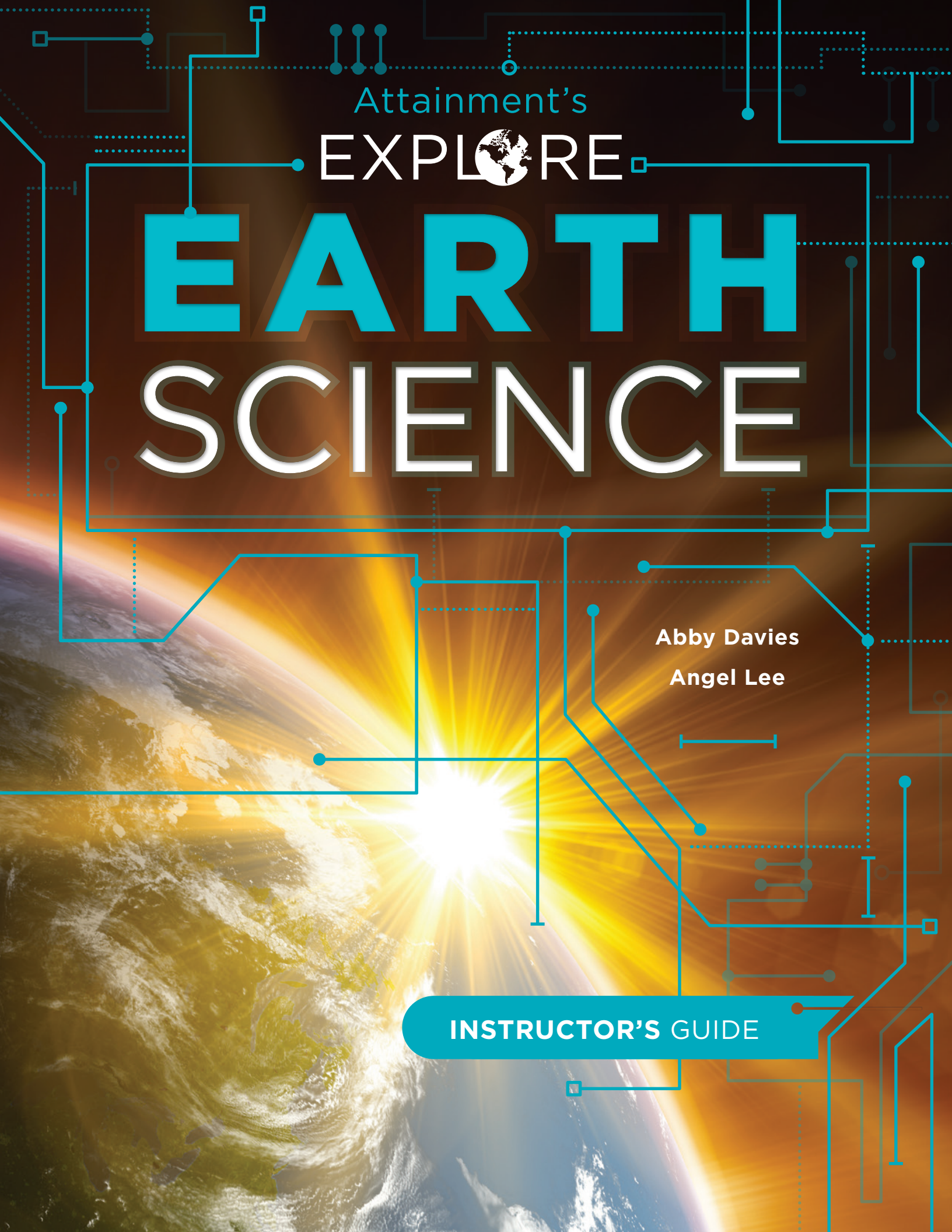
Attainment's

EXPLORE

EARTH SCIENCE

Abby Davies

Angel Lee



INSTRUCTOR'S GUIDE

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EXPLORE EARTH SCIENCE

INSTRUCTOR'S GUIDE

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Chapter 3

Dynamic Earth

LESSON

CHAPTER 3

GETTING STARTED

Getting Started

Student Workbook pages 38-39

Introduction of Big Ideas

LEARNING OBJECTIVE:

Demonstrate an understanding of at least three Big Ideas.

MATERIALS:

Big Idea Cards, Earth model

Optional: *printed Big Ideas page from* **Student Book, Big Idea Worksheet, Courseware Software***; see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

examples of natural disasters, temperature, density, mass, change, landforms, layers, inner vs. outer

PREREQUISITE VOCABULARY:

continent

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

LANGUAGE BUILDER!

Use picture supports and point out important verbs, nouns, adverbs, and prepositions within big ideas.

Earth is made up of many layers.	Earth's surface is always changing.	Continents move very slowly.	Landforms can be caused by tectonic plate movement.	Some natural disasters are caused by tectonic plate movement.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• **Examine It!** Use the Earth model to show Earth's levels. • Show the timeline of a mountain. • **Examine It!** Open the Earth model to show the volcanic eruption diagram.	• Rather than answering verbally, allow students to complete the Big Idea Worksheet for the chapter. • Have students select from response options when answering questions.	• Search online for *graham cracker treat plate tectonics*. • Create a volcanic eruption model in class. • Point out examples of erosion and weathering nearby.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

OVERVIEW

INTRODUCTION *Answer question*

Today we will begin Unit 2 titled "The Geosphere." We learned about the geosphere in Chapter 2, and you should remember that the geosphere contains all of Earth's rocks and solid materials.

Who can tell me one thing that is part of the geosphere? Confirm correct responses. If needed, model finding the correct answer by returning to Big Idea 6 and reading the text on page 24.

Find Chapter 3 in your book. Chapter 3 is titled "Dynamic Earth." Dynamic means always changing. Describe the image on page 37. Relate the image to Earth being dynamic.

Remember that each chapter follows the same order, so the first lesson in Chapter 3 will be an overview of the Big Ideas about ways that the Earth is dynamic or always changing.

ACTIVATE PRIOR KNOWLEDGE *KWL chart*

Complete the KWL chart, recording what students know and want to know about the ways Earth changes.

EXPLORE

THE BIG PICTURE *Follow along • Answer question*

Ask students to turn to page 38. Point to the text as you read the title for the Big Picture. Point out the Big Picture to students and describe it.

Remember earlier I said that dynamic means always changing. So if I say Earth is dynamic, I am saying Earth is _____? Students answer, "Always changing." Confirm and reinforce correct responses. Model the correct answer if needed.

BIG IDEAS *Follow along*

Ask students to turn to page 39. Read each Big Idea, pointing to each one, so students can see. Show each Big Idea Card as you read each Big Idea.

Optional: *Ask students to point to each Big Idea in their book as you read it.*

CHECK FOR UNDERSTANDING *Answer questions*

Go back through the Big Ideas, reading each one once or twice. After each Big Idea, ask a corresponding question.

CLOSING

Reinforce students' efforts. Provide a brief summary of the lesson and what will come next.

Note: *Chapter 1 is more explicit and provides more scripting than other chapters. Since the lesson formats within each chapter (Introduction, Vocabulary, Big Idea lessons, Discovery, and Quiz) are consistent, the lessons in Chapter 1 serve as a model. Refer back to these lessons as needed when moving through the curriculum.*

Vocabulary

OBJECTIVE:

Gain exposure to new scientific vocabulary.

MATERIALS:

Vocabulary Cards, Model-Lead-Test Procedure Card, Time-Delay Procedure Card, Vocabulary Worksheet

Optional: *photos or objects to represent vocabulary,* **Word Search Activity***; see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

atmosphere, lithosphere, inner vs. outer, solid vs. liquid, to break down (wear down)

PREREQUISITE VOCABULARY:

gradual, sudden

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression*, and *Engagement* into lesson steps.

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
Varying ways to represent vocabulary: • As presented in Student Book • Words and definitions supported by: Illustrations, photographs, graphics (e.g., fault, convection), Models (e.g., Earth's core, Earth's outer core, weathering), Videos (e.g., time-lapse video of weathering or erosion)	• Use picture supports and synonyms for vocabulary words and their definitions. Allow students to create different versions of the definitions using synonyms for the words in the definitions.	• Vary what you consider to be acceptable performance for this lesson. Not all students will learn and maintain ten vocabulary words.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

VOCABULARY

INTRODUCTION *Follow along*

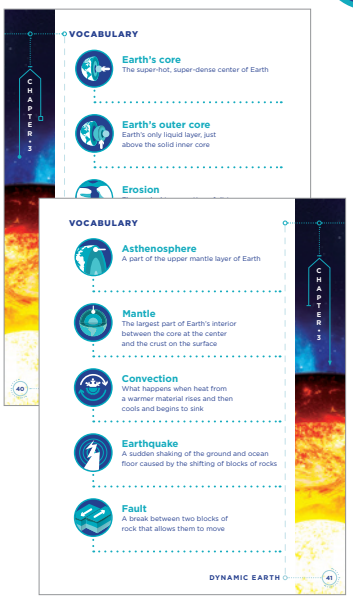
Ask students to turn to page 40 in the Student Book. **Today we are on Chapter 3, vocabulary lesson.**

CHOOSE YOUR STRATEGY *Learn vocabulary*

Model-Lead-Test Repeat with each vocabulary word.

Time-Delay Teach the words in sets of four.

Note: *Refer back to Chapter 1 lessons for full scripting.*



Use picture supports and point out important verbs, nouns, adverbs, and prepositions within vocabulary definitions: The super-hot, super-dense center of Earth. Give a synonym for *super hot* (very hot) and *super dense* (thick, packed).

WRITE ABOUT IT

WORKSHEET *Complete worksheet*

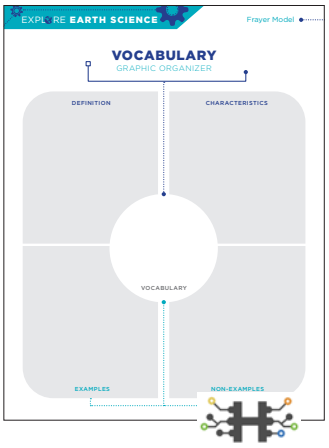
Use the editable Vocabulary writing page to create a Vocabulary Worksheet appropriate for each student.

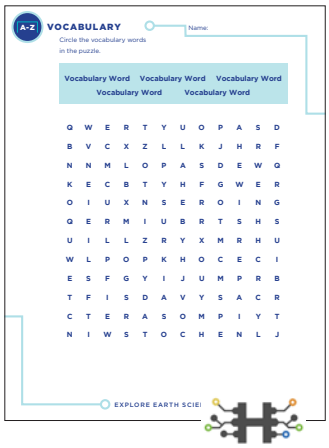
Note: *Refer back to Chapter 1 lessons for full scripting.*

CLOSING

Refer back to the KWL chart to see if any questions have been addressed.

Great job with the vocabulary words! We will review vocabulary words again as we read each Big Idea.





REAL-WORLD CONNECTIONS

- Find news articles or media about earthquakes and fault lines.
- Find the fault line nearest you on a map.

EXTENSION ACTIVITIES

- If repeating this lesson over multiple days, choose two to three words per day to better understand the vocabulary. *Discuss pros and cons, watch related videos, locate photographs.*

Language Builder! Complete a Frayer Model graphic organizer (found on the HUB) for vocabulary words.

Write About It! Use the editable Word Search writing page (found on the HUB) to create a Word Search activity for students to complete.

CHAPTER 3

LESSON 12

Big Idea 12

Student Workbook pages 44-45

Earth's surface is always changing.

LEARNING OBJECTIVES:

1. Wind, liquid water, and ice cause changes on Earth's surface.
2. Natural disasters cause fast changes to Earth's surface.

MATERIALS:

Vocabulary Cards for ***erosion, weathering,*** and ***gravity***; **Earth model; Big Idea Card**

Optional: *photos or objects to represent vocabulary words, printed Big Ideas page from* **Student Book***; see UDL chart for additional ideas*

PREREQUISITE KNOWLEDGE:

change, surface, water (liquid and ice), gravity

PREREQUISITE VOCABULARY:

worn down, appearance

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.

WHAT TO EXPECT:

Watch for these language-building opportunities throughout the lesson.

Offer synonyms for keywords in the reading.	Have students give an opinion about the beach.	What is one thing that causes erosion?	What is a difference between weathering and erosion?

UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Provide images of different forms of erosion caused by ice, liquid water, gravity, and wind. • Show rocks that have been worn down.	• Offer the opportunity to answer yes/no as an alternative to using various response options (e.g., **Was it windy at the beach?**). • Provide a word bank with adjectives that students may use to describe erosion and weathering in video.	• Pass around rocks and have students look at their imperfections.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

Lesson Prep continued:

National Geographic has an informative video relevant to Big ideas 12–15. Consider viewing this video multiple times through the lessons in this chapter. Search "*National Geographic*, education" (https://www.nationalgeographic.org/education/).

INTRODUCTION

BIG IDEA *Follow along*

Show Big Ideas from page 39 or from a printed pdf. Read Big Idea 12. Show the Big Idea Card.

VOCABULARY *Identify vocabulary words*

Review the vocabulary words ***erosion*** and ***weathering*** and their definitions related to Big Idea 12.

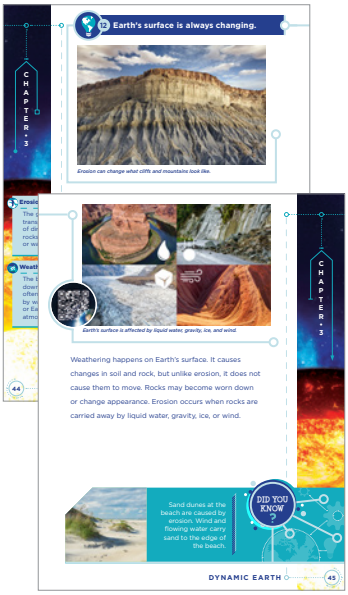
Review the previous vocabulary word ***gravity***.

COMPREHENSION *Answer questions*

Ask students to turn to page 44. Point to and read the title. Ask, **What is Earth's surface constantly doing?** Reinforce correct responses. If needed, use a Reread prompt.

Point out the corresponding image and read its caption. Ask, **What can change the appearance of cliffs and mountains?** Reinforce correct responses. If needed, use a Reread prompt.

Optional: *Show a time-lapse video clip of erosion.*



EXPLORE

READ *Follow along • Answer question*

Ask students to follow along in their book while you read. Show students where to start if needed. Remind students that vocabulary will be in bold text and to listen for ***erosion*** and ***weathering***.

Read the passage on page 44.

Offer synonyms for words such as *constantly* and *activity*.

If needed, stop to remind students what natural disasters are. Ask, **Does erosion cause Earth's surface to change or stay the same?** Reinforce correct responses. If needed, use a Reread prompt.

What is one thing that causes erosion?

Optional: *Show additional photographs of erosion. Images showing a beach house where the ocean now flows under it or a house that has slid down a mountainside illustrate the dangers of erosion and human interaction with the environment.*

COMPREHENSION *Answer questions*

Point out the small image on page 44 and read its caption.

This is a sign that you might see on the side of the road when driving in a mountainous place. Ask, **What do you think this sign means?** Reinforce correct responses. If needed, explain how this is an example of erosion that may be potentially dangerous.

Offer synonyms for words such as *appearance* and *occurs*.

READ *Follow along • Answer question*

Ask students to turn to page 45 and follow along as you read.

Read the passage. Ask, **Where does weathering happen?** Reinforce correct responses. If needed, use a Reread prompt.

What is a difference between weathering and erosion?

DEEPER UNDERSTANDING *Watch video • Answer questions*

Point out the image on page 45 and read its caption.

Use the QR code to access the video clip about erosion.

Ask students one or two questions about the video or ask one thing that was learned. If needed, use LIP.

CHECK FOR UNDERSTANDING

QUIZ *Answer at least one quiz question*

Ask Q3 and Q4 from the quiz on page 53 of the Student Book. Provide choices from the quiz. Confirm correct responses. If needed, use a Reread prompt.

Refer back to KWL chart to see if any questions have been addressed.

APPLY

DID YOU KNOW? *Answer questions*

Use the "Did You Know?" as a discussion topic.

Ask, **How many of you have been to the ocean? Do you remember how windy it can be at the beach?**

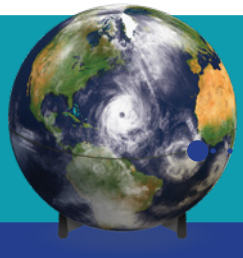
Using the search term *erosion at the beach*, locate videos to illustrate erosion. Discuss how sand dunes can protect coastal communities. Ask topic-related questions. Use LIP as needed.

Using the same search term on YouTube, find and replicate science experiments illustrating beach erosion.

Have students give an opinion about the beach. Have them use phrases like "I think..." or "In my opinion..."

CLOSING

Review the Big Idea again.



EXAMINE IT! *Integrate the Earth Model into your lesson.*

- Use the provided Earth model to reinforce where Earth's surface is.

REAL-WORLD CONNECTIONS

- Take a virtual tour of a national park and point out examples of how erosion and weathering have created beautiful landforms. Ask students to describe erosion and weathering seen in videos.
- Go outside to see examples of erosion and weathering on your school grounds.

EXTENSION ACTIVITIES

- Create a Venn diagram to compare and contrast erosion and weathering.
- Model coastal erosion by putting sand and small rocks in a plastic bag or a bin. Add water to the bag/bin and move it to simulate waves. Show how the water has moved rocks from one place to another. Show how the "coast" has changed.

Discovery

LEARNING OBJECTIVE:

Name how scientists know about Earth's levels.

MATERIALS:

Discovery Worksheet; *see UDL chart for additional idea*

PREREQUISITE KNOWLEDGE:

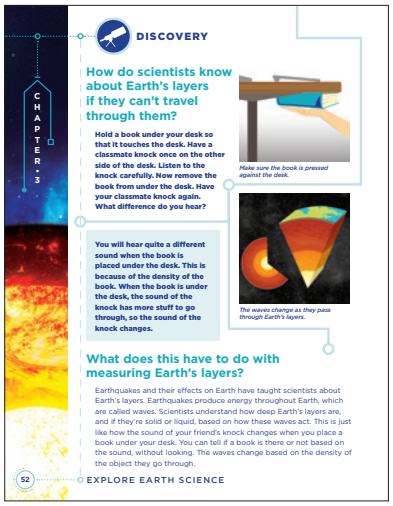
density, heavy vs. light, mass, large vs. small

PREREQUISITE VOCABULARY:

produce (generate)

LESSON PREP:

Review the general and lesson-specific UDL charts. Incorporate suggestions for *Representation, Expression,* and *Engagement* into lesson steps.


DISCOVERY

How do scientists know about Earth's layers if they can't travel through them?

Hold a book under your desk so that it touches the desk. Have a classmate knock once on the other side of the desk. Listen to the knock carefully. Now remove the book from under the desk. Have your classmate knock again. What difference do you hear?

Make sure the book is pressed against the desk.

You will hear quite a different sound when the book is placed under the desk. This is because of the density of the book. When the book is under the desk, the sound of the knock has more stuff to go through, so the sound of the knock changes.

The waves change as they pass through Earth's layers.

What does this have to do with measuring Earth's layers?

Earthquakes and their effects on Earth have taught scientists about Earth's layers. Earthquakes produce energy throughout Earth, which are called waves. Scientists understand how deep Earth's layers are, and if they're solid or liquid, based on how these waves act. This is just like how the sound of your friend's knock changes when you place a book under your desk. You can tell if a book is there or not based on the sound, without looking. The waves change based on the density of the object they go through.

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UNIVERSAL DESIGN FOR LEARNING

Representation *Resourceful, knowledgeable learners*	Expression *Strategic, goal-directed learners*	Engagement *Purposeful, motivated learners*
• Use word banks and synonyms and highlight important nouns/underline important verbs.	• Provide opportunities for students to respond verbally, using preprogrammed AAC devices, to select from response options when answering questions. • Some students may point when asked, and others may eye gaze.	• Have each student participate in the sound activity using their desk.
Provide supports for important words in the text. Nouns | Verbs | Adjectives		

Examine It! **Language Builder!** **Challenge!**

DISCOVERY

PART 1 *Follow along • Answer question*

Ask students to turn to page 52 and follow along as you read.

In this chapter, we have learned about Earth's layers. Review what the layers are. **In this lesson, we will discover how scientists know about Earth's layers. We will also conduct an experiment.**

Read the title and the first passage while students follow the directions in the passage.

Ask students to follow along while you continue reading the second passage.

Ask, **Why is the sound different when you hold a book under your desk?** Confirm correct responses. If needed, use a Reread prompt.

PART 2 *Follow along • Answer question*

Continue reading the passage. Ask, **What is one thing that has taught scientists about Earth's layers? Confirm correct responses.** If needed, use a Reread prompt.

Say, **The text says that the waves change based on the density of the object they go through. Density describes how much space an object takes up in relation to its mass. If an object is heavy and small, like a brick, it has a high density. If an object is larger but light, like a pillow, it has a low density.**

Point to the image and read the caption.

CHECK FOR UNDERSTANDING *Answer question*

Listen to what we know. Waves change based on the density of the material that it is traveling through. Waves traveling through Earth DO change.

Ask, **Is Earth made of solid material where the density stays the same, or is it made of layers where the density changes?**

THINK-ALOUD QUESTION

Discuss the differences in sound with and without the book under the desk.

Use the image at the top of page 52 for students to use as a visual reference.

Offer synonyms for words such as *remove* and *carefully*.

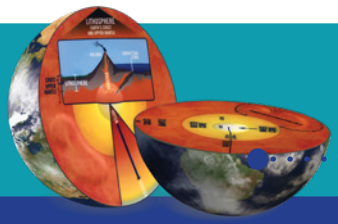
WRITE ABOUT IT

WORKSHEET *Complete worksheet*

Use the editable Discovery writing page to create a writing prompt appropriate for each student.

CLOSING

Review the main ideas of the lesson.



EXAMINE IT! *Integrate the Earth Model into your lesson.*

- Use the provided Earth model to show Earth's layers.

REAL-WORLD CONNECTIONS

- Find a video online of seismic waves and their uses in everyday life. *Ask topic-related questions.*

EXTENSION ACTIVITIES

- Explore density, asking students to compare objects such as a pillow and a brick and determine which one is denser.

Review/Quiz

WRITE ABOUT IT

CHOOSE THE METHOD THAT WORKS FOR YOU.

- Have students complete the Big Ideas worksheet independently.
- Read each Big Idea sentence, along with the response options to the students. Allow the students to answer verbally or select a response option.

***Students** may opt to give their answers out loud instead of writing them down. Have them use declarative statements.*

REVIEW

Prepare for the quiz by reviewing the Big Idea and Vocabulary Cards for the chapter.

QUIZ

CHOOSE THE PROCEDURE THAT WORKS FOR YOU.

- Have the students take the quiz in the consumable Student Workbook independently.
- Read the questions and choices to the students and have them circle or point to their answers.
- Use the quiz as a chapter review and not as a comprehension assessment.

***Note:** Refer back to Chapter 1 lessons for full scripting.*