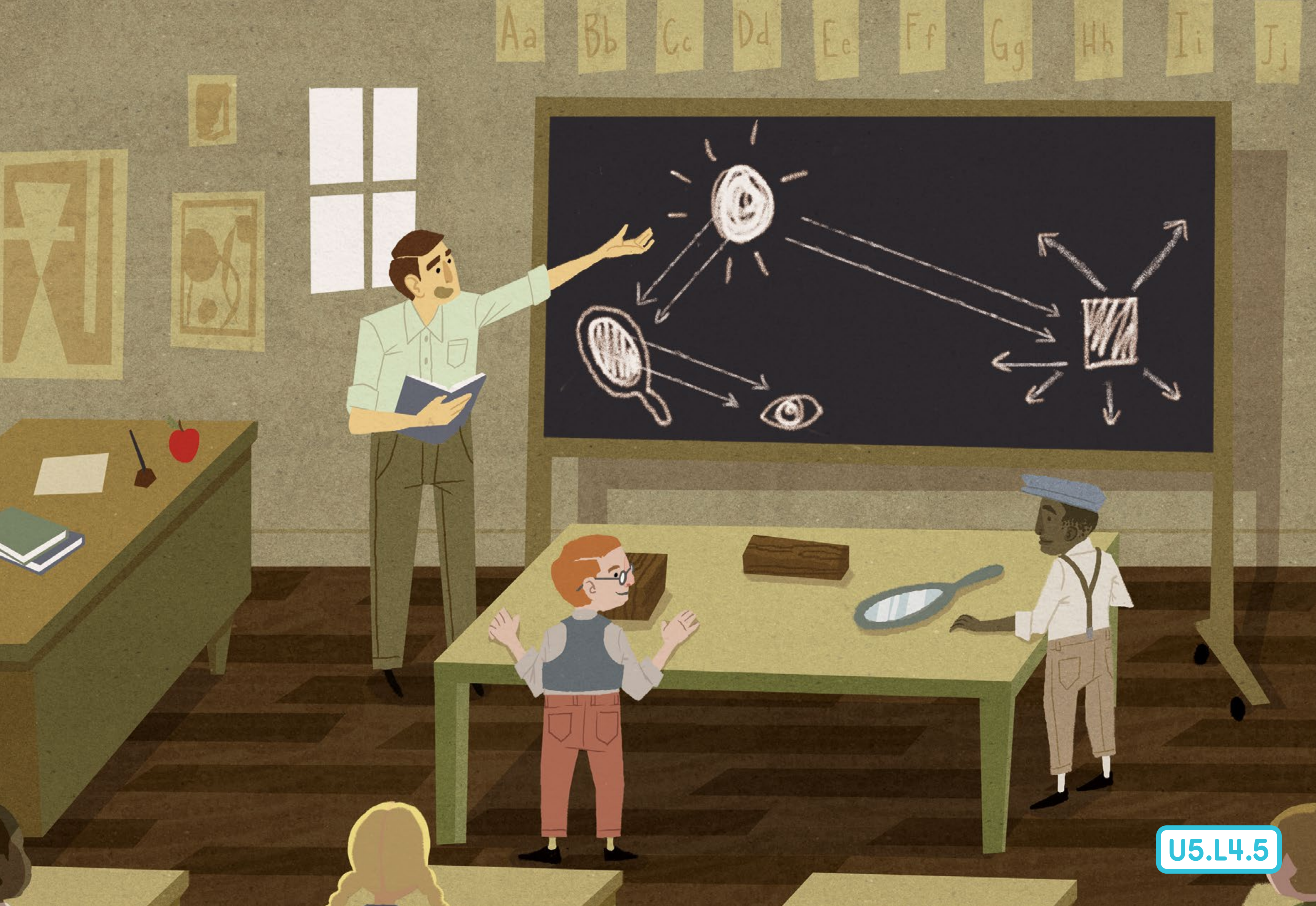




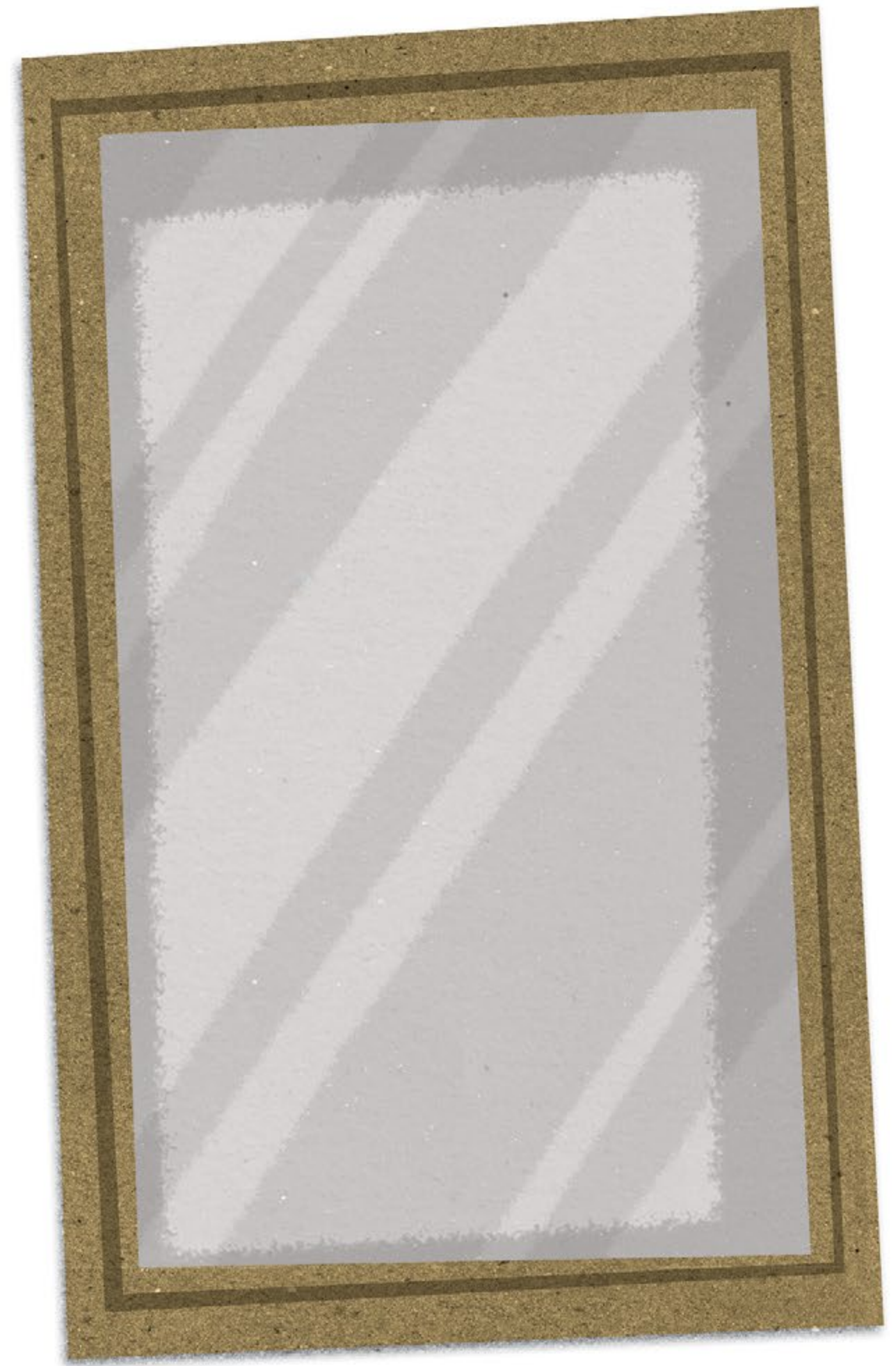




















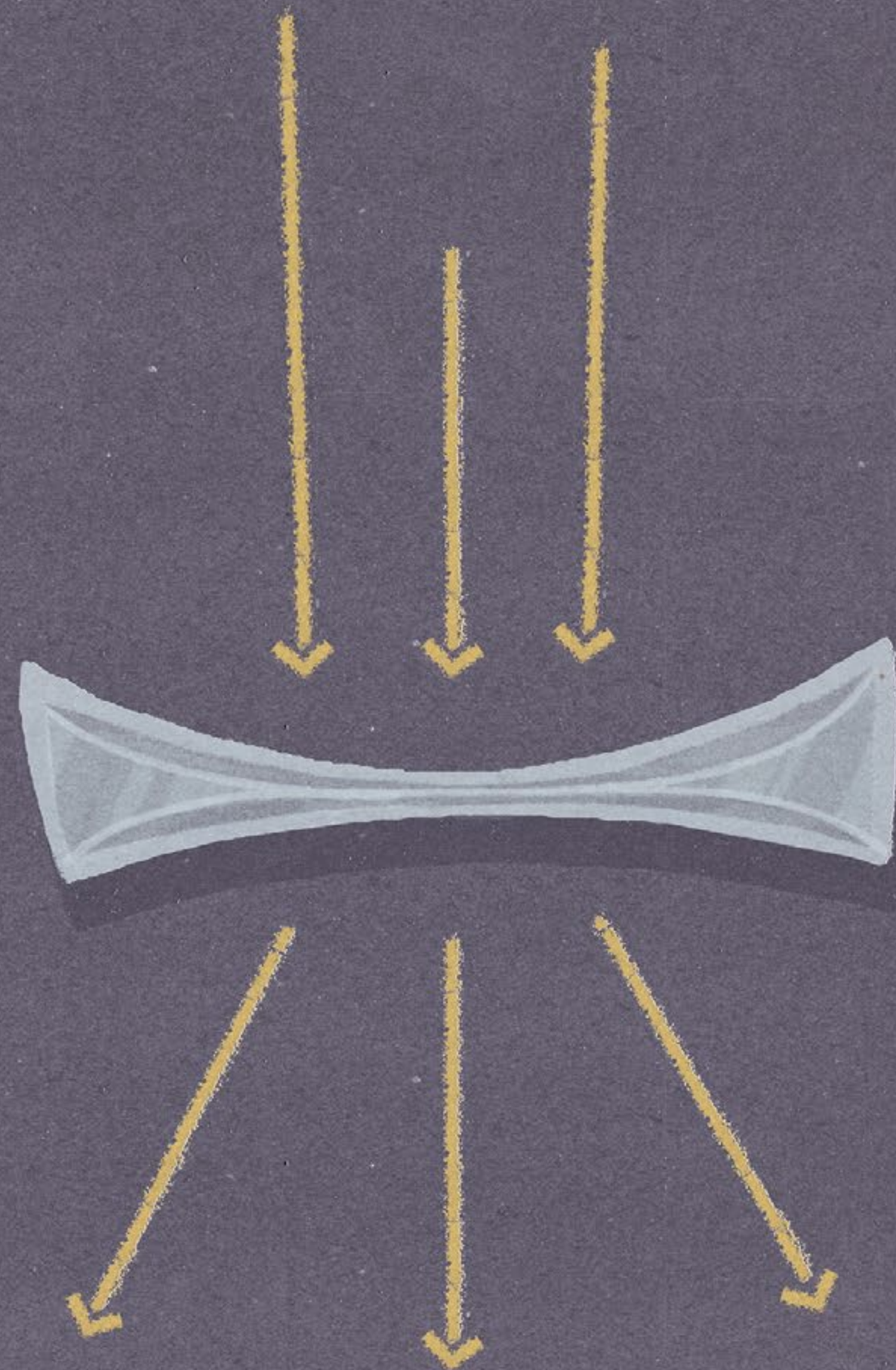
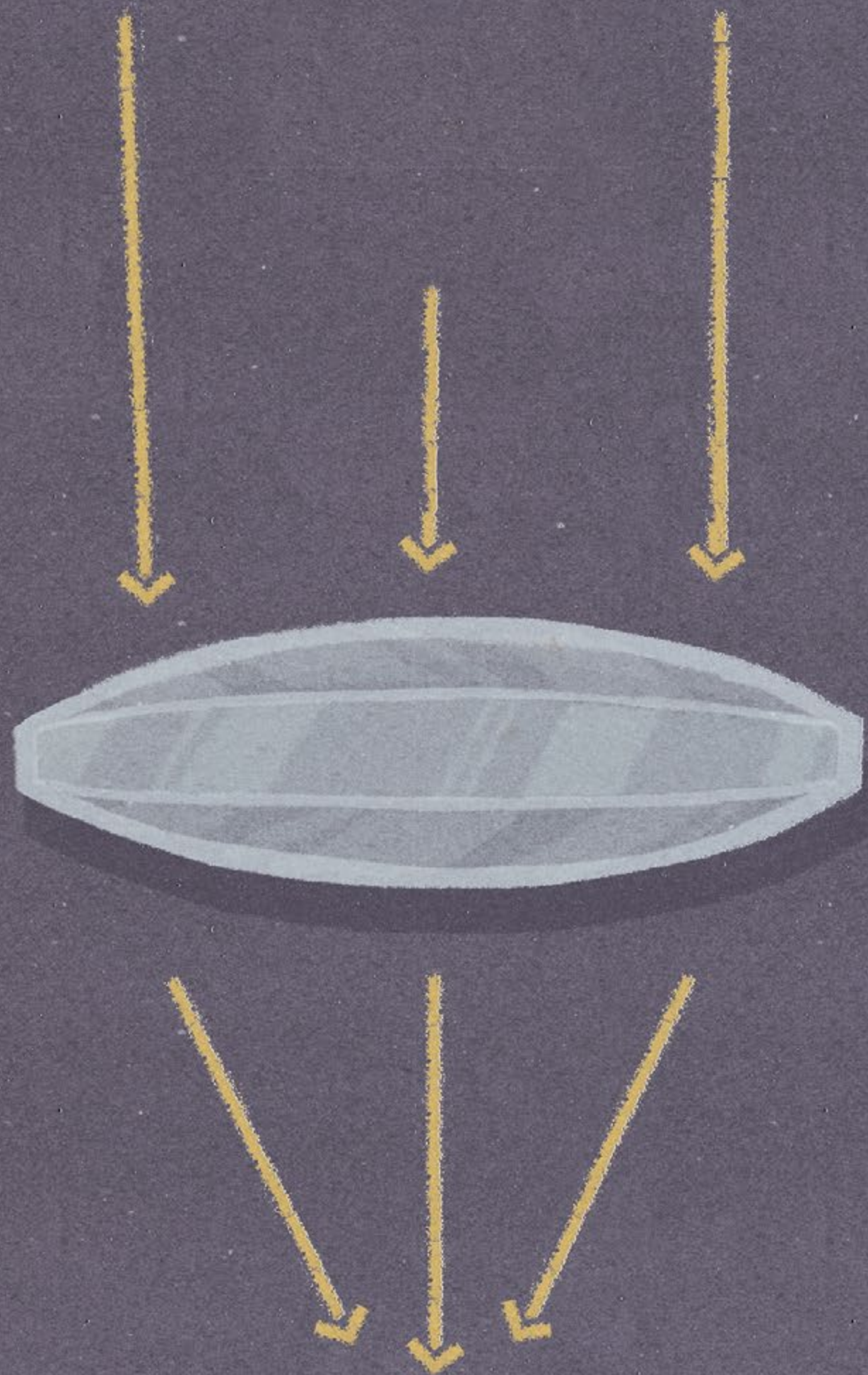














HOUSE
-OF-
MIRRORS

TICKETS

COTTON CANDY

SAVE
TREES.
AVOID
HOMEWORK.















Light Energy From the Sun

Longer Wavelengths

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MICROWAVE

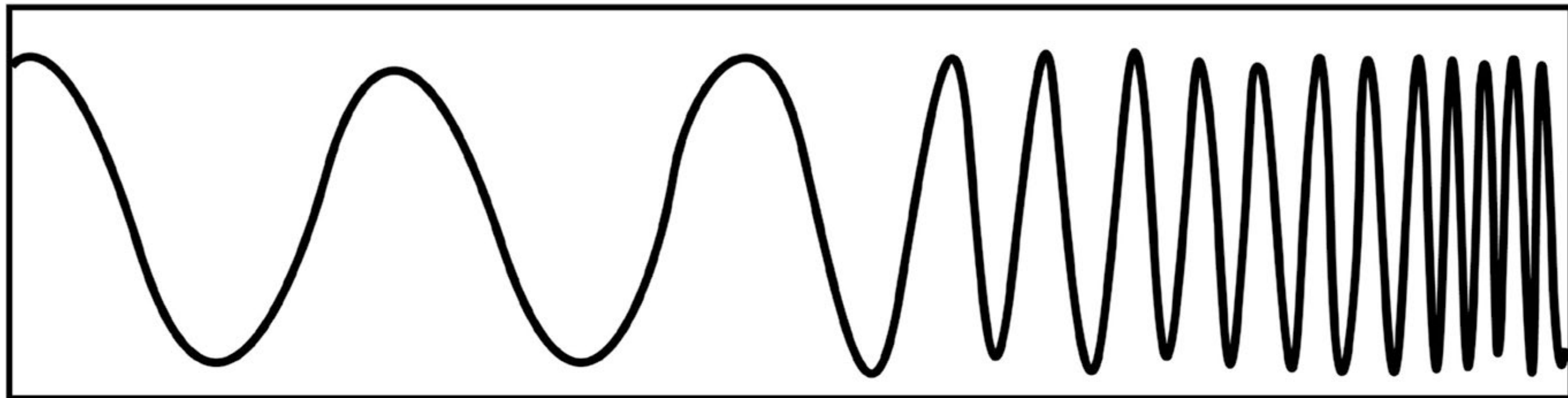
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U5.L7.6













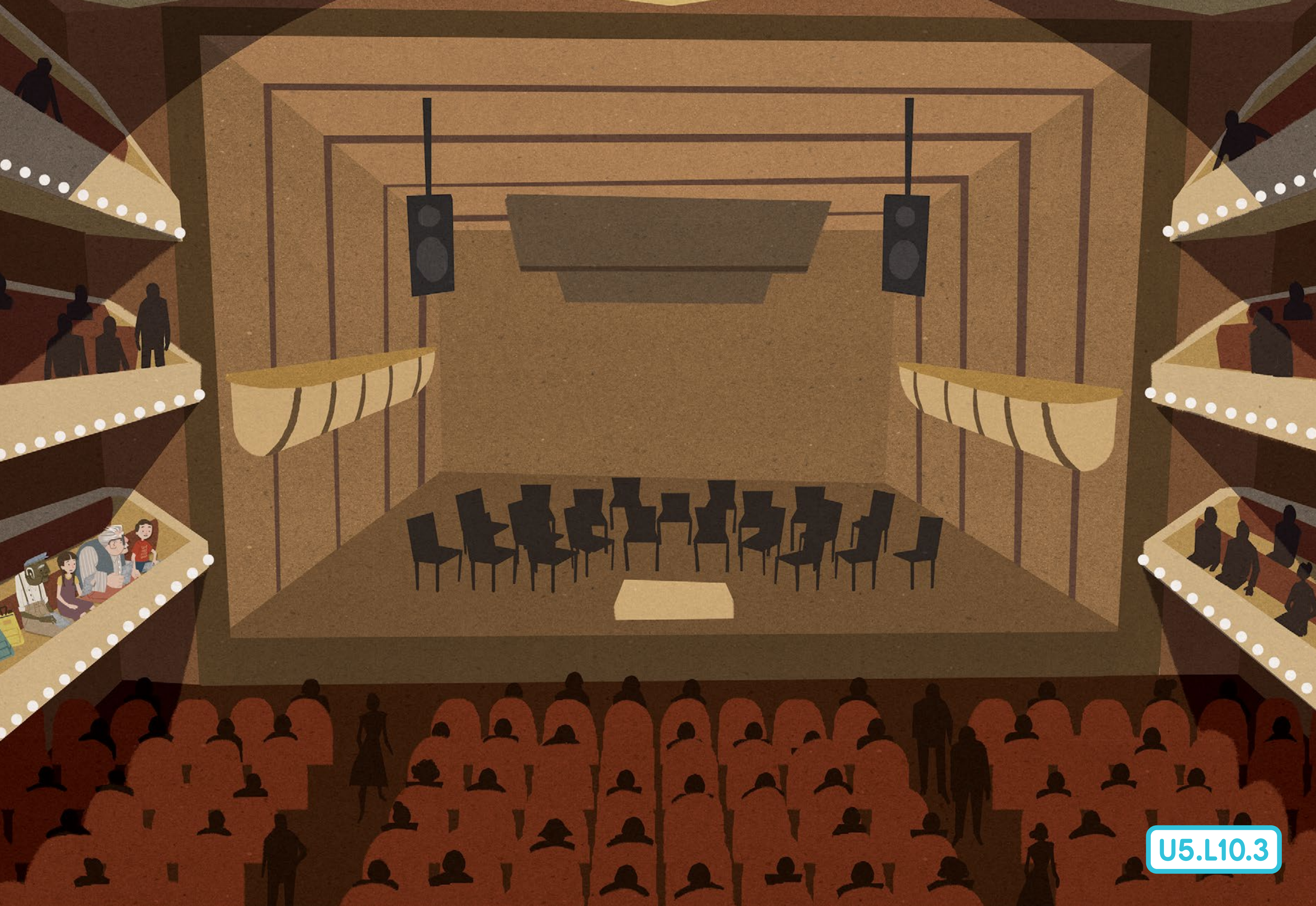








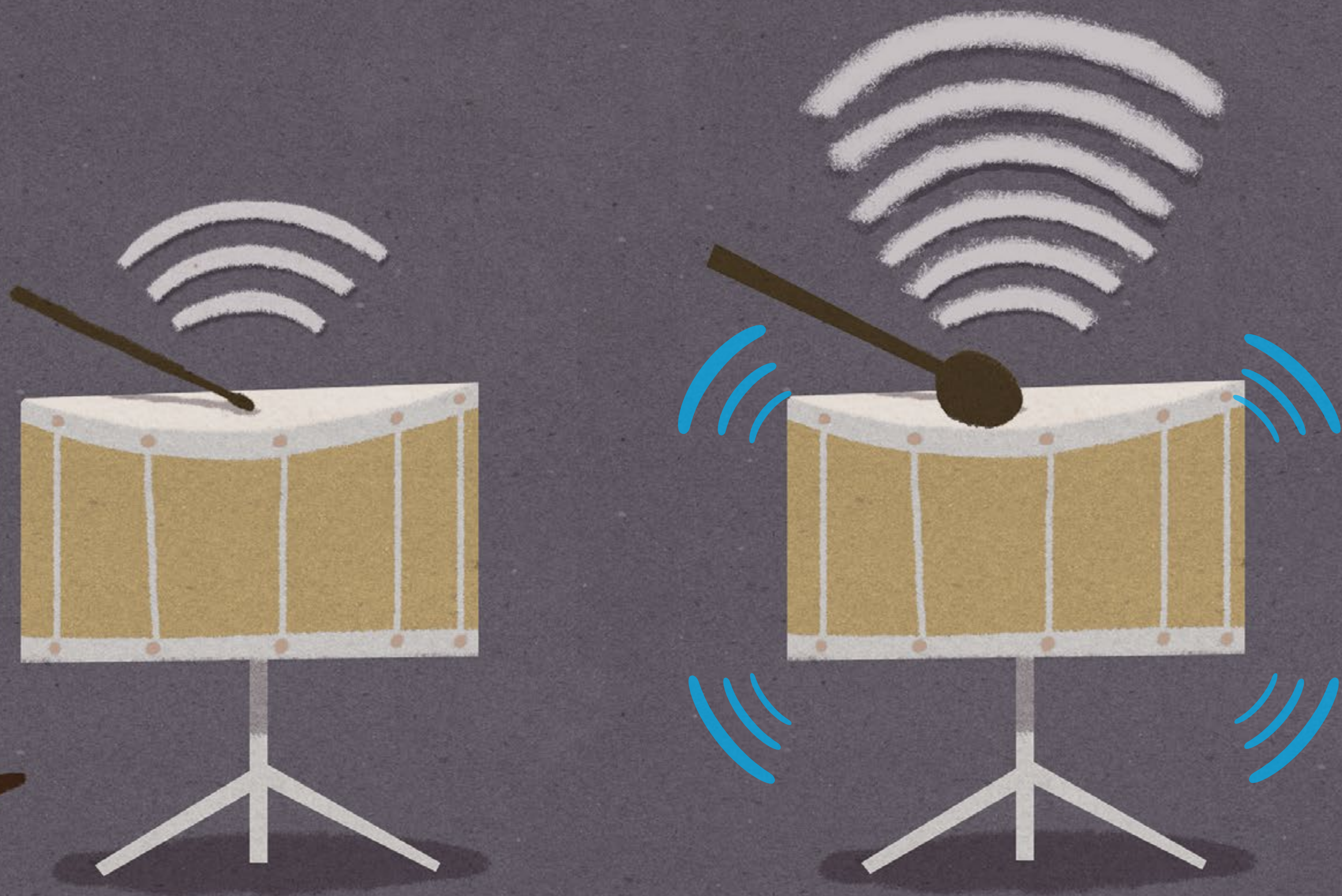












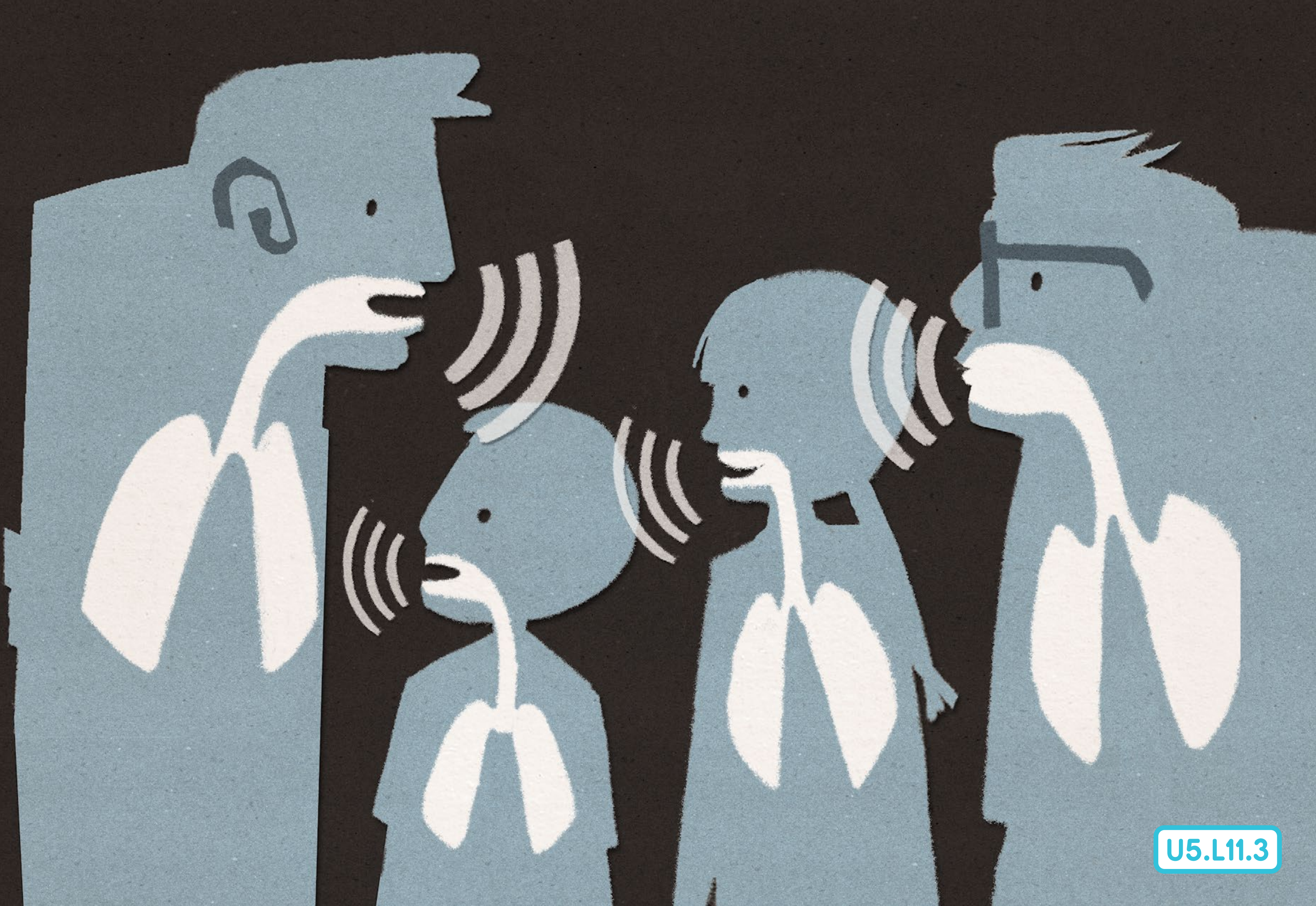






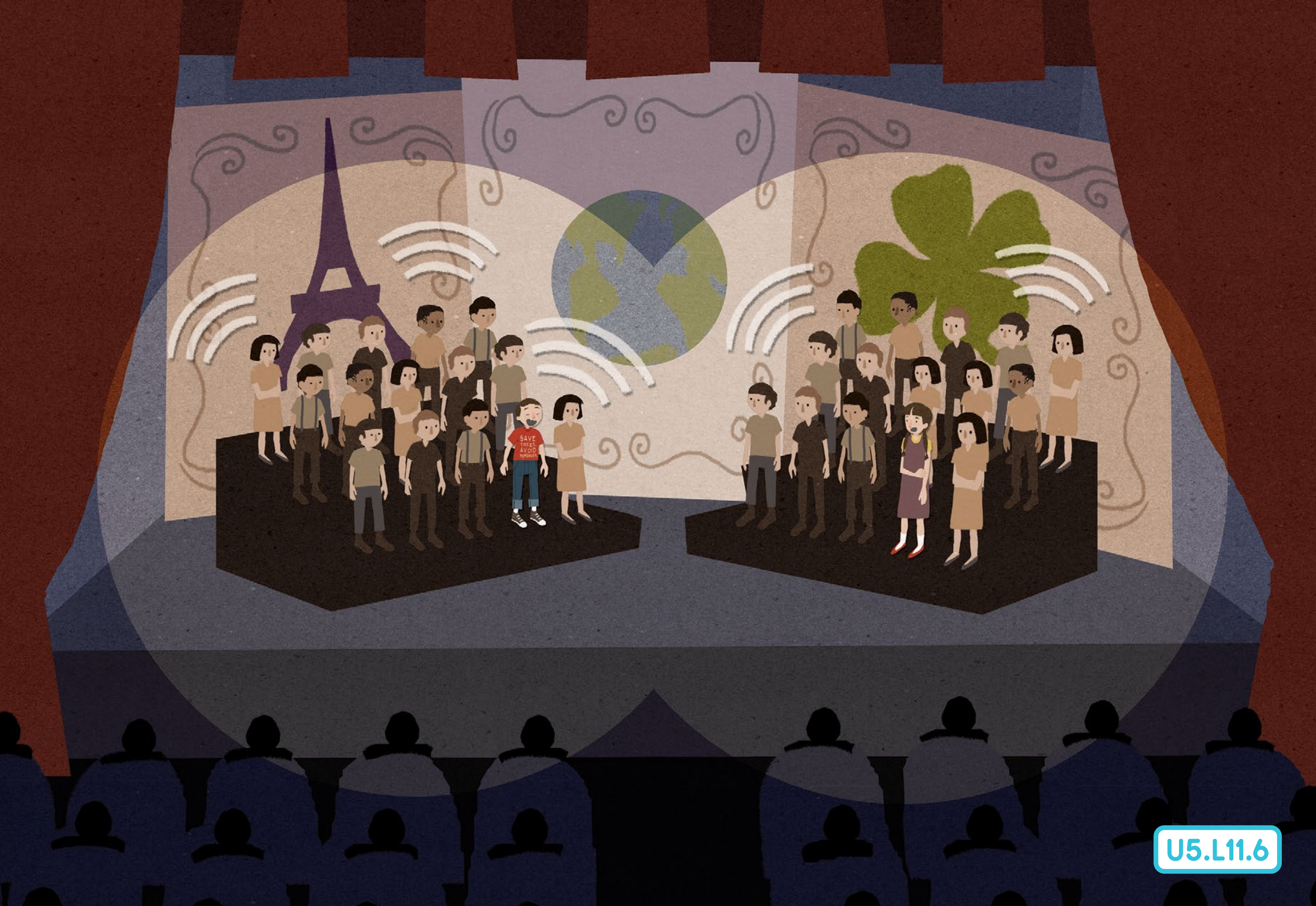


















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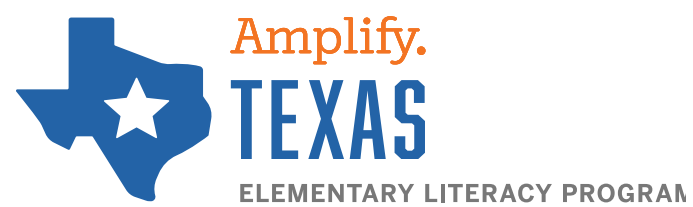
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Grade 3 | Unit 5 | Digital Flip Book
Flash, Bang, Boom! Exploring Light and Sound



Grade 3

Unit 5 | Image Cards

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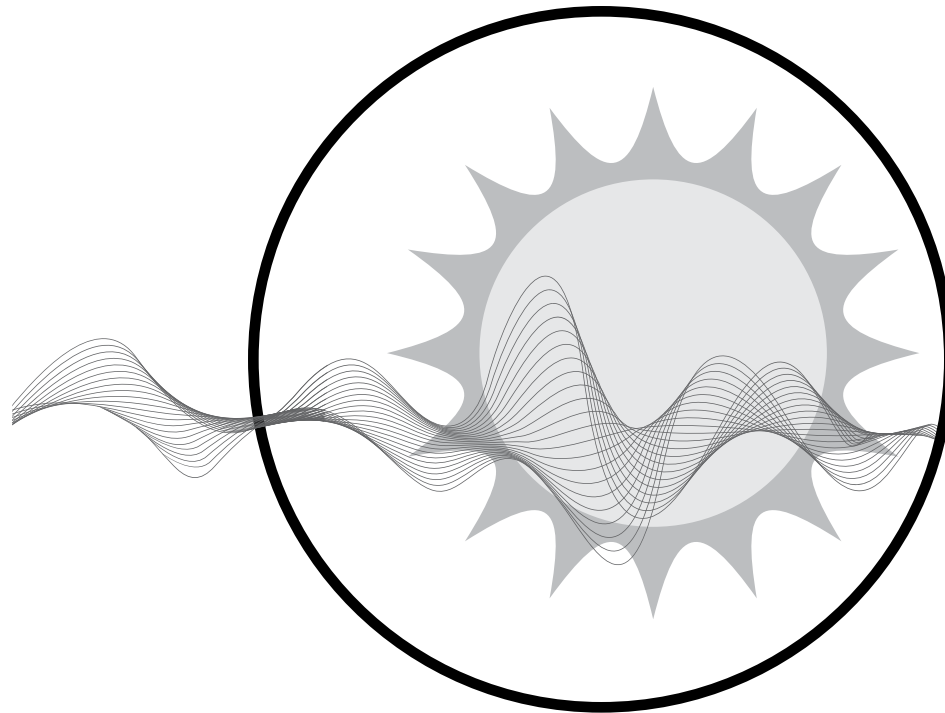
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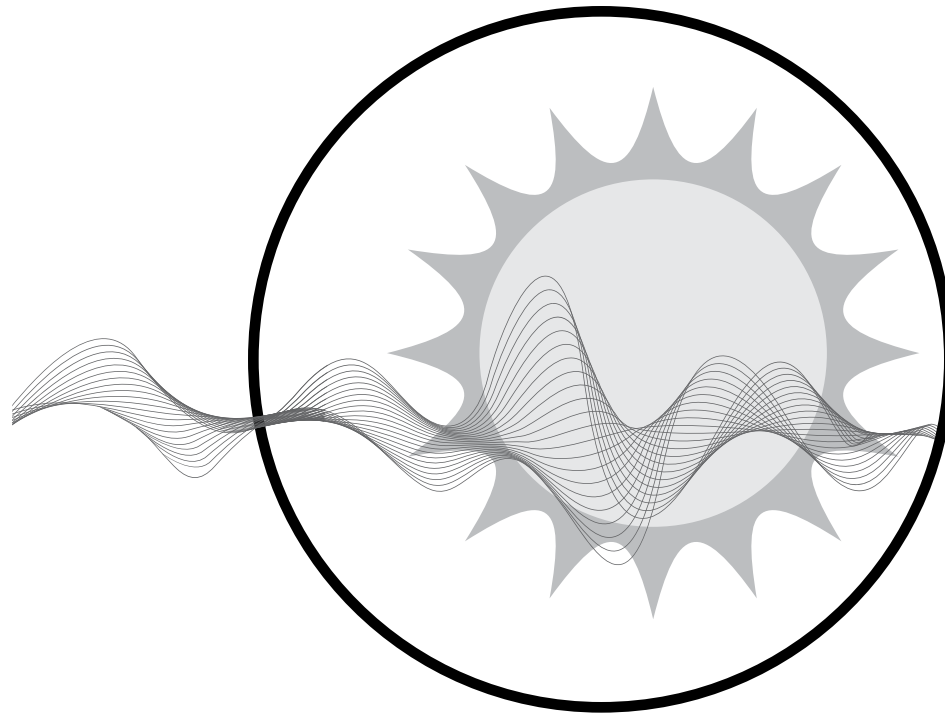


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C.U5.L2.1 Rays of Sunlight



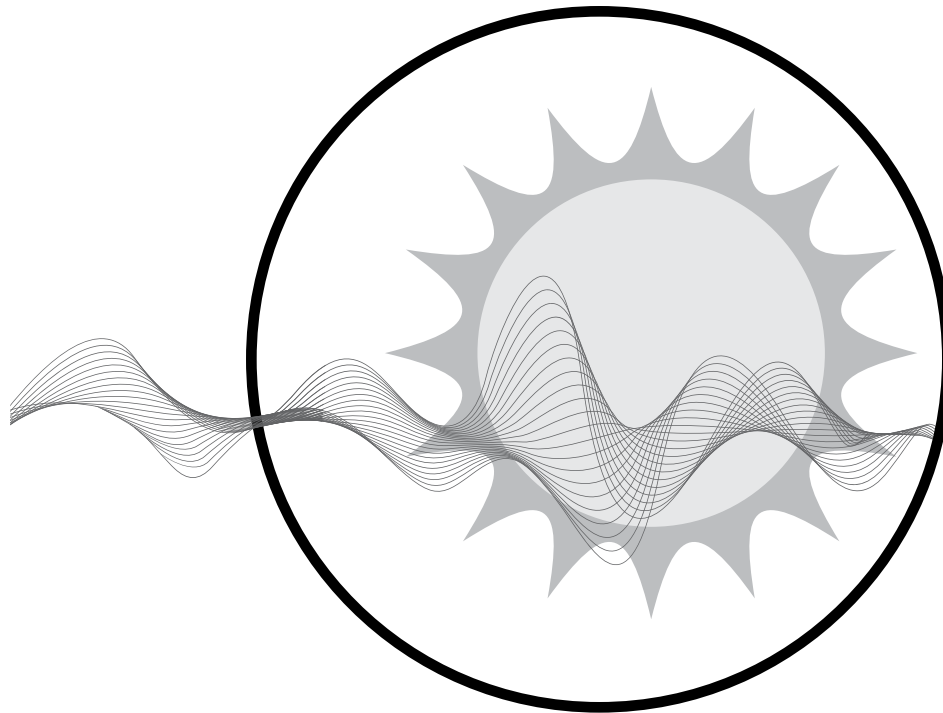


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C.U5.L4.1 Firefly



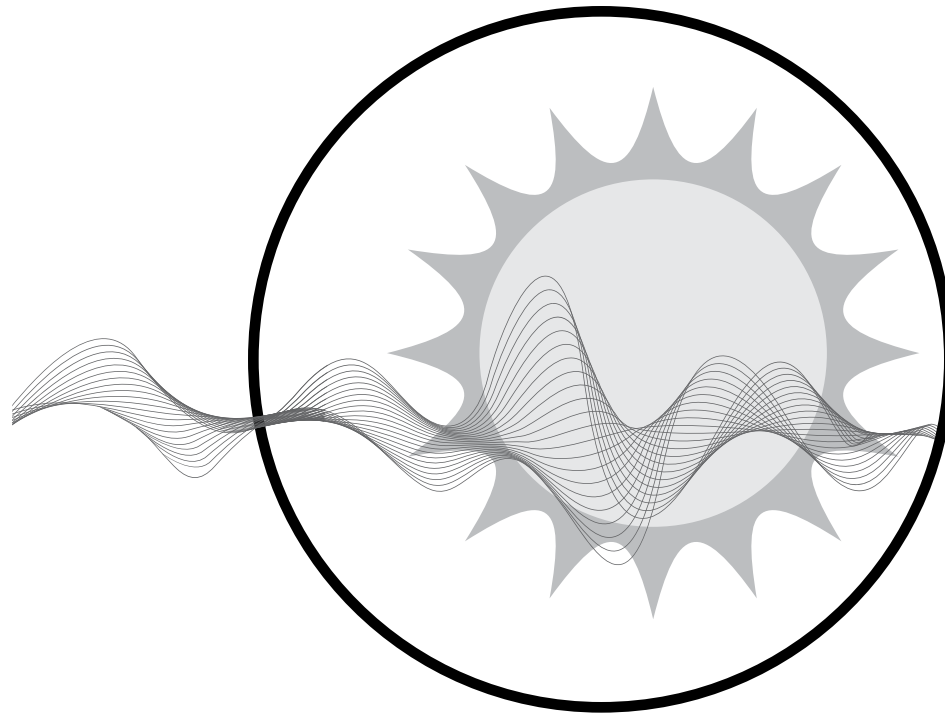


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C.U5.L5.1 Refraction



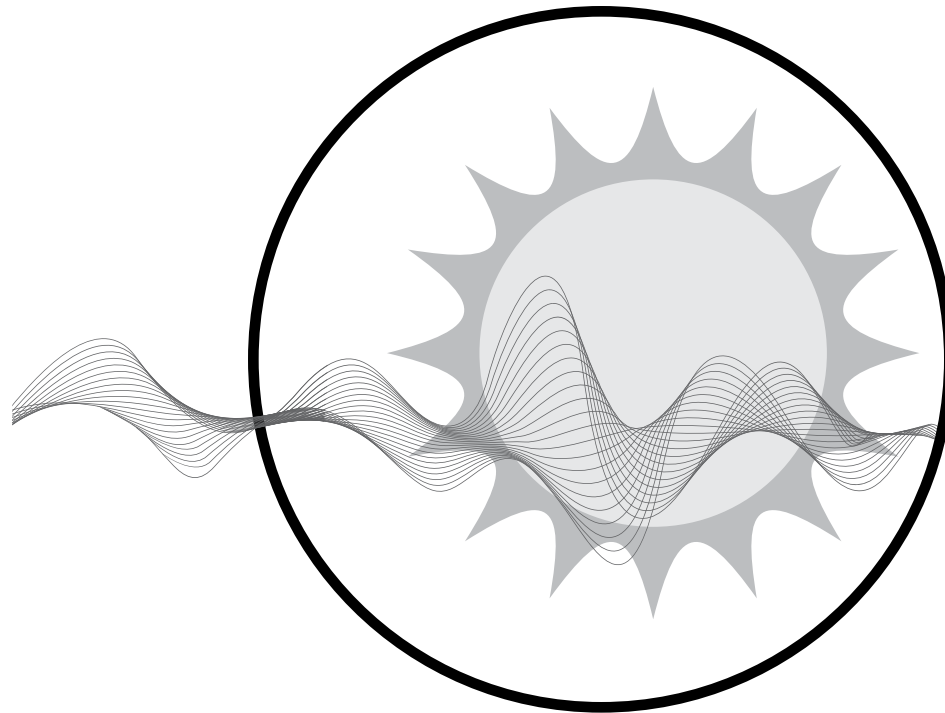


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C.U5.L5.2 Instruments That Use Lenses





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C.U5.L5.3 Distortion Mirror

LONGER WAVELENGTHS

SHORTER WAVELENGTHS

RADIO

MICROWAVE

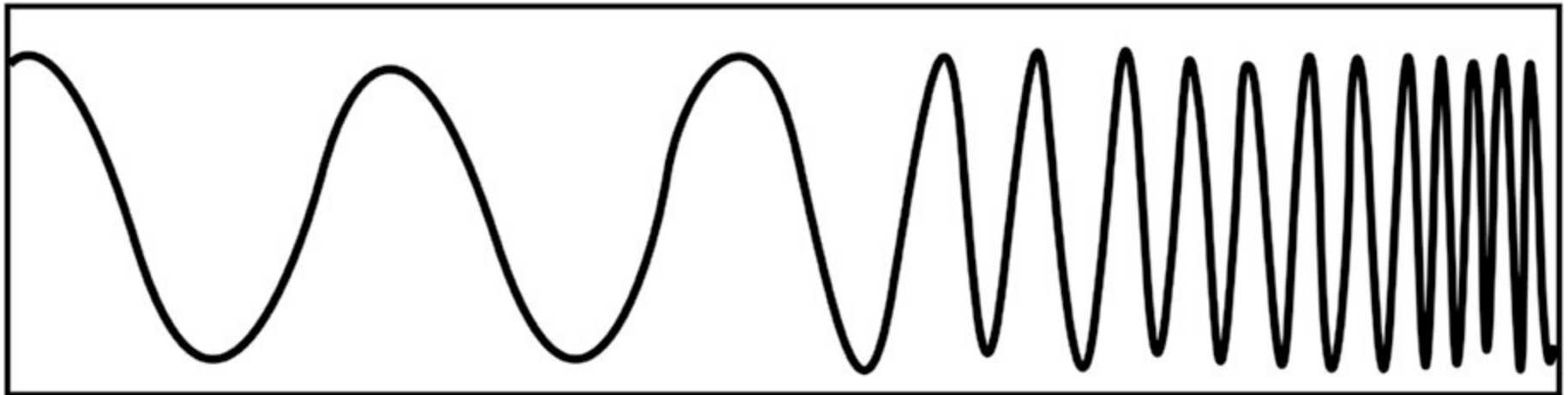
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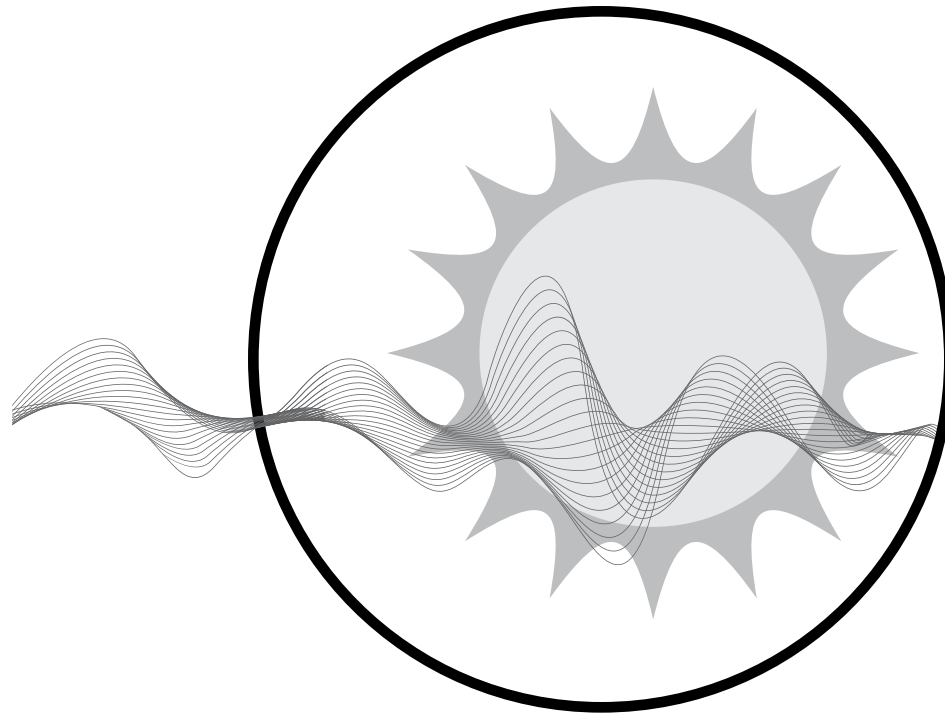
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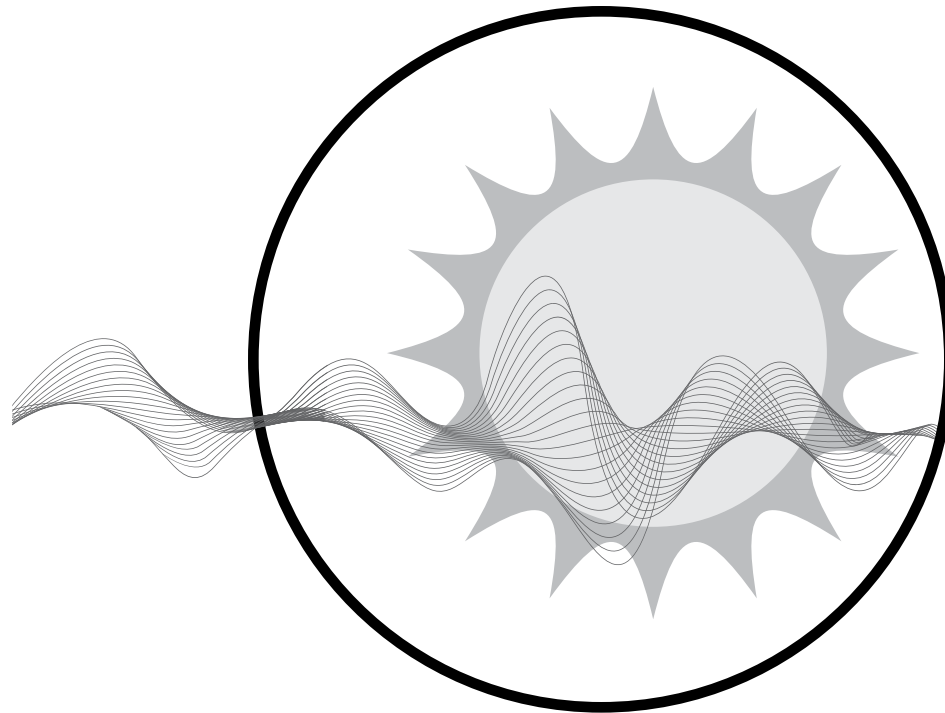


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C.U5.L7.1 Light Energy from the Sun

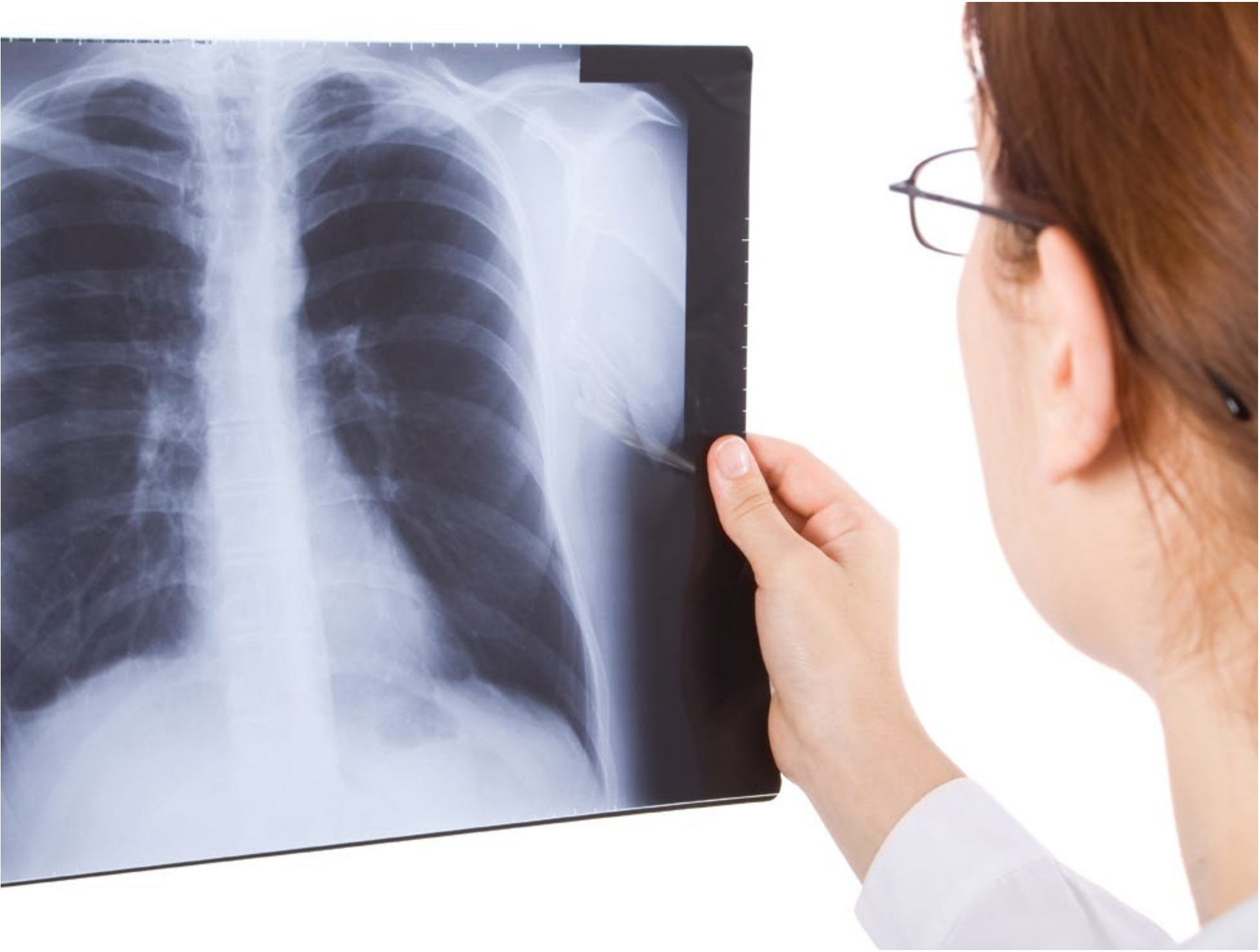


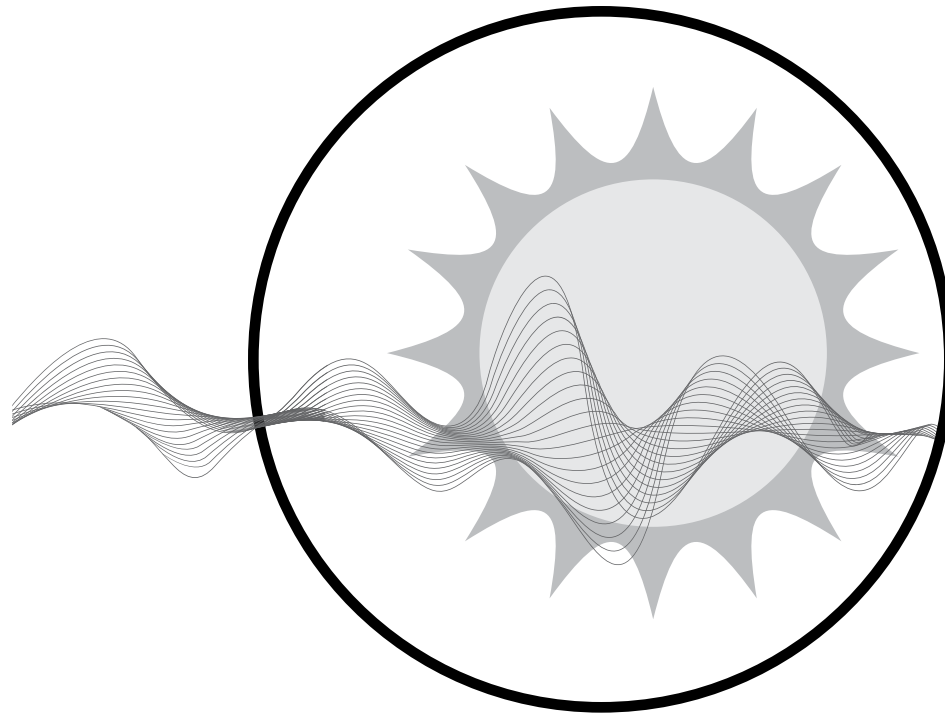


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C.U5.L7.2 Rainbow

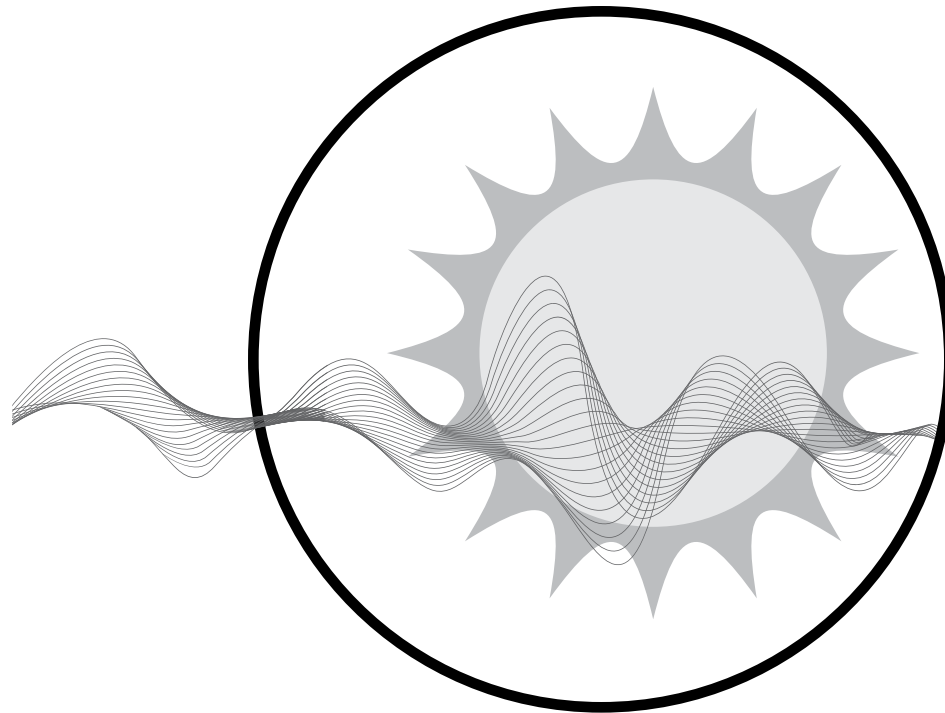


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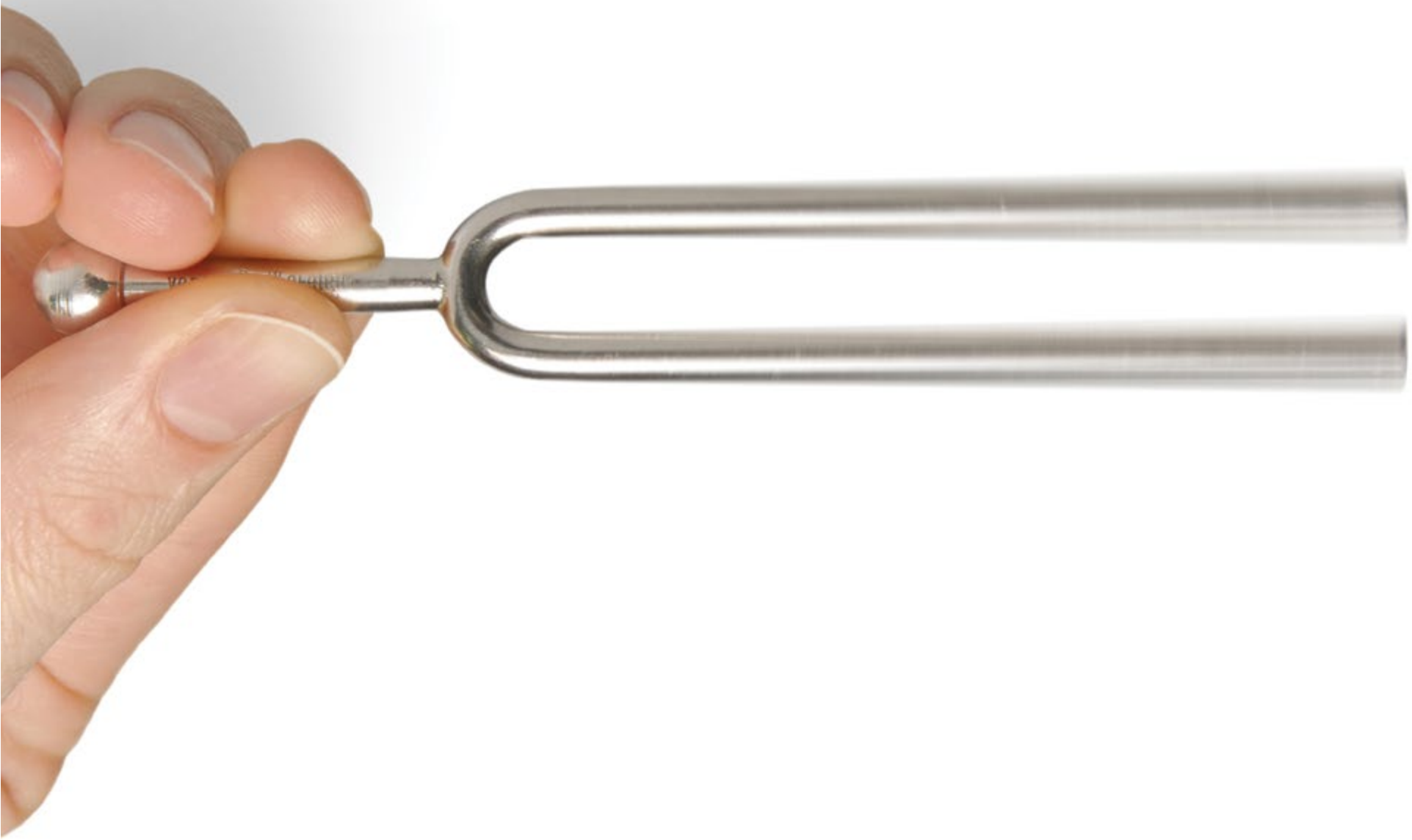
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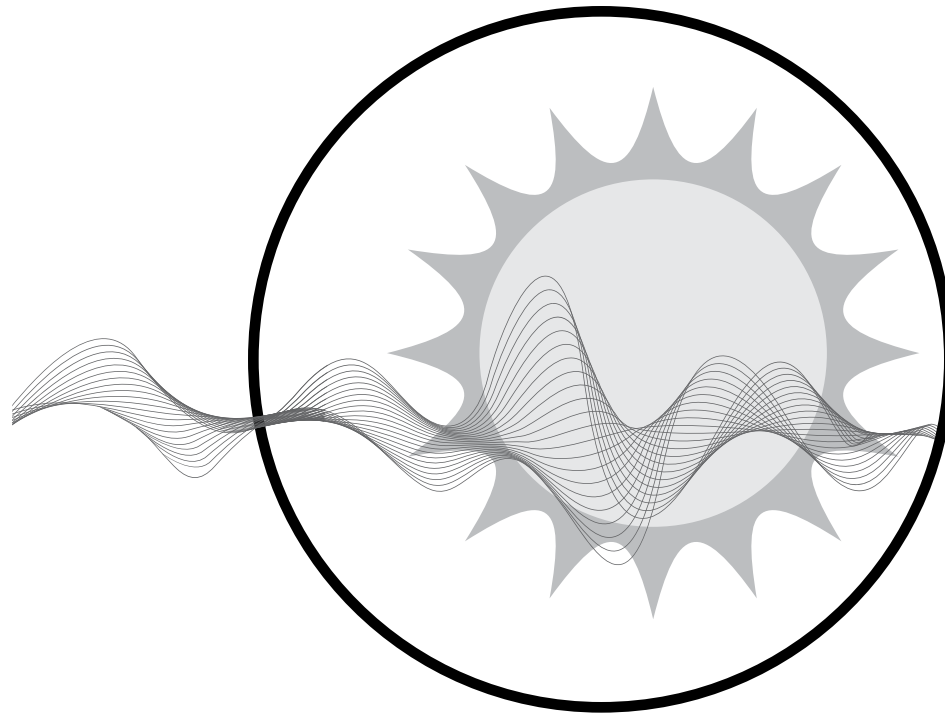


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C.U5.L7.4 Reflection and Color



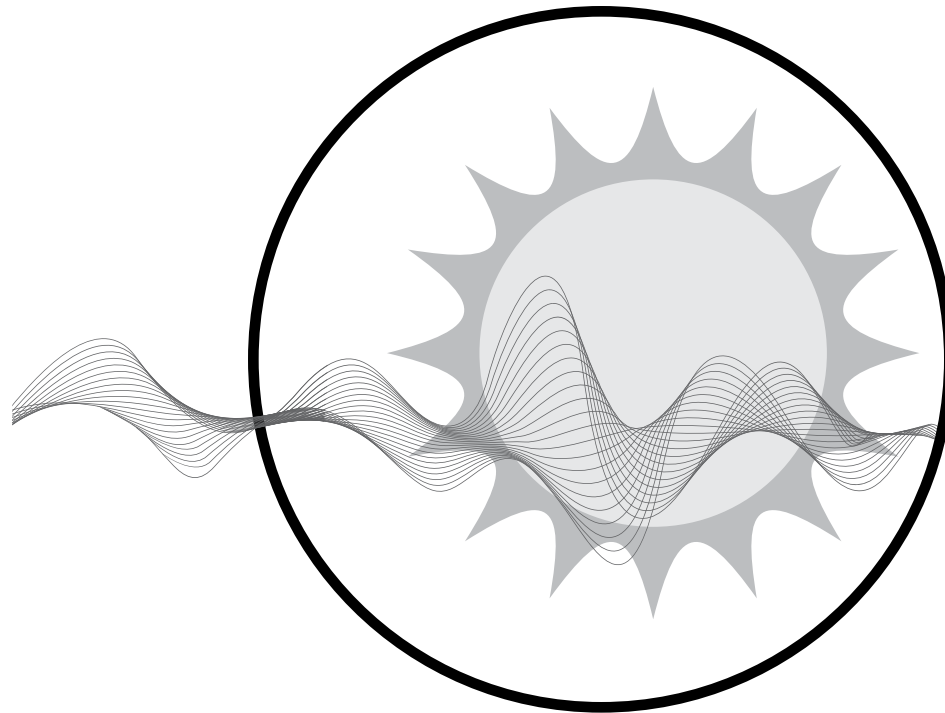


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C.U5.L8.1 Tuning Fork



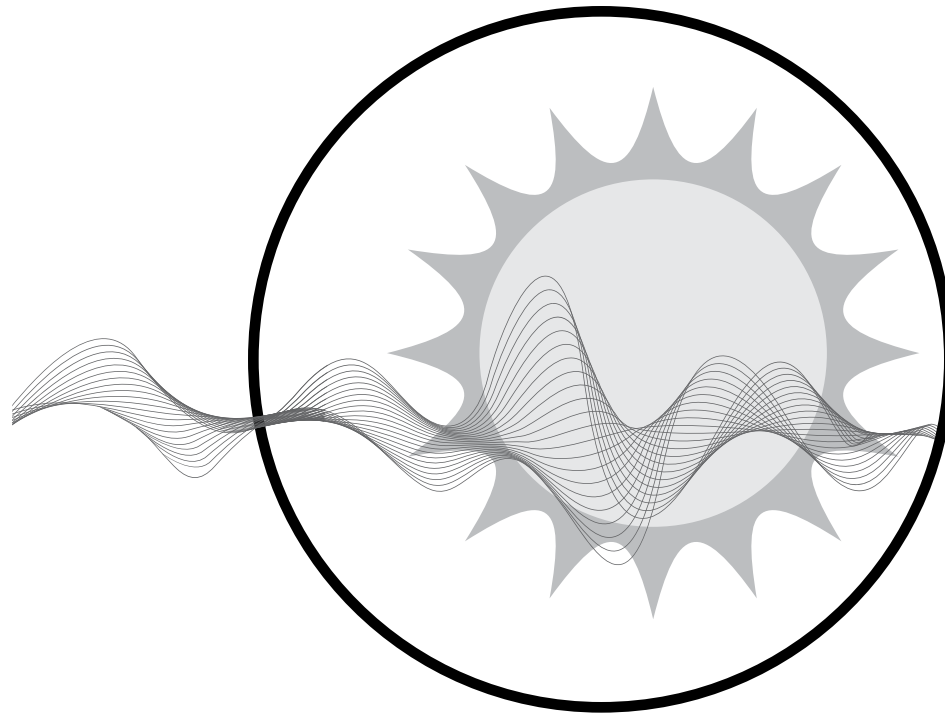


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C.U5.L8.2 Guitar



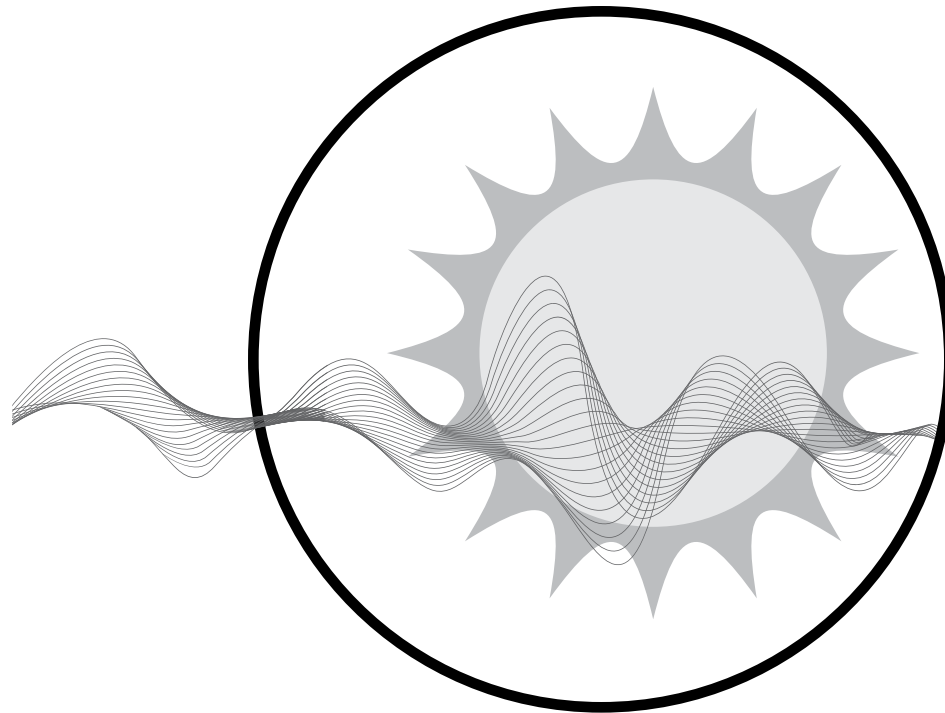


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C.U5.L8.3 Recorder

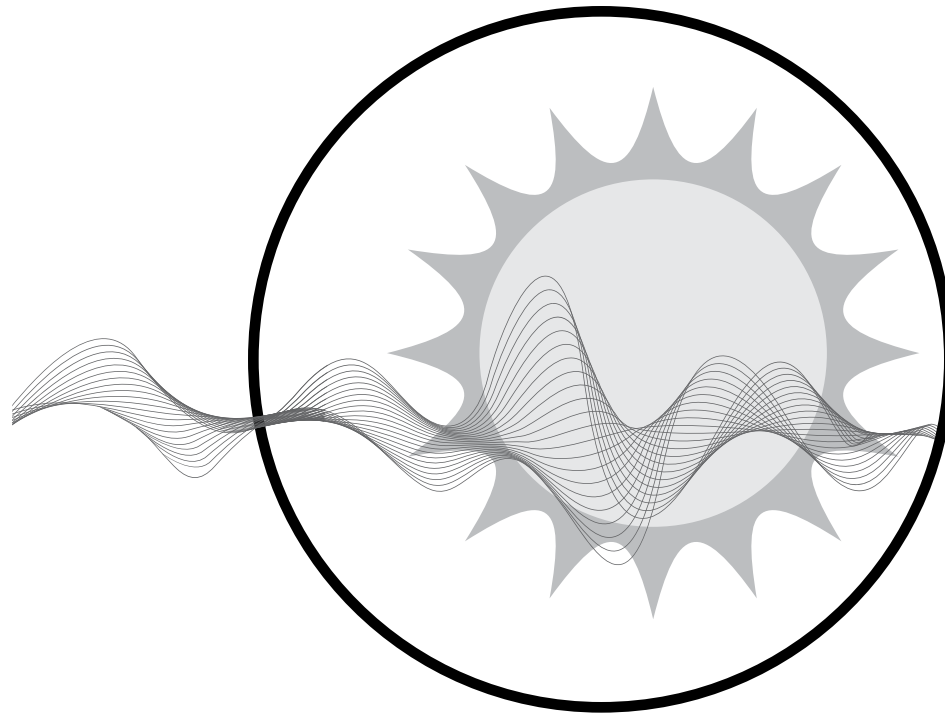


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C.U5.L8.4 Sound Traveling Through String

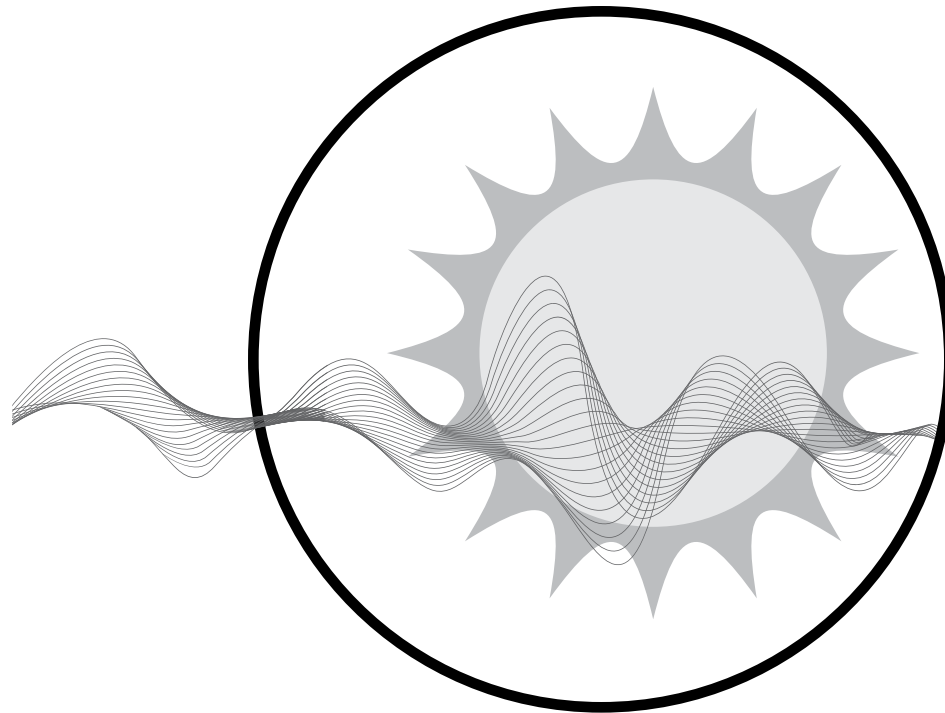


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C.U5.L8.5 Sound Waves Entering Ear



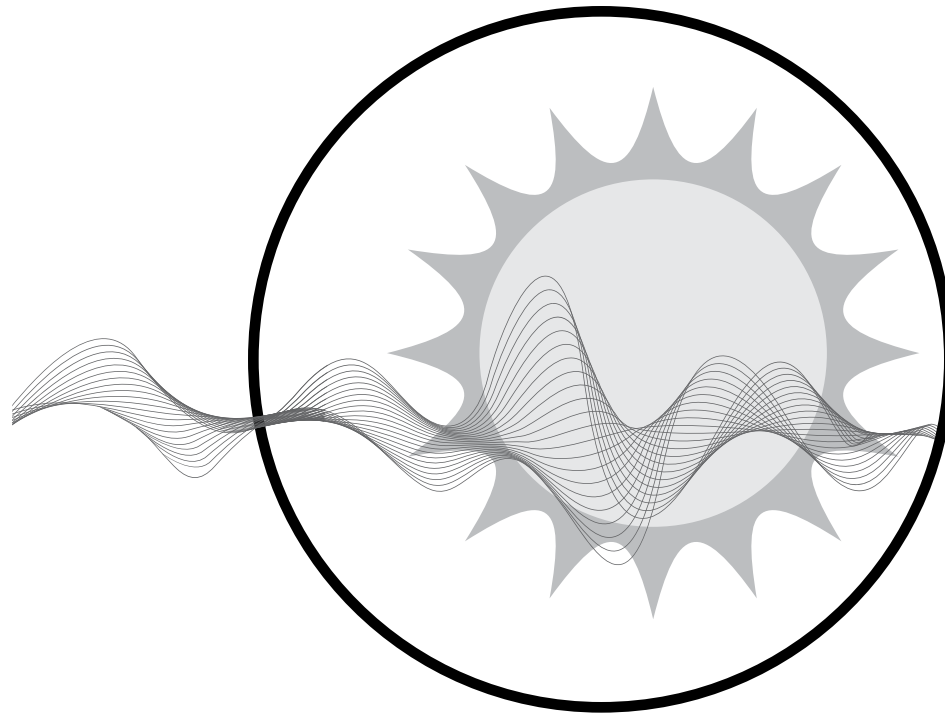


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C.U5.L10.1 Orchestra



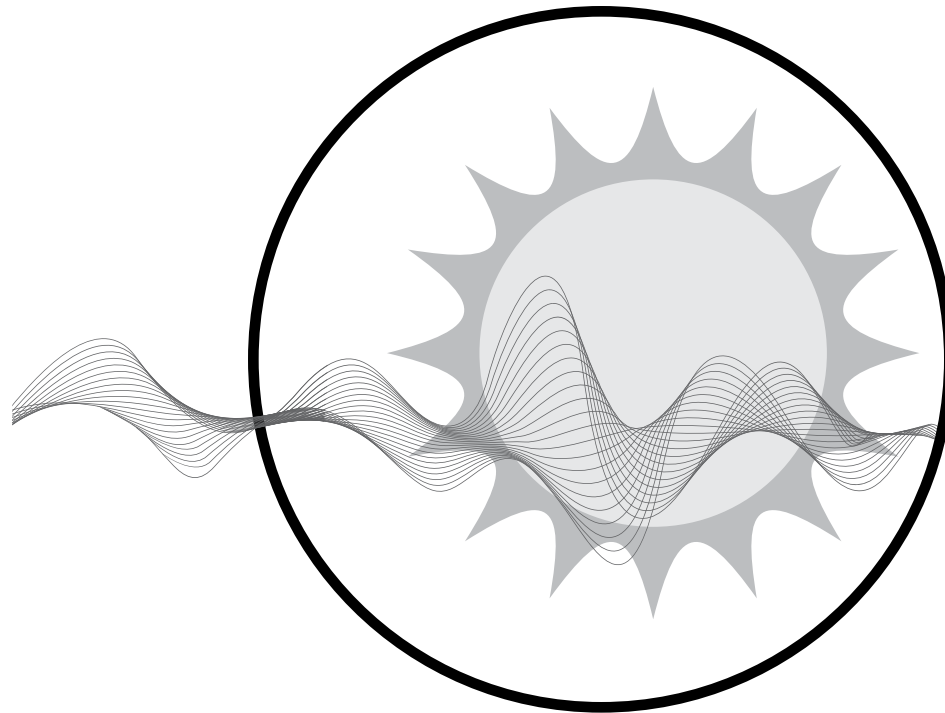


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C.U5.L10.2 Hearing Aid

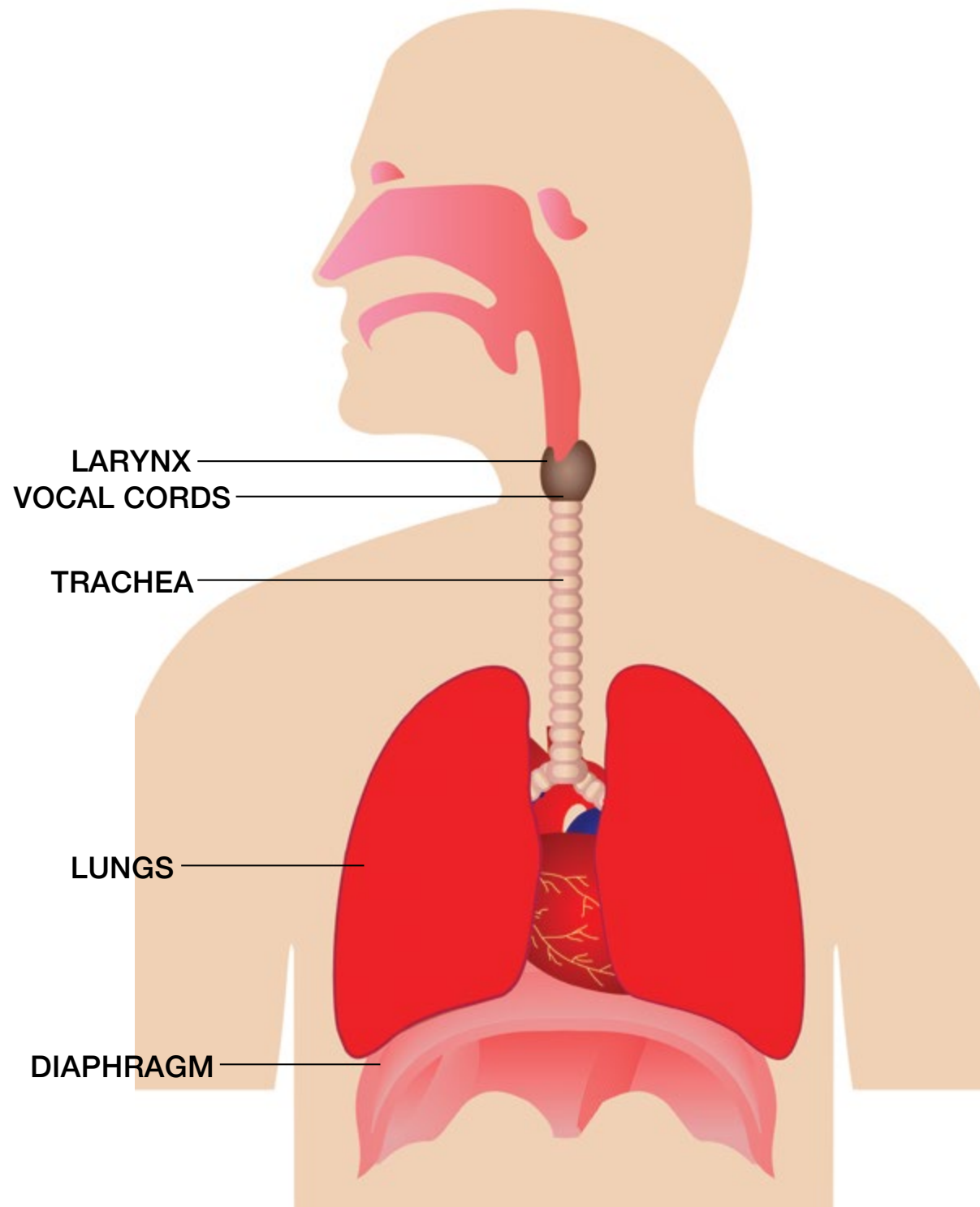


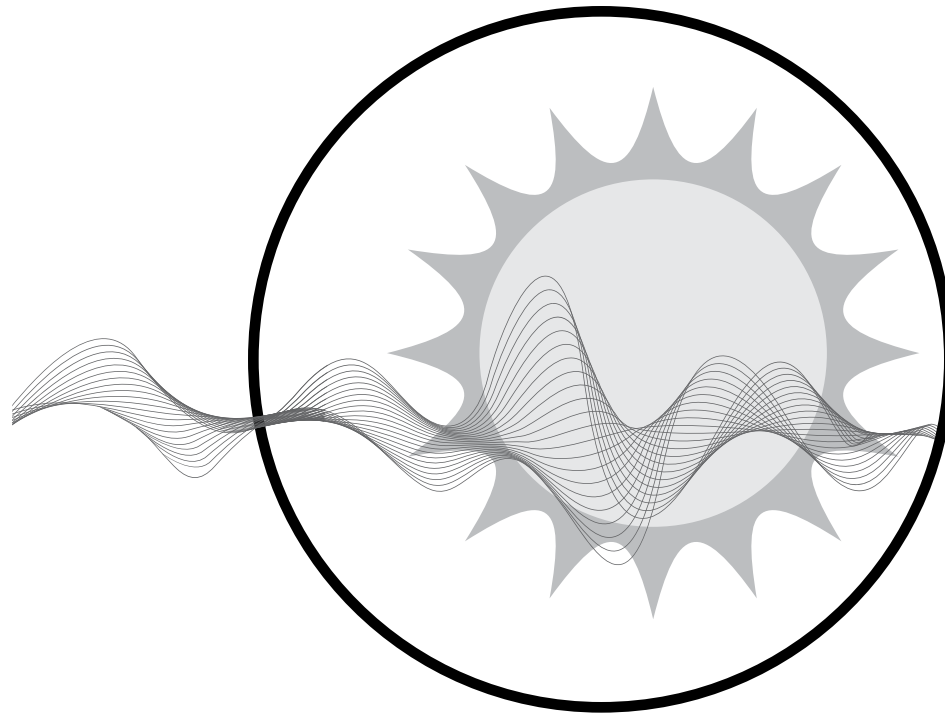


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C.U5.L10.3 Violin and Bass





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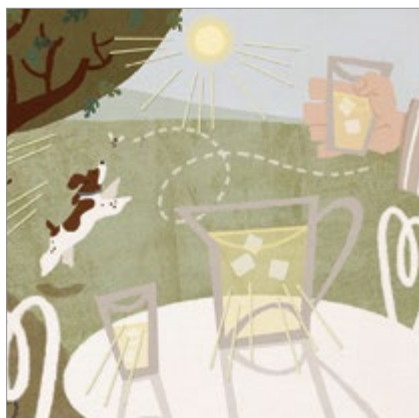
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Grade 3

Unit 5: *Flash, Bang, Boom! Exploring Light and Sound*



Unit-level Essential Question

What are the properties of light and sound?

Lessons 1–5

Guiding Question: Why is the sun's light important for life on Earth?

Writing Prompt: Why does the moon shine brightly at night, even though it does not make its own light?

Lessons 6–10

Guiding Question: What is the relationship between color and light?

Writing Prompt: Take a look at the outfit you are wearing right now. Why are the pieces of clothing you're wearing certain colors?

Lessons 11–17

Guiding Question: How do humans produce sound?

Writing Prompt: How do your vocal chords, diaphragm, and larynx help you to make sound?

Unit 5 Culminating Activity

Choose a chapter from your Reader that taught you a subject you enjoyed reading about. Next, write a short scene with Samuel and Jack explaining that subject. How can you put the concept in your own words?



Grade 3

Unit 5 | Digital Projections

Flash, Bang, Boom! Exploring Light and Sound

Grade 3

Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

Digital Projections

Contents

Flash, Bang, Boom!

Exploring Light and Sound

Digital Projections

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Lesson 4 DP.U5.L4.1 Adverbs That Tell *when*.....3

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Lesson 11 DP.U5.L11.1 Spelling Chart.....8

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Spelling Chart

| 'y' > /ee/ | 'e' > /ee/ | 'i' > /ee/ | 'ea' > /ee/ | 'ee' > /ee/ | 'ie' > /ee/ | 'ey' > /ee/ | 'e_e' > /ee/ |
|------------|------------|------------|-------------|-------------|-------------|-------------|--------------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

T-Chart Organizer

| Text 1: What is Light? (Reader) | Text 2: What is Light? (Excerpts) |
|---------------------------------|-----------------------------------|
| | |

Adverbs That Tell *when*

_____ I will play football with my friends at the park.

_____ I played football with my friends at the park.

I _____ play football with my friends at the park.

He did his hardest homework assignment _____, then he did the easier one.

He made a mistake in his homework, so he did it _____.

Adverbs That Tell *where*

Mike cut the grass _____.

Dad _____ in a building with ten floors.

Flowers are growing _____.

I left my book _____.

Sam put the mail _____.

Spelling Chart

| 'ay' > /æ/ | 'ai' > /æ/ | 'ea' > /æ/ |
|------------|------------|------------|
| | | |
| | | |
| | | |
| | | |
| | | |

Morphology

The boy is filled with joy.

The boy sang with a joyous voice.

The boy joyously sang the song.

The large waves in the sea are full of danger.

The large waves in the sea are dangerous.

The large waves crashed dangerously on the beach.

Language Chart

| 'ay' > /ae/ 'ai' > /ae/ 'ea' > /ae/ | | |
|-------------------------------------|---------|-----------|
| failed | blazes | statement |
| says | greatly | daytime |

Spelling Chart

| 'a_e' > /ae/ | 'a' > /ae/ |
|--------------|------------|
| | |
| | |
| | |
| | |
| | |
| | |

How to Have a Great Discussion Chart

Have a Great Conversation!

Here's how to get started:

I wondered about _____.

Could you say more about that?

I really liked _____.

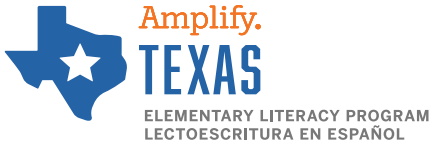
Why did you _____?

I noticed that _____.

I have a question about _____.

I'm not sure about _____. Could you explain more?

Do you think that _____?



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Welcome!

Grade 3, Unit 5

Flash, Bang, Boom!

Exploring Light and Sound

In this unit, students will learn about the properties of light and sound.

What's the story?

Students will build on what they previously learned about the **five senses** and the human body, focusing on the **senses of seeing and hearing**. Students will be introduced to this content through a narrative story about two old friends, Samuel and Jack, who are losing their sight and hearing.

What will my student learn?

Students will learn **how light** and **sound travel in waves** and how light and sound can be manipulated by various instruments.

In this unit, students will **respond to texts** they have read, **conduct research**, and **take and organize notes**. As part of their final writing task, they will **plan, draft, revise, edit**, and **publish a newspaper article**.

Conversation starters

Ask your student questions about the unit to promote discussion and continued learning:

1. What are some sources of light?
Follow up: What would Earth be like without the light from the sun? What would it be like without the heat energy from the sun?
2. What are some things that are transparent?
3. What causes light to reflect off water, glass, and other smooth and shiny objects?
Follow up: What are some things in our home that are reflective?
4. What happens to light when it encounters a translucent object?
Follow up: What are some examples of translucent things?
5. Explain the difference between convex and concave.
Follow up: How do scientists use convex lenses? What are concave lenses used for?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 1 - What does light have to do with wavelengths? Use evidence from the text to support your response.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 2 - How do the characters in this narrative use their five senses and sensory organs to experience the world around them? What was the author's purpose in writing this narrative?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 3 - Are people's bodies transparent or opaque? How do you know?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 4 - Based on the information in the story so far, why do you think Samuel wants to visit the House of Mirrors?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 5 - What is the purpose of a magnifying glass? How does a magnifying glass make things look different?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 6 - The word *microscope* comes from two ancient Greek words: *micro*, meaning "small," and *scope*, meaning "to see or to look." Do you think that it's a good word to describe the instrument? Why or why not? Use evidence from the text to support your answer.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 7 - Describe the spectrum of colors and how it is formed.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 8 - How do we sense the vibrations of sound waves? Use evidence from the text to support your answer.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 9 - Today you learned more information about sound and light. Compare and contrast light and sound. Use evidence from the text to support your response.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 10 - How would school be different if all sounds were the same pitch and volume?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 11 - Why do adults have lower-pitched voices than children? Use evidence from the text to support your response.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 12 - How did Aleck's mother and father inspire him? What did they inspire him to create? Use evidence from the text to support your response.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 13 - You have read informational text about two famous inventors, Alexander Graham Bell and Thomas Edison. Compare and contrast the two inventors.

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 15 - What was the most important thing you learned from your partner's feedback on your writing? What are some of the improvements you made to your writing?

Name: _____

Date: _____



Grade 3

Unit 5, Lesson 16 - What attention-grabbing headline do you plan to use to announce your invention? What made you pick that headline?

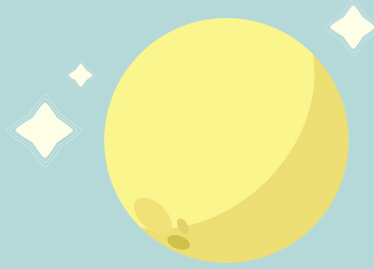
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Grade 3

Unit 5, Lesson 17 - Which chapter in the Reader did you select as your favorite? Explain why it is your favorite chapter.



Vocabulary

Grade 3 Unit 5: Flash, Bang, Boom! Exploring Light and Sound



Synonyms and Antonyms

Introduction: Synonyms and Antonyms



A **synonym** is a word that means the same thing as another word. An **antonym** is a word that means the opposite.

Shades of meaning is when words have similar meanings but do not mean exactly the same thing.

Let's look at these words from our unit on light and sound:

know

wonder

ponder

They have similar meanings, but they do not mean exactly the same thing.

Know means to have an understanding.

Wonder means to feel curiosity or doubt.

Ponder means to think about something.

Let's read these sentences from the domain:

You might **wonder** about the speed at
which sound travels.

You already **know** that light travels at a very fast speed—faster than any machine made by humans.

“I have been **pondering** life,” said Samuel.

Let's Try It Together!



Look at these words from our domain:

intently

eagerly

They have similar meanings, but they do not mean exactly the same thing.

Intently means with great effort or determination.

Eagerly means showing urgent desire or interest.

Read this sentence from the domain:

They watched and listened _____ as
the musicians played.

Turn to a partner and whisper which word is best to complete this sentence.

Raise one finger if you think **intently** is the best word to complete this sentence.

Raise five fingers if you think **eagerly** is the best word to complete this sentence.

They watched and listened **intently** as the musicians played.

Now you try one with a partner. Read this sentence from the domain:

Samuel was already on the pier, ____ focused on attaching a large, juicy bloodworm to the hook on the end of his fishing line.

Raise one finger if you think **intently** is the best word to complete this sentence.

Raise five fingers if you think **eagerly** is the best word to complete this sentence.

Did you remember the steps?

1. Determine the meaning of each word.

intently

eagerly

2. Decide which word BEST completes the sentence.
(Hint: Try both words in the sentence to see which fits best.)

3. Choose the BEST word to complete the sentence.

intently

Now Try One by Yourself!



Which word best completes the sentence?

“Of course, I could sit here all night and talk about why light is so important,” Samuel said ____.

grumpily

contemplatively

Grumpily means in an irritated or annoyed way.

Contemplatively means in a thoughtful way.

Write the word **grumpily** if you think that word best completes the sentence.

Write the word **contemplatively** if you think that word best completes the sentence.

Answer



contemplatively

Vocabulary

Grade 3 Unit 5: Flash, Bang, Boom! Exploring Light and Sound



Root Words

Introduction: Root Words



Root words are words to which prefixes and suffixes can be added to form new words.

In the unit *Flash, Bang, Boom! Exploring Light and Sound*, we have been reading about the character Jack **Audire**. We've learned that his last name contains a root in it.

What special meaning does this root, **aud**, have?

Knowing that **aud** has something to do with hearing can help us determine the meaning of these words.

auditory: connected to the sense of hearing

audiologist: a doctor who studies hearing and how to help people with hearing loss

Aud is a Latin root. Words that use this root have to do with *hearing*.

The author may have used this root in Jack **Audire**'s name because his story is concerned with hearing loss.

In the unit, we have discussed several words that use the root **aud**. Let's look at two.

auditory

audiologist

Let's Try It Together!



Let's think about other words that use the root **aud**.

If you are going to give an **audiovisual** presentation, what kinds of things would it need to include?

Turn to a partner and whisper what you think **audiovisual** means.

audiovisual (adj.): related to both sight and hearing

An **audiovisual** presentation would need to include something to see (such as slides or pictures) and something to hear (such as a speech or recording).

Based on the definition for the word **audiovisual**, turn to a partner and make a new sentence with this word.

Raise your hand to share the new sentence you and your partner came up with!

Continuing with the root word **aud**, add the following:

ition

Turn to a partner and whisper what the new word would be with *-ition* added.

The new word is **audition**.

Adding *-ition* creates a new word.

audition (noun): a performance or tryout

This is the most common meaning of the noun **audition**. It evolved from an earlier meaning, which was about the power of hearing.

Now Try One by Yourself!



Identify the root of the following word to determine its meaning:

audible

Write down the root word.

Write down the meaning of the word **audible**.

Answer



Root word: **aud**

Meaning: heard or able to be heard

POETRY

Grade 3 Lesson 2: “Tula [“Books are door-shaped”]”
by Margarita Engle



Introduction



Today we’re going to read a poem about a girl’s love of reading.

You might notice something interesting about this poem: the lines don’t rhyme.

If a poem does not rhyme or have a set pattern of beats, it is usually called a **free verse** poem.

As we read today’s poem, listen for the story the speaker tells.

Read “Tula [‘Books are Door-shaped’]” by Margarita Engle aloud.

The poem can be found online or from other sources, such as the library.

How does the speaker feel about reading?

How does the speaker's mother feel about girls reading?

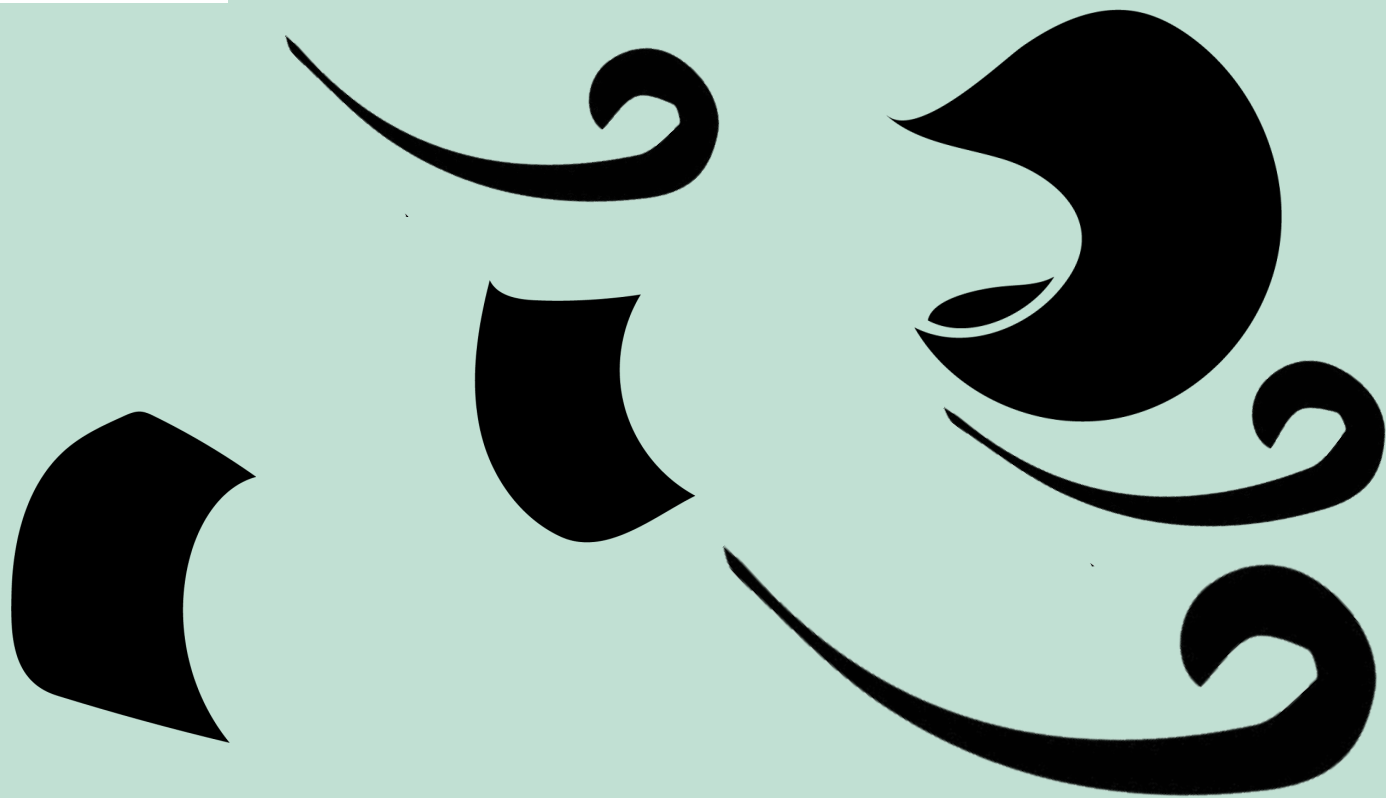
How does the speaker feel about reading?

Books and reading help her feel less alone.

How does the speaker's mother feel about girls reading?

She thinks girls who read are “unladylike / and ugly.”

Reading



You’ve learned before about synonyms and antonyms.

What is a synonym?

What is an antonym?

What is a synonym?

two words having the same or nearly the same meaning

What is an antonym?

two words having opposite meanings

Turn and talk to a partner. List as many synonyms and antonyms as you can for the word *happy*.

As we reread the poem, listen for descriptive words and their synonyms or antonyms.

Read “Tula [‘Books are Door-shaped’]” by Margarita Engle aloud.

The poem can be found online or from other sources, such as the library.

What synonyms did you find in the poem?

What synonyms did you find in the poem?

Possible answers include distant/faraway,
locked/trapped, race/rush, etc.

What antonyms did you find in the poem?

What antonyms did you find in the poem?

*Possible answers include ugly/enticing,
permitted/forbidden, free/trapped, etc.*

Wrap-Up



In this poem, you read, “free thoughts / rush in / to replace / the trapped ones.”

List as many synonyms and antonyms as you can for the word *rush*.

Answer



List as many synonyms and antonyms as you can for the word *rush*.

Synonyms could include dash, hurry, scramble, race, etc. *Antonyms could include* wait, delay, slow, lag, etc.