



UNITED ARAB EMIRATES  
MINISTRY OF EDUCATION



YEAR OF  
**ZAYED**

TEACHER EDITION

2018 - 2019

McGraw-Hill Education

# Integrated Science

United Arab Emirates Edition

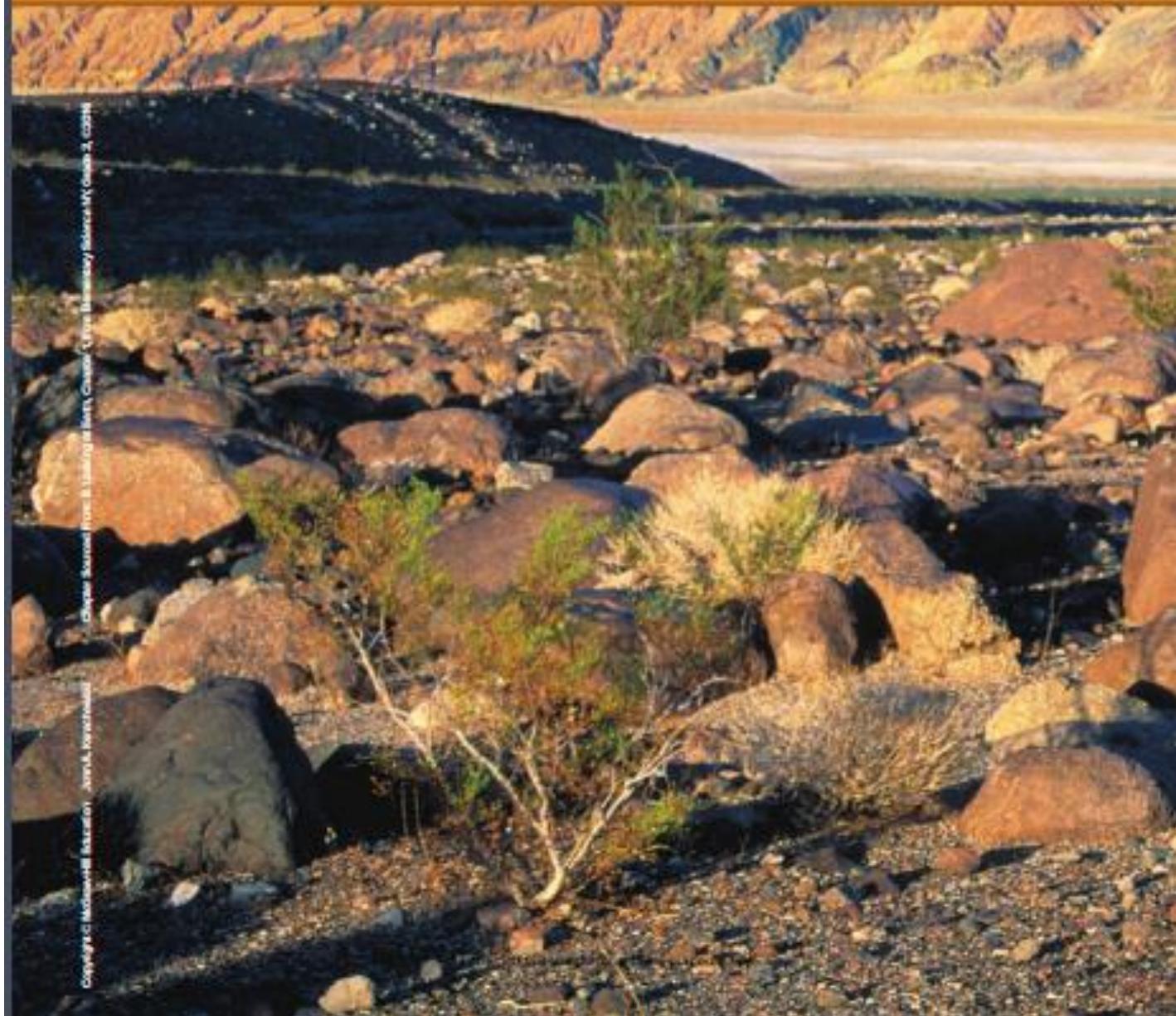
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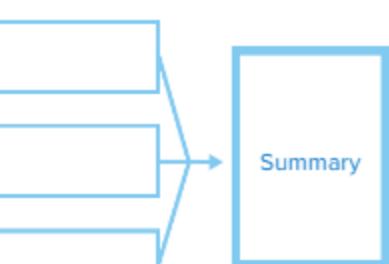
# Earth and Space Science

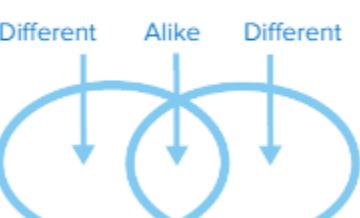


Chaper 1 Section 1: Earth's Crust and Surface Weathering

Chaper 1 Section 2: Weathering and Soil Formation

## CHAPTER 8 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
<h1>1 What Earth Looks Like</h1> <p><b>PACING:</b> 3 days</p> <p><b>FAST TRACK:</b> 1 day</p>	<p><b>OBJECTIVES AND READING SKILLS</b></p> <ul style="list-style-type: none"> <li>Identify different types of land on Earth.</li> <li>Describe differences between bodies of water.</li> </ul>  <p><b>Reading Skill</b> Summarize</p>	<p><b>VOCABULARY</b></p> <ul style="list-style-type: none"> <li>continent</li> <li>mountain</li> <li>river</li> <li>valley</li> <li>plains</li> </ul>

<h2>2 Changing the Land</h2> <p>PACING: 2 days <b>FAST TRACK:</b> 1 day</p>	<ul style="list-style-type: none"><li>Describe how and why weathering occurs.</li><li>Explain the process of erosion and how it can be prevented.</li></ul>  <p>Reading Skill Compare and Contrast</p>	<p>weathering erosion deposition</p>
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# Activity Planner

## EXPLORE Activities

### Explore PACING: 30 minutes



Objective Model an island.

Skills **make a model, observe, communicate**

Materials modeling clay, clear bin

★ **PLAN AHEAD** Line desks with newspapers for easier clean up.

## QUICK LAB Activities

### Quick Lab PACING: 10 minutes



Objective Create and label a picture of water and land.

Skills **communicate**

Materials crayons, paper

★ **PLAN AHEAD** You might want to provide images of various land and water forms.

## Explore PACING: 20 minutes



Objective Observe how water breaks rock.

Skills **make a model, predict, observe, infer**

Materials film canisters, water

★ **PLAN AHEAD** If time is short, have a pre-frozen canister ready to show children.

## Quick Lab PACING: 10 minutes



Objective Observe the effects of erosion.

Skills **observe**

Materials deep tray, sand, water

★ **PLAN AHEAD** Protect areas of your classroom from spills



## Academic Language

When learning, students need help in building their understanding of the academic language used in daily instruction and science activities. The following strategies will help to increase children's language proficiency and comprehension of content and instruction words.

### Strategies to Reinforce Academic Language

- **Use Context** Academic language should be explained in the context of the task. Use gestures, expressions, and visuals to support meaning.
- **Use Visuals** Use charts, transparencies, and graphic organizers to explain key labels to help children understand classroom language.
- **Model** Use academic language as you demonstrate the task to help children understand instruction.

### Academic Language Vocabulary Chart

The following chart shows chapter vocabulary and inquiry skills. Vocabulary words help children comprehend the main ideas. Inquiry Skills help children develop questions and perform investigations.

#### Vocabulary

continent  
mountain  
river  
valley  
plains  
weathering  
erosion  
deposition

#### Inquiry Skills

make a model  
observe  
communicate  
predict  
infer

## Vocabulary Routine

Use the routine below to discuss the meaning of each word on the vocabulary list. Use gestures and visuals to model all words.

**Define** A valley is low land between mountains.

**Example** A valley is a landform.

**Ask** What might a valley look like?

Children may respond to questions according to proficiency level with gestures, one-word answers, or phrases.

## Vocabulary Activities

Help children understand that there are many kinds of landforms.

**BEGINNING** On the board, write the words *mountain*, *valley*, *plain*, and *hill*. Point out each landform in the photographs in Lesson 1. As you do, ask either/or questions: *Is a mountain high or low? Is a plain flat or pointed?* Model responses and have children repeat after you.

**INTERMEDIATE** Working in small groups, challenge children to identify mountains, plains, and islands on a globe or map. Have each group complete a three-column chart with the landforms identified. Then have groups compare their charts to find out which groups identified the same landforms.

**ADVANCED** Turn to Lesson 1 and have children identify the landforms shown in the photographs: *What is this?* (A mountain.) Help children form sentences that describe particular characteristics of each landform.

## Looking at Earth



What does Earth look like?

*Answers will vary. Account of renewable resources.*

## Vocabulary

**river** a body of fresh water that moves**valley** the low land between mountains**mountain** land that is very high for what is adjacent to it**plains** flat land that spreads out a long way

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## CHAPTER 8

## Looking at Earth



## THE BIG IDEA What does Earth look like?

**Chapter Preview** Have children look at the pictures in the chapter and predict what the lessons will be about.

## ► Assess Prior Knowledge

Before reading the chapter, discuss the Big Idea question and record children's responses on a class **KWL** chart. Ask:

- What does the land on Earth look like?
- What bodies of water do you know?
- How does land look different in different places?

Answers shown represent sample student responses.

Follow the **Instructional Plan** below after assessing children's prior knowledge of chapter content.

# Differentiated Instruction

## Instructional Plan

Chapter Concept Earth is covered by land and water.

**EXTRA SUPPORT** Children who are not yet able to identify landforms and bodies of water should cover all of **Lesson 1** before continuing with the rest of the chapter.

**ON LEVEL** Children who can identify landforms and bodies of water can compare Earth's land and water, and then go to **Lesson 2** to explore how Earth's surface is changing.

**ENRICHMENT** Children who are ready to enrich their understanding of the chapter concepts may explore erosion more deeply by focusing on Writing in Science.

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

## Earth

What We <b>K</b> now	What We <b>W</b> ant to Know	What We <b>L</b> earned
There is water on Earth.	What types of water are there?	Most of Earth is covered by oceans, rivers, lakes and other bodies of water.
There are rocks in the ground.	What can change the land?	Weathering and erosion can change the land.
Rocks can break.	What breaks rocks?	Ice and trees can break rocks.

# Vocabulary

- Have a volunteer read the Preview Vocabulary words aloud to the class. Ask children to find one or two of the words in the chapter. Add these words and their definitions to a class Word Wall.
- Encourage children to use the illustrated glossary in the Student Edition's reference section.

Stop Here to

# Plan Your Lesson

## Lesson 1 What Earth Looks Like

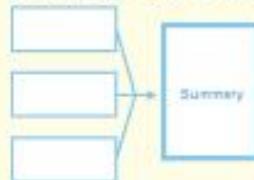
### Essential Question

What does Earth's surface look like?

### Objectives

- Identify different types of land on Earth.
- Describe differences between bodies of water.

### Reading Skill Summary



You will need a summarizing graphic organizer.



### FAST TRACK

Lesson Plan: When time is short, follow the Fast Track and use the essential resources.

#### 1 Introduce

Look and Wonder

#### 2 Teach

Discuss the Main Idea

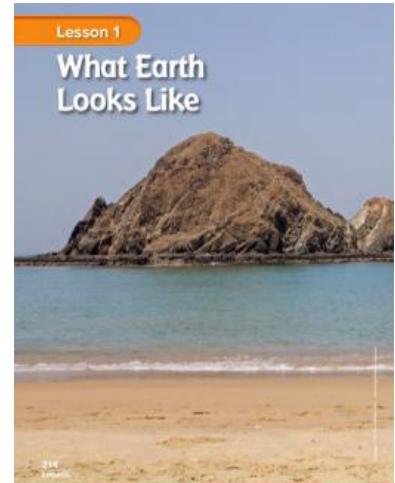
#### 3 Close

Think, Talk, and Write

# Lesson 1 What Earth Looks Like

## Objectives

- Identify different types of land on Earth.
- Describe differences between bodies of water.



# 1 Introduce

## ► Assess Prior Knowledge

Have a discussion to explore what children already know about landforms and bodies of water. Ask:

- What are some words that describe different kinds of land?
- Where are places that water can be found?

Record children's answers in the What We Know column of the class KWL chart.

## Warm Up

### Start with a Model

Show children a globe and explain that it is a model of Earth. Have children describe the land they see on the globe. Ask:

- How do you know it is land? **Possible answer: It is green and brown like grass and trees, and grass and trees grow on land.**

If children are observing a relief globe, ask them what the globe's texture tells about the land. Have children describe the areas covered by water. Ask:

- How do you know it is water? **It is blue.**
- Is there more land or water on Earth? **water**

## Look and Wonder

### Before You Read

An island is land surrounded by water. What does the land look like here?

Possible answer: The land has trees and sand along the edges.

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### Essential Question

What does Earth's surface look like?

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## Look and Wonder

Read the Look and Wonder statement and question about islands and invite children to share their responses. Ask:

- How are islands similar to or different from the land where we live?

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.

## Explore



small groups



30 minutes

**Plan Ahead** Have a large container of water available. Squeeze packages of plastic modeling clay until they are soft.

**Purpose** The formation of land masses happens so slowly that it is impossible to observe the process firsthand. Making models helps children visualize and understand large-scale planetary actions. Models allow children to conceptualize how land is shaped by water and how different types of land interact differently with water.

### Structured Inquiry

#### What to Do

Explain that children will work together to make a model of an island.

**1 Make a Model** As children work, encourage them to vary the topography of their island. Point out that some islands are flat, some have mountains, and some might have hills and lakes. When each group has formed an island, help them add water to their container. **Be Careful!** Remind children to wash their hands after handling the clay and before handling classroom objects or food.

**2 Observe** Ask children to describe the land above and below the surface of the water.

#### What can an island look like?

##### What to Do

**1 Make a Model.** Use clay to make an island in a clear bin. Add water.

**⚠ Be Careful.** Remember to wash your hands!



**2 Observe.** Describe the land on your island. Is the land flat or high?

*Answers will vary. Some students may say that the land is flat. Others may have created mountains or hills on their island.*

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EXPLORE

## Alternative Explore

### How do water and land form islands?

Have children draw an island and the water around it, and watch to see if they draw it as a floating raft. If so, help them think about how islands are attached to Earth.

As children finish, have them share their drawing with a partner. Have a class discussion to establish that islands are like underwater mountains, the tops of which rise above the ocean.

## Inquiry Activity

### Explore More

**3 Communicate.** Write about the plants and animals that might live on or around your island.

Possible answer: My island has birds, fish, trees, and flowers.

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### Open Inquiry

Learn more about islands in the UAE.

My question is:

Sample question: How are islands formed?

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**Guided Inquiry****Explore More**

**3 Communicate** Have children use small pieces of clay to represent the locations of plants and animals on their island. Ask: **What might happen to them if we add or take away water?** Have children talk together about what happens when the water level rises or falls.

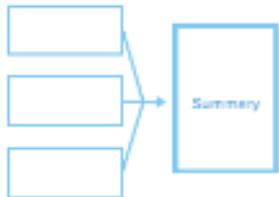
**Open Inquiry**

If there is a nearby island, help children use print and Internet resources to learn more about that island. If not, suggest specific islands for children to study.

# 2 Teach

## Read and Respond

Reading Skill **Summarize** Retell the most important ideas from the reading selection.



### What is on the surface of Earth?

#### ► Discuss the Main Idea

**Main Idea** Earth is covered by continents and water.

Before reading, have children identify the land and water in both pictures. Ask:

- How does the land look the same in both pictures?  
How does the land look different?

After reading, invite children to look at a map of the world. Help them identify which continent they live on, and count the continents. Ask:

- How are continents different from other types of land? **Possible answer: Continents are much larger than other types of land.**

#### Read and Respond .....

##### What is on the surface of Earth?

Have you ever looked at a map of Earth? Land and water cover Earth's surface. Which one covers more of Earth?

Land is the solid parts of Earth. There are seven large pieces of land on Earth. Each big piece of land is a **continent**.



### Science Background

**Earth's Surface** Earth is roughly divided into the core, mantle, and crust. The core is composed of a solid inner core and a liquid outer core. The mantle, though solid, is hot enough to flow very slowly. The crust is made of thick tectonic plates composed of the same material as the mantle, but cooled into solid rock. Pressure and heat from the core and mantle rise and shift these plates, causing changes to Earth's composition and the distribution of land.

## LA Support

**Use Illustrations/Extend Vocabulary** Use the photo on this page to help children practice using language and to extend their vocabulary.

**BEGINNING** Point to and name things in the picture. Have children repeat the words.

**INTERMEDIATE** Have children describe what they see. Ask them to add words that describe the color, size, or shape of various objects in the picture.

**ADVANCED** Have children share experiences they have had along the shore.

Earth looks mostly blue from space. This is because water covers most of Earth. Water surrounds the continents.

Small pieces of land with water on all sides are islands.

 **Quick Check**

1. What makes up Earth's surface?

Possible answer: land and

water; continents and water

Earth



**Read a Photo**

Where is the water on this photo of Earth?

Possible answer: The blue parts are water.

## Read a Photo

Explain to children that they are looking at a picture of Earth taken from space. Ask:

- What would Earth look like without water? **Possible answers:** brown, green, all land
- How would the land look if much more water was added to Earth? **Possible answers:** smaller, blue

## ► Develop Vocabulary

**continent** Remind children that a *continent* is one of the seven large pieces of land on Earth. Distribute copies of the world map from the Teacher Resources section in the back of this book. Help children mark the seven *continents* with an X, and have them label their maps *Continents*.

## ► Explore the Main Idea

**ACTIVITY** Have children look through magazines to find pictures of various landforms and bodies of water. Invite them to sort their pictures into *land* and *water* groups. If some pictures show both land and water, help children decide how to sort them. Have them create a large class mural with the labels *Land* and *Water*, and encourage them to glue their pictures under the appropriate label.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Gather several large rocks and place them in a plastic tub. Tell children that the rocks represent land. Have children slowly pour enough water into the tub to partially submerge the rocks. Ask: How has the “land” changed? **Possible answers: Some land is above the water and some is below; islands have been created.**

**ENRICHMENT** Encourage children to make a model of a landform near their house or school. Help them decide what they will need to make their model. When they have finished, have them share their model with a partner.

## What is Earth's water like?

### ► Discuss the Main Idea

**Main Idea** Most of Earth is covered by either salty ocean water or by fresh water located in rivers, streams, and lakes.

If children have been to an ocean, a lake, or a river, encourage them to describe their experience and what the water was like.

- How is the water in oceans different from water in lakes or rivers? **Possible answers:** The ocean water is salty. The water in most lakes and rivers is not salty.

### ► Use the Visuals

Encourage children to study the pictures on these pages. Ask:

- What do you see in the pictures that gives you information about each body of water? **Possible answers:** The water is still; the water is moving; the water is surrounded by land; the body of water is very large.
- How would the ocean water taste? **salty**

### What is Earth's water like?

Not all water on Earth is the same. Most water on Earth is in salty oceans. Oceans cover about three-fourths of Earth. Many living things cannot drink salt water. They need fresh water to survive.

Think of Earth as four equal parts. Oceans cover three of those four parts.

#### Quick Lab

Draw the water in your area.



▼ An ocean is a very large body of salty water.



## Classroom Equity

Encourage children to become hands-on with science. Studying land and water is a great opportunity to help children understand that many discoveries require scientists to dig in and get dirty. Have children apply this concept by taking them to a local park or nature preserve to explore land and water. Encourage them to use sense words to describe the land and water.

## Quick Lab



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**Objective** Create and label a picture of water and land.

You need crayons, paper

- 1 Encourage children to **communicate** about the kinds of water in their area.
- 2 Ask: What is the water like? **Possible answers:** big, small, deep, blue, salty
- 3 Have children draw a picture of the water and the land that is near the water.
- 4 Ask: What does the land look like? **Possible answers:** high, low, grassy, green, lots of trees
- 5 Have children label their picture with words about the water and land.



Fresh water is water with little or no salt. Streams, rivers, and lakes can be made of fresh water. Streams flow downhill into rivers. **Rivers** might flow into lakes or oceans.

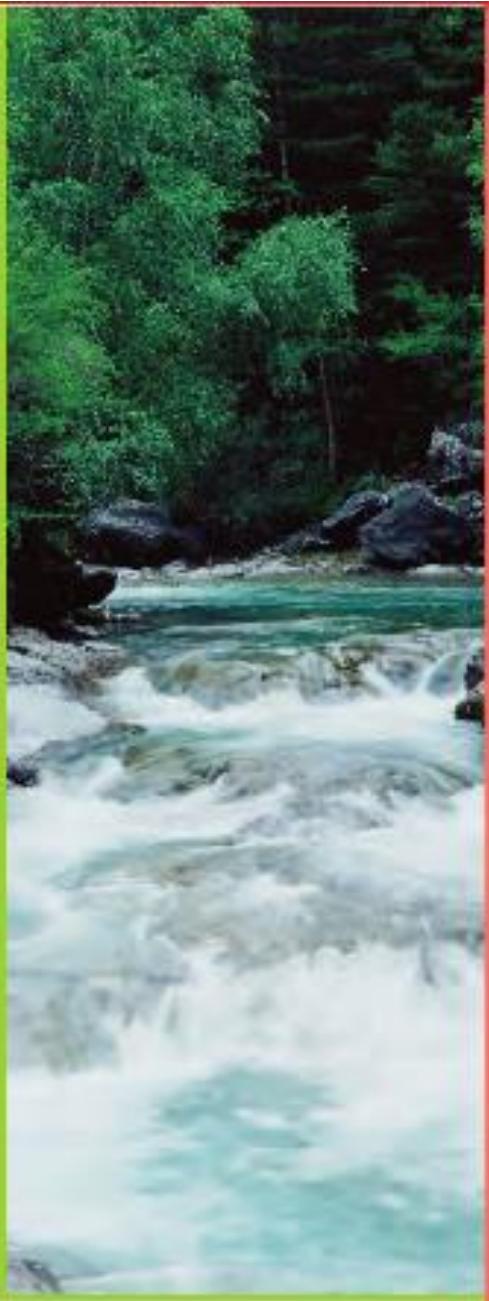
 **Quick Check**

2. What are some different types of water?

Possible answers: oceans, rivers, lakes, streams



▲ A lake is water that has land all around.



▲ A river can move fast.

**FACT** Not all lakes are freshwater.

**221**  
EXPLAIN

## ► Address Misconceptions

Children may think all lakes are freshwater. In fact, more than 25 percent of the world's lakes are made up of salt water.

Many saltwater lakes are also known as terminal lakes, because water flows into them but not out of them. When water evaporates, the salt remains. This maintains the salinity of the lake.

**FACT**

Not all lakes are freshwater. Show children a picture of the great Salt Lake in Utah, and explain that it is the fourth-largest terminal lake in the world.

## ► Develop Vocabulary

**river** Explain that a *river* is a narrow body of moving water. Some rivers empty into lakes, others empty into oceans. Show children pictures of a large, slow-moving river and a narrow, fast-moving river. Have them describe how these two rivers are alike and different.

## ► Explore the Main Idea

**ACTIVITY** Show children a local map. Help them identify the rivers on the map and explore where they begin and end.

# Differentiated Instruction

## Leveled Questions

**EXTRA SUPPORT** Ask questions such as these to check children's understanding of the material.

- What bodies of water have freshwater? **lakes, rivers, streams**
- What bodies of water have salt water? **oceans, some lakes**

**ENRICHMENT** Use these types of questions to develop children's higher-order thinking skills.

- Why is it important to keep freshwater streams, rivers, and lakes clean? **Possible answer: Many living things need to drink fresh water.**
- Why do you think some animals live only in oceans and not rivers? **Possible answer: Their bodies need salt water to live, not fresh water.**

## What is Earth's land like?

### ► Discuss the Main Idea

**Main Idea** Mountains are high land, valleys are low land, and plains are flat land.

Before reading, discuss the land nearby. Ask:

- What are some words that can describe the shape of the land near the school?

### ► Use the Visuals

Have children study the photos on these pages.

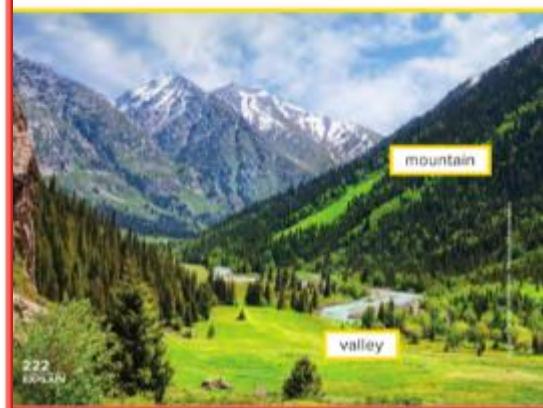
Ask:

- What do you see in each picture that gives you information about these types of land? Possible answers: The land is flat; the land is tall; the land is between mountains.

### What is Earth's land like?

Not all land on Earth looks the same. Land can be smooth, rocky, or flat. Land can be high or low.

A **mountain** is the highest type of land. Mountains come in all shapes and sizes. A **valley** is low land between mountains.



## LA Support

Practice Using Language Model using verbs and adjectives to help children learn about different landforms.

**BEGINNING** Say: *(Child's name) climbed up the hill.*

Have children repeat using the name of the child on their right. Then say: *(Child's name) ran down the hill.* Have children repeat using the name of the child on their left. Repeat with other landforms.

**INTERMEDIATE** Help children list landforms and words that describe them. Encourage them to use the words in a sentence, such as *The mountain is tall.*

**ADVANCED** Have children discuss how hills and mountains are alike and different. Then discuss how valleys and plains are alike and different.

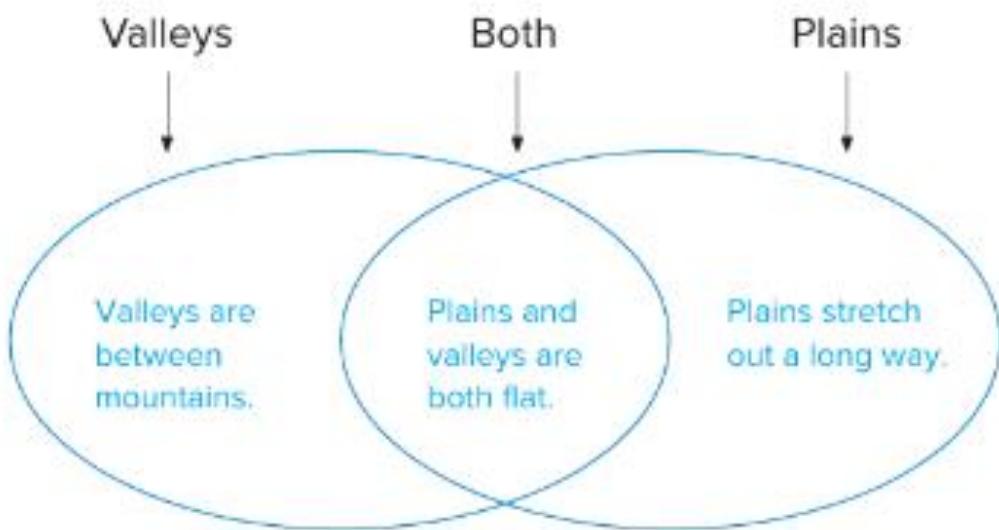


plains

▲ **Plains** are flat land that spreads out a long way.

 **Quick Check**

3. How are valleys and plains alike? How are they different?



## ► Develop Vocabulary

**mountain** Remind children that *mountains* are high places on Earth. Ask children to draw a picture of a mountain and write a sentence about it.

**valley** Explain that *valleys* are the rounded low lands between mountains. Draw a picture of mountains and a valley on the board and ask children to label the valley.

**plains** Write *plain* and *plane* on the board and discuss the meanings of these homonyms. Explain also that *plain* has two meanings. When used as an adjective or describing word, it means “simple” or “ordinary.” When used as a noun or naming word, it means “flat land.”

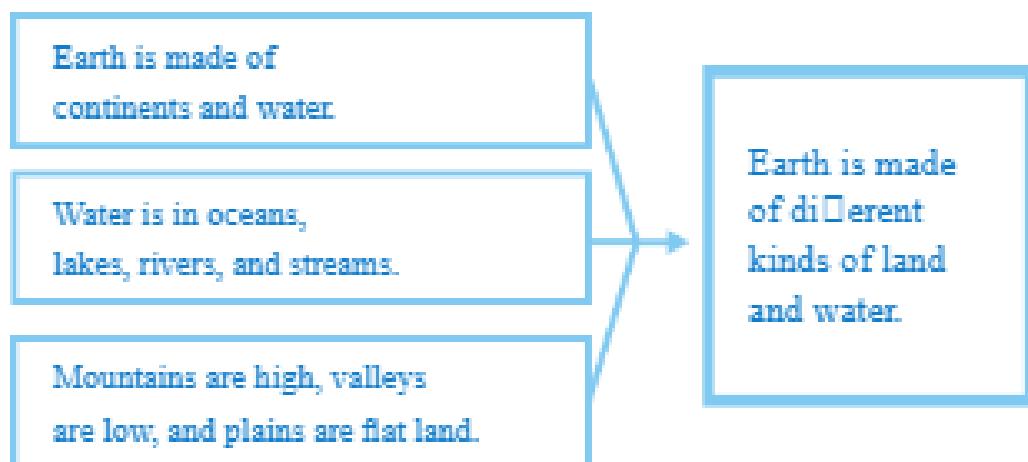
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about land and water. Revisit the Big Idea question: **What does Earth look like?** Record children's responses in the What We Learned column of the class KWL chart.

## ► Using the Reading Skill Summarize

Use the reading skill graphic organizer to summarize the lesson.



## Visual Summary

Write about what you learned.



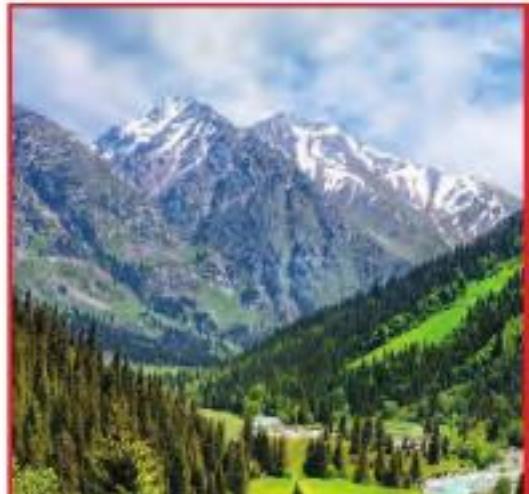
### Earth's Water

Possible answer: Water covers most of

Earth. Most water on Earth is salty oceans.

Streams, rivers, and lakes can be made of

freshwater that has little or no salt.



### Earth's Land

Possible answer: Not all land on Earth looks

the same. The land can be smooth, rocky,

or flat. Land can have high mountains or

low valleys between mountains.

## Think, Talk, and Write

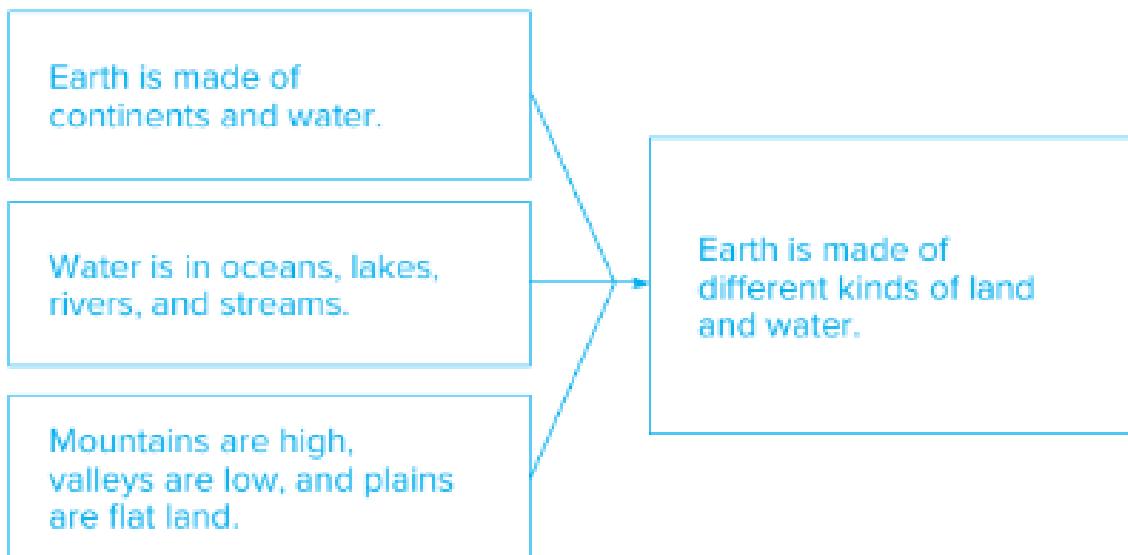
### 1 Vocabulary. What is a continent?

Possible answer: A continent is a big piece of land.

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### 2 Summarize. What are some different kinds of land and water?



### Essential Question What does Earth's surface look like?

Possible answer: Earth's surface is made of continents and water. Mountains,

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valleys, and plains are all different types of land on Earth. Oceans, streams,

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rivers, and lakes are types of water on Earth.

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## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Have children work in pairs. Provide them with country and world maps, and encourage them to point to and name different bodies of water to their partners. Have them explain how they know which bodies of water are oceans, lakes, and rivers.

## Focus on Skills

## Inquiry Skill: Make a Model

When you **make a model** you make something to show how it looks or works.

## ► Learn It

Faisal wanted to find out how a river flows into a lake. He used clay and water to make a model. He saw how a river flows.



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Engage

## Inquiry Skill: Make a Model

## ► Learn It

Ask children to describe any models they have made. If they need a prompt, ask:

- Who has made a paper airplane, set up a train set, or decorated a dollhouse?

Explain that these are all examples of making a model.

Read the text and discuss the model Salem made with the class. Ask:

- What does this model tell you about water?

**Possible answers:** that it flows downhill; that it can create a lake

- How is this model more helpful than someone telling you about water? **Possible answer:** It lets me see the water.

## Extended Reading

## Visit the Library

Encourage children to look at books that focus on making models.

Ask children to think about something they would like to know more about, such as airplanes, trees, or dinosaurs.

Prompt them to think about how making a model could help them learn more about it. Ask:

- How would making a model of an airplane help you learn more about airplanes? **Possible answer:** I would learn more about how they are built and the different parts that make up an airplane.

► Try It

Look at the picture below.



1. What kind of land is in this picture?

Possible answer: This picture shows a mountain with glaciers or

ice caps.

2. Make a model of the land.

3. Write about why people make models.

Possible answer: People make models to help them see how

something looks in real life.

## ► Try It

If children have trouble identifying the landform, encourage them to refer to the pictures and labels in Lesson 1.

1. Ask children to describe the mountain in the picture. Record their responses in a list to help elicit as many details as possible.
2. Ask: What could you use to make a model of this mountain? **Possible answers: brown clay, green clay, white clay, sticks, twigs, pipe cleaners, soil, felt**
3. After children have made their models and before they begin writing, have them share what they did with the class. Encourage them to discuss what they know about mountains and to explain how the model helped them learn about mountains.

## ► Apply It

Explain that making a model of something big, like a mountain, can help you see things that you could not see just by looking at a real mountain or pictures of a mountain. Models can also help us see details of very small things, such as insects or tiny flowers.

Have children use a hand lens to observe a small object, such as a leaf, a flower, or a coin. Have them use clay or other materials to make a model that is larger than the original item. Encourage children to add as many details to their model as they can, and then share it with the class.

Here to

# Plan Your Lesson

## Lesson 2 Changing the Land

### Essential Question

What can change the land?

Reading Skill **Compare and Contrast**

Different    Alike    Different



### Objectives

- Describe how and why weathering occurs.
- Explain the process of erosion and how it can be prevented.

You will need a compare-and-contrast graphic organizer.



### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### 1 Introduce

Look and Wonder

#### 2 Teach

Discuss the Main Idea

#### 3 Close

Think, Talk, and Write



## ENGAGE

EXPLORE

EXPLAIN

EVALUATE

EXTEND

## Lesson 2 **Changing the Land**

### Objectives

- Describe how and why weathering occurs.
- Explain the process of erosion and how it can be prevented.

# 1 Introduce

### ► Assess Prior Knowledge

Find out what children know about how the land can change. Ask:

- What might cause a rock to change?
- What might cause the shape of the land to change?

Record children's answers in the **What We Know** column of the class **KWL** chart.

## Look and Wonder

### Before You Read

This part of Earth is very cold. What is happening to the ground in this picture?

Possible answer: The picture shows how the ground is cracking.

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### Essential Question

What can change land?

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## Look and Wonder

Read and discuss the Look and Wonder statement and question. Have children describe what they see in the photograph. Ask:

- What happened to the land? **Possible answer:** *The rock cracked.*
- What will happen if the ice melts? **Possible answer:** *Water will flow between the cracks in the rock.*

Write children's responses on the board and note any misconceptions they might have.

## Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.

## Explore

### How can water break rock?

#### What to Do

- 1 **Make a Model.** Fill a film canister all the way with water. Put the cap on.



#### You need



film canister



water

- 2 Have your teacher place the canister in a freezer.
- 3 **Predict.** What will happen to the water in the canister?

Possible answer: The water will freeze.

**Explore**

whole class



20 minutes

**Plan Ahead** Obtain access to a freezer. If time is short, pre-freeze a capped film canister filled with water so that children can observe the results of the experiment more quickly.

**Purpose** This activity will help children see and begin to understand how water, when it freezes, can break rocks.

**Structured Inquiry****What to Do**

Explain that the class will work together to see what happens when water freezes inside a film canister.

- 1 Make a Model** Remind children that models show how something looks or works. In this case, the film canister will show how a rock with a crack in it can break when water fills the crack and then freezes.
- 2 Ask: Why do we put things in a freezer?**
- 3 Predict** Encourage children to record their predictions for future reference.

**Alternative Explore****How can ice cause erosion?**

Provide groups of children with ice cubes and small piles of dirt on trays. Have them place an ice cube on top of the dirt and **observe** what happens as the ice melts. Ask:

- How does the melting ice change the dirt? **Possible answer:** It carries the dirt with it as it flows.

Encourage children to **infer** that melting ice can cause the erosion of land.

## Inquiry Activity

4 **Observe.** Look at the canister after a few hours.

What happened?

Possible answer: The water inside the canister froze and took up more

room. It forced the lid to pop off.

### Explore More

5 **Infer.** What do you think will happen if water freezes in a rock?

Possible answer: When water freezes in a rock, the ice can break

the rock.

### Open Inquiry

Investigate the effects of ice on land.

My question is:

Sample question: What does ice do to land?

ENGAGE

EXPLORE

EXPLAIN

EVALUATE

EXTEND

**4 Observe** Once the water has completely frozen, show children the film canister. Ask: Why do you think the cap popped off? **When water freezes, it expands, or takes up more room.**

### Guided Inquiry

#### Explore More

**5 Infer** Remind children to use what they observed when water froze inside the film canister to help them infer what will happen when water freezes in a rock.

### Open Inquiry

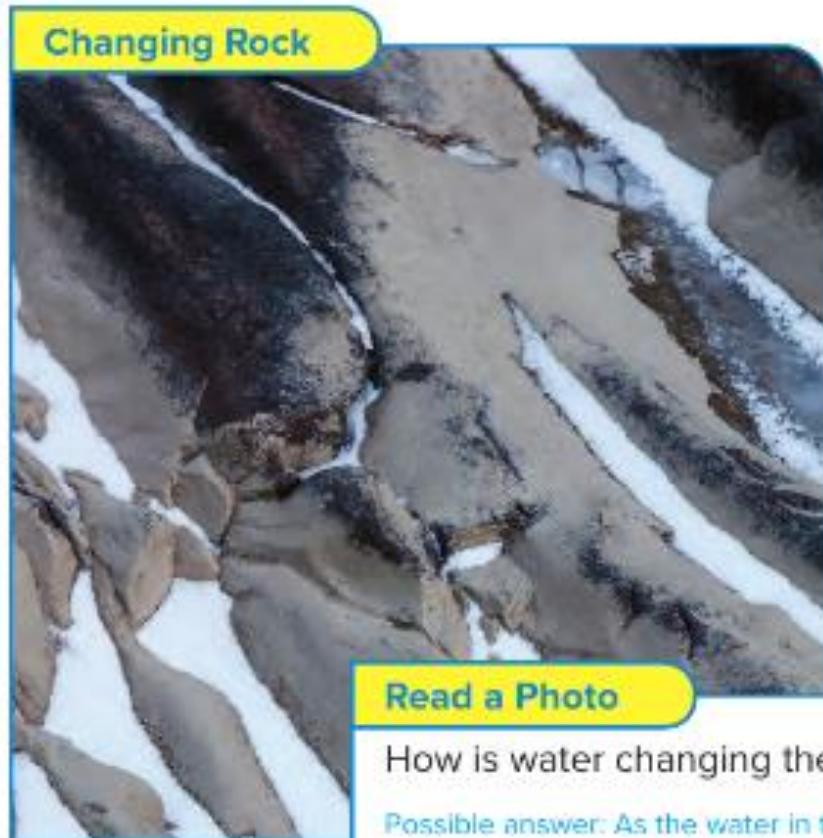
Encourage children to observe ice in the context of experiments with water. Encourage children to look closely at how dirt and rocks interact with water as the water freezes, melts, and refreezes.

## Read and Respond .....

### What is weathering?

Earth changes every day. Did you know that water can change the shape and size of rocks? This is called **weathering**.

When water gets into cracks in a rock, it can freeze and push the rock. The cracks get bigger and the rock breaks.



How is water changing these rocks?

Possible answer: As the water in the rock

freezes, it makes the crack in the rock bigger.

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# 2 Teach

## Read and Respond

Reading Skill **Compare and Contrast** To compare is to decide how things are alike. To contrast is to decide how things are different.



### What is weathering?

#### ► Discuss the Main Idea

**Main Idea** Water and plants can break rocks through the process of weathering.

Read the question at the top of the page and discuss children's responses.

After reading together, ask:

- How can you tell if a rock has been broken? **Possible answer:** The rock will have uneven edges.
- How do rocks crack? **Possible answers:** Ice pushes against the rocks; the roots of plants push against the rocks.

# Science Background

**Changes in Nature** Water causes erosion through acid rain and, over time, through regular rainfall. Ocean water causes erosion through wave action. Likewise, swiftly moving river water tosses rocks around, gradually wearing away their rough edges.

## LA Support

**Use Pictures** Use the pictures to describe how the effects of weathering and plant growth can change the size and shape of rocks. Ask: Which picture shows how water can change the shape of rocks? Which picture shows how plants can change the shape of rocks?

**BEGINNING** Point to the crack in the rock on the left and have children repeat the word *ice*. Point to the crack in the rock on the right and have children repeat the word *tree*.

**INTERMEDIATE** Have children complete this sentence aloud: \_\_\_\_\_ can change the shape of rocks.

**ADVANCED** Have children write a sentence to explain why the ice and the tree can change the shape of the rock. Encourage them to read their sentence aloud to a partner.

Weathering usually happens so slowly that you do not notice it. Many changes take thousands of years to happen.

Running water and wind can also cause weathering. Running water and wind pick up small rocks. These rocks scrape against other rocks. This scraping slowly wears away rocks.

### Quick Check

1. What can break a rock?

Possible answer: Ice

and plant roots can

gradually break rocks

apart

▼ Plants can also break rocks. As this tree's roots grow, they crack the rock.



### Read a Photo

Have children study the photo on the left. Ask:

- How do you think this rock looked a long time ago? **Possible answers:** The crack was much smaller; the rock had no crack in it.

### ► Address Misconceptions

Children may think that sidewalks and other forms of pavement are stronger than tree roots. This is not true. Roots absorb water for the tree, and this water can exert enormous pressure. As the roots grow, they can become powerful enough to crack sidewalks.

**FACT**

Tree roots can grow under sidewalks and make them crack.

### ► Develop Vocabulary

**weathering** *Word Origin* Encourage children to find *weather* in the word *weathering*. Explain that *weather* can be a verb that means “to wear away.” Help children understand that these two forms of *weather* are related because *weathering* occurs when things are exposed to the forces of *weather*.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Ask questions such as these to check children's understanding of the material.

- What can happen when water gets inside a rock and freezes? *The rock can break.*
- How can plant roots break rocks? *The roots push so hard against the rocks that the rocks break.*

**ENRICHMENT** Use these types of questions to develop children's higher-order thinking skills.

- How else can rocks break? *Possible answers: People can use tools to break rocks; lightning can strike rocks.*
- Where can you find many rocks that have been broken by ice? *Possible answer: in very cold places*

## What is erosion?

### ► Discuss the Main Idea

Main Idea Erosion changes the shape of land.

Before reading, ask:

- What are some different types of land? **Possible answers:** Land can be high or low; land can be rocky or grassy.

After reading together, ask:

- What causes land to change? **Possible answers:** erosion; wind and water
- How do plants help stop erosion? **Possible answer:** Plant roots hold the soil in place.

### ► Use the Visuals

Discuss the photo and read the caption. Ask:

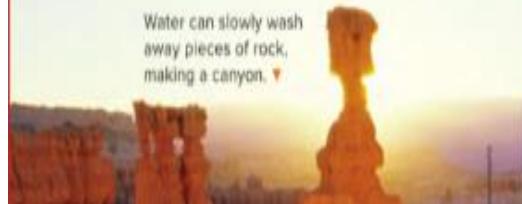
- How does a canyon form? **Possible answer:** Water slowly washes away the land, causing it to be lower than the land around it.

### What is erosion?

Broken rocks are sometimes moved to other places. **Erosion** is when rock and soil are moved by wind or water to a new place. Glaciers also cause erosion. A glacier is a large sheet of ice that moves slowly across the land.

Erosion can happen slowly or quickly. Floods can cause erosion quickly when rivers overflow. Glaciers cause erosion slowly as they move.

Underline the part of the text that tells what causes erosion to happen slowly or quickly.



Water can slowly wash away pieces of rock, making a canyon. ▶

# Quick Lab



whole class



10 minutes

**Objective** Observe the effects of erosion.

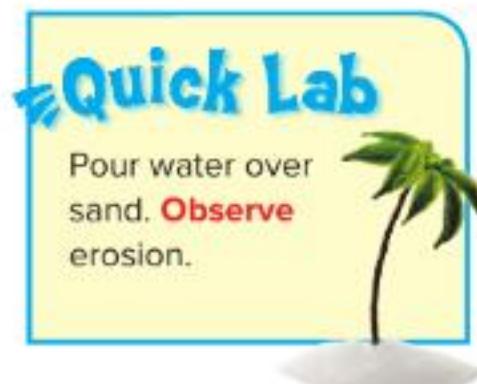
You need deep tray, sand, water

- 1 Have children place a large pile of sand in a deep tray.
- 2 Invite a volunteer to pour water over the pile of sand, and have children **observe** how the water changes the sand. Ask: What happened? **Possible answers: The sand moved; the water carried away the sand.**
- 3 Encourage children to use the results of the experiment to infer the effects of erosion. Ask: How can rain change the shape of the land? **Possible answers: Soil can get washed away; mountains can get smaller; canyons can form.**

Water and wind can carry broken rocks far away. Then they are dropped in new places.

**Deposition** is the dropping off of weathered rock. Erosion and deposition work together to change Earth's surface.

Plants can help prevent erosion. A plant's roots help hold soil in place so wind and water cannot move it.



### Quick Check

#### 2. What is erosion?

Possible answer: Erosion occurs when wind or

water carries away small pieces of rock and soil.



## ► Develop Vocabulary

**erosion** Explain that the word *erosion* describes the gradual wearing away of soil by wind or water.

**deposition** Word Origin Encourage children to find the word *deposit* in the word *deposition*. Explain that *deposit* can be a verb that means “to place or set down.”

Have a discussion with children about why erosion and deposition can be a concern and what the consequences of it can be.

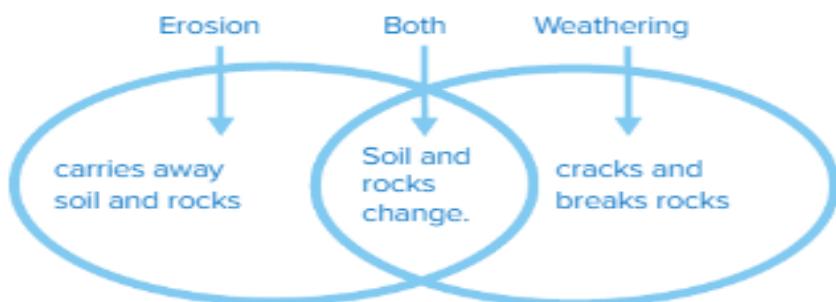
## 3 Close

### ► Using the KWL Chart

Review with children what they have learned about weathering and erosion and how these can change land and rocks. Revisit the Big Idea question: **What does Earth look like?** Record children’s responses in the What We Learned column of the class KWL chart.

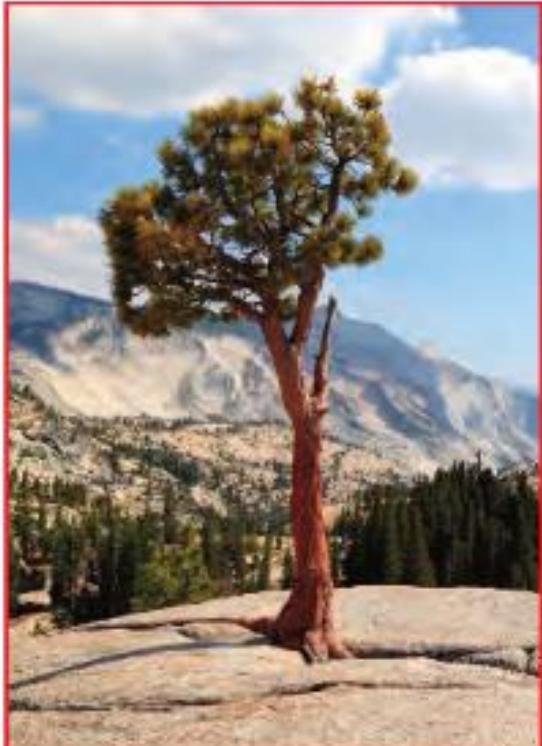
### ► Using the Reading Skill Compare and Contrast

Use the reading skill graphic organizer to compare and contrast the effects of erosion and weathering on soil and rocks.



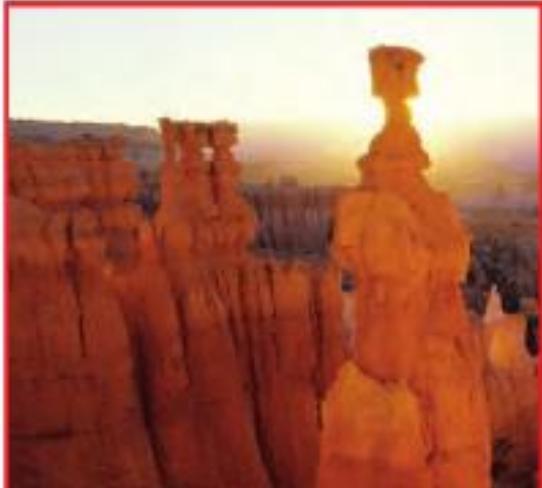
## Visual Summary

Write about what you learned.



### Weathering

Possible answer: Weathering can cause  
water to change the shape and size of  
rocks. When water gets into cracks it can  
freeze and force the rock to break.



### Erosion

Possible answer: Erosion happens when  
rock and soil are moved by wind or water  
to a new place. Erosion can happen slowly  
or quickly.

## Think, Talk, and Write

### 1 Vocabulary. What is deposition?

Deposition is the dropping off of weathered rock.

### 2 Compare and Contrast. Describe two ways water can change rock.

Possible answer: Water can freeze inside rocks and break them apart;

water can wash away rock and make canyons.

### Essential Question What can change land?

Possible answers: Weathering and erosion can change land. Weathering is

when water changes the shape and size of rocks. Erosion is when rock and

soil are moved by wind or water.

## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Social Studies Link

After a rainy day, have children look for signs of soil erosion. Then have children describe the soil erosion they found. Ask: **How do you know that what you found was a sign of soil erosion? How might erosion affect the people, animals, and plants that live nearby?**

# Writing in Science

## Objective

- Write a story to tell how erosion could be stopped.

## Stopping Erosion

### Talk About It

Look at the picture with children. Ask them to describe what is happening in the picture. Ask:

- What would happen if it rained more? **Possible answers:** The water level would rise; there could be a flood.

### Writing in Science

#### Stopping Erosion

Look at the picture below. What do you think could be eroding the soil?



### Learn About It

Read the title and text with children. Explain to them that the moving water in this flooded river washes soil away. Ask:

- Why is soil important? **Possible answers:** Animals live in it; plants need it to get nutrients.
- What could happen if soil gets eroded? **Possible answers:** Plants could die; animals could lose their homes.

## Extended Reading

### Visit the Library

Read a book about erosion to children.

Discuss the different things that cause erosion and what effects they have on the land.



## Write About It

Tell children they are going to write a story about one way that the erosion in the picture on the left could be stopped. Encourage them to refer back to the lesson pages on erosion.

Ask them to give details about what the people in their story do in order to help stop erosion. Help them adhere to the story structure of beginning, middle, and end.

### Write About It

Write a story about what could help stop erosion in this picture.

### Remember

A story has a clear beginning, middle, and end.

### Planning and Organizing

Use the following chart to plan your story.

Answers will vary. Accept all reasonable plans.

Write your story on a separate piece of paper.

# CHAPTER 8 Review

## ► Use the KWL Chart

Review the **KWL** chart that the class made at the beginning of the chapter. Help children compare what they know about Earth now with what they knew then. Add any additional information to the What We Learned column of the **KWL** chart.

## CHAPTER 8 Review

### Vocabulary

Use each word once to complete the sentences.

1. The seven large pieces of land on

Earth are called

continents .

continents

mountain

plains

river

2. This moving water that flows into a lake or ocean is a

river .



3. Flat land that spreads out a long way are plains .



4. This kind of land is called a mountain .



## Science Skills and Ideas

Answer the questions below.

5. How can the land change?

Possible answers: Weathering and erosion can change land. Weathering is when water changes the shape and size of rocks. Erosion is when rock and soil are moved by wind or water.

6. **Make a Model.** How could you make a model of a kind of land forms?

Possible answer: I could make a lake out of clay and water.

7. **Put Things in Order.** Number these rocks from biggest to smallest. Label the biggest rock 1, the medium rock 2, and the smallest 3.



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CHAPTER 8 + REVIEW

## Science Skills and Ideas

7. Encourage children to use their fingers or rulers to measure the size of the rocks.

# CHAPTER 8 Review



10. Children should be able to address concepts taught in each lesson: describing different landforms and different bodies of water; describing rocks and different kinds of soil; articulating that rocks and land can change.

## CHAPTER 8 Review

8. How are lakes and oceans different?

Possible answers: A lake is water that has land all around it. Lakes can be made up of freshwater or salt water. An ocean is a very large body of salt water.

9. What are some ways water can change Earth?

Possible answers: Water can wash away soil; water can make a canyon; water can freeze and crack rocks.

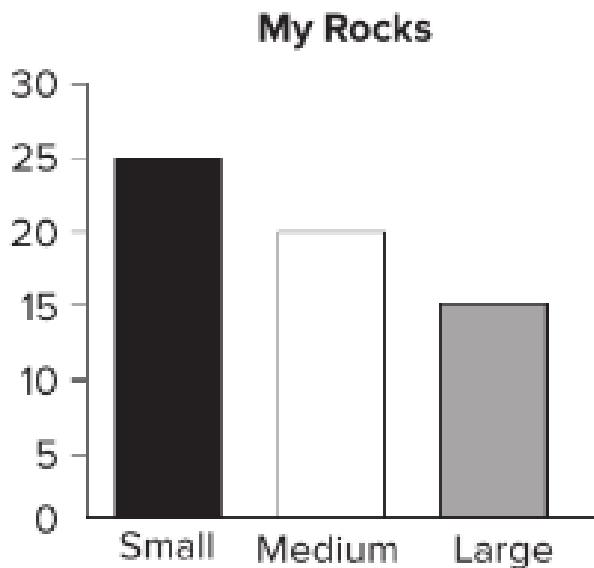


10. What does Earth look like?

Accept all reasonable responses.

## Test Prep

1. Which does not contain freshwater?
  - a lake
  - an ocean
  - a stream
  - a river
2. Look at the chart Fahd made to compare the size of the rocks he found.



How many large rocks did he find?

- 15
- 25
- 20
- 10

## Depth of Knowledge

**Level 1 Recall** Level 1 requires memory of a fact, a definition, or a procedure. At this level, there is only one correct answer.

**Level 2 Skill/Concept** Level 2 requires an explanation or the ability to apply a skill. At this level, the answer reflects a deep understanding of the topic.

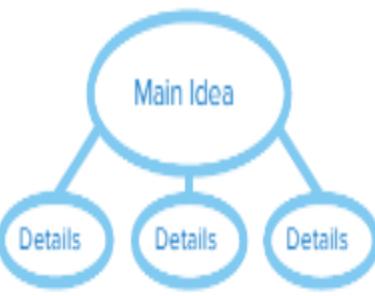
**Level 3 Strategic Reasoning** Level 3 requires the use of reasoning and analysis, including the use of evidence or supporting information. At this level, there may be more than one correct answer.

**Level 4 Extended Reasoning** Level 4 requires the completion of multiple steps and requires synthesis of information from multiple sources or disciplines. At this level, the answer demonstrates careful planning and complex reasoning.

## Test Preparation

1. An ocean is a very large body of salt water. Lakes, streams, and rivers may contain fresh water.
2. Fahd found 15 large rocks, 20 medium rocks, and 25 small rocks.

# CHAPTER 9 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
<b>1</b> Living and Nonliving Things	<ul style="list-style-type: none"><li>Compare and classify living and nonliving things.</li><li>Explain what plants need to live and grow.</li></ul> <p>Reading Skill Main Idea and Details</p> 	living things nonliving things human-made things
<b>2</b> Rocks and Minerals	<ul style="list-style-type: none"><li>Explain what rocks are and how they are used.</li><li>Explain what minerals are and how they are used.</li></ul> <p>Reading Skill Classify</p> 	natural resource rock minerals

## CHAPTER 9 Planner

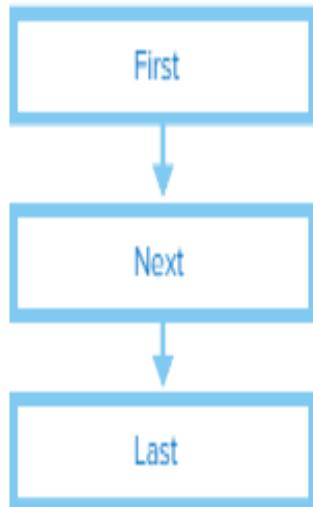
### 3 Soil

PACING: 2 days

**FAST TRACK:** 1 day

- Describe what things make up soil.
- Explain how soil is formed.

Reading Skill  
Sequence



soil  
decompose

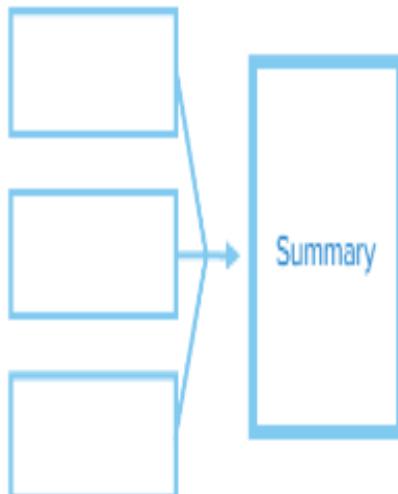
### 4 Using Earth's Resources

PACING: 3 days

**FAST TRACK:** 1 day

- Describe how people use natural resources.
- Explain why people should take care of Earth's resources.

Reading Skill  
Summarize



pollution  
reduce  
reuse  
recycle

PACING Assumes a day is a 20-25 minute session.

# Activity Planner

## EXPLORE Activities

### Explore

PACING: 25 minutes



**Objective** Understand what happens when living and nonliving things are watered.

**Skills** compare, observe, infer

**Materials** rocks, plants, water, clear bins

**★ PLAN AHEAD** Choose a fast-growing plant so children can easily see growth and change.

## QUICK LAB Activities

### Quick Lab

PACING: 10 minutes



**Objective** Identify living and nonliving things in the classroom.

**Skills** observe, classify

**Materials** paper, crayons, magazines, paste

**★ PLAN AHEAD** To save time, you could cut out magazine images ahead of time for student use.

### Explore

PACING: 25 minutes



**Objective** Observe rocks and classify them by their physical attributes.

**Skills** observe, classify, communicate

**Materials** rock kit, hand lenses, pencils, paper

**★ PLAN AHEAD** Be sure to provide sturdy bags to collect rocks in. If children are to collect rocks on their own, send a note home to parents asking to provide adult supervision.

### Quick Lab

PACING: 15 minutes



**Objective** Observe and compare minerals in rocks.

**Skills** observe, compare

**Materials** rock kit, hand lenses, markers, paper

**★ PLAN AHEAD** Provide enough rocks for each pair. Explain how to draw a Venn diagram.

# Activity Planner

## Explore PACING: 20 minutes



**Objective** Observe the properties of soil.

**Skills** observe, communicate

**Materials** two kinds of soil, two paper plates per grouping, strainers, hand lenses, crayons

**★ PLAN AHEAD** Have a plan for distributing the soil. Be sure to have enough strainers for each pair.

## Explore PACING: 20 minutes



**Objective** Understand how natural resources are used and why they are important.

**Skills** communicate, draw conclusions, infer

**Materials** poster board, crayons, markers

**★ PLAN AHEAD** Have poster board, crayons, and markers available for children to use to make their charts.

## Quick Lab PACING: 10 minutes



**Objective** Predict and observe what happens to dead plants in soil.

**Skills** observe, record, predict

**Materials** clear plastic containers, lunch scraps, potting soil, pencils, paper

**★ PLAN AHEAD** Fill containers with soil before class. While conducting the experiment, try to place containers in a well-ventilated area.

## Quick Lab PACING: 15 minutes



**Objective** Predict and observe how much recyclable materials are collected in the classroom.

**Skills** predict, compare

**Materials** three recycling bins

**★ PLAN AHEAD** Research on the Internet what items are deemed recyclable in your area and use as a reference.



## Academic Language

As they learn, students need help in building their understanding of the academic language used in daily instruction and science activities. The following strategies will help to increase children's language proficiency and comprehension of content and instruction words.

### Strategies to Reinforce Academic Language

- **Use Context** Academic language should be explained in the context of the task. Use gestures, expressions, and visuals to support meaning.
- **Use Visuals** Use charts, transparencies, and graphic organizers to explain key labels to help children understand classroom language.
- **Model** Use academic language as you demonstrate the task to help children understand instruction.

### Academic Language Vocabulary Chart

The following chart shows chapter vocabulary and inquiry skills. Vocabulary words help children comprehend the main ideas. Inquiry Skills help children develop questions and perform investigations.

#### Vocabulary

living things  
nonliving things  
human-made things  
natural resource  
rock  
minerals  
soil  
decompose  
pollution  
reduce  
reuse  
recycle

#### Inquiry Skills

observe  
classify  
communicate  
draw conclusions  
infer

## Vocabulary Routine

Use the routine below to discuss the meaning of each word on the vocabulary list. Use gestures and visuals to model all words.

**Define** A natural resource is a material people use from Earth.

**Example** Rocks are a *natural resource*.

**Ask** What is a *natural resource* that you use every day?

Children may respond to questions according to proficiency level with gestures, one-word answers, or phrases.

## Vocabulary Activities

Help children understand how we use natural resources daily.

**BEGINNING** Label a four-column chart with the words *water*, *air*, *soil*, and *minerals*. Explain that the words name natural resources. Read each one and have children repeat. Then challenge them to think of ways they use each resource: *What do you use water for?* Write responses on the chart and read them together.

**INTERMEDIATE** On the board, write a list of natural resources. Form two groups. Have each group take turns creating first-person riddles for the other group to guess about the resources listed. Model an example: *People use me to grow plants. What resource am I?* (soil)

**ADVANCED** Write the words *water*, *air*, *soil*, and *minerals*. Encourage children to discuss why these words can be categorized as natural resources. Then challenge children to describe how people use these resources and how life would change without them.

# CHAPTER 9

## Earth's Resources



**THE BIG IDEA** What are Earth's resources?

**Chapter Preview** Have children look at the Essential Questions and predict what the lessons will be about.

### ► Assess Prior Knowledge

Before reading the chapter, create a **KWL** chart with children. Ask the Big Idea question, and then ask:

- What are Earth's natural resources?
- Why are natural resources important?
- How can we protect Earth's natural resources?

Answers shown represent sample children's responses.

Follow the **Instructional Plan** below after assessing children's prior knowledge of chapter content.

### Differentiated Instruction

#### Instructional Plan

**Chapter Concept** Earth provides many useful resources.

**EXTRA SUPPORT** Children who need to review the difference between living and nonliving things should review **Lesson 1** before proceeding with the rest of the chapter.

**ON LEVEL** Children who can compare living and nonliving things might go directly to **Lessons 2** and **3** to learn more about rocks, minerals, and soils.

**ENRICHMENT** For children who are ready, **Lesson 4** introduces the concept of nonrenewable resources.

### CHAPTER 9

#### Earth's Resources



What are Earth's resources?

Answers will vary. Accept all reasonable responses.

#### Vocabulary



**nonliving thing** a thing that does not grow and change, or need food, air, or water to survive



**rock** a nonliving part of Earth



**minerals** bits of rocks and soil that plants and animals need



**soil** a mix of tiny rocks and bits of dead plants and animals

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CHAPTER 9

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

## Earth's Resources

What We <b>K</b> now	What We <b>W</b> ant to Know	What We <b>L</b> earned
Resources come from Earth.	Why do we need to save resources?	We need Earth's resources to live. Natural resources take millions of years to form and cannot be quickly replaced.
Water is a natural resource.	What can be made from resources?	Trees can be used to build homes and furniture. Wind can be used to make power that gives homes heat and light. Soil can be used to grow crops.
People and plants need water.	How can we conserve water?	We can conserve water by not using more than we need.

# Vocabulary

- Have a volunteer read the Preview Vocabulary words aloud to the class. Ask children to find one or two of the words in the chapter. Add these words and their definitions to a class Word Wall.
- Encourage children to use the illustrated glossary in the Student Edition's reference section.

Stop Here to

# Plan Your Lesson

## Lesson 1 Living and Nonliving Things

### Essential Question

How are living and nonliving things different?

### Objectives

- Compare and classify living and nonliving things.
- Explain what plants need to live and grow.

Reading Skill **Main Idea and Details**



You will need a main idea and details graphic organizer.



### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### 1 Introduce

Look and Wonder

#### 2 Teach

Discuss the Main Idea

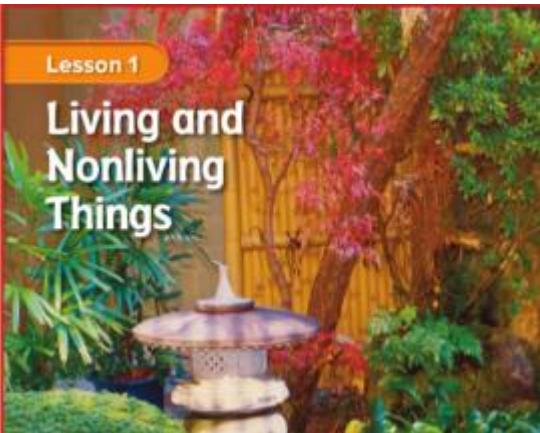
#### 3 Close

Think, Talk, and Write

# Lesson 1 Living and Nonliving Things

## Objectives

- Compare and classify living and nonliving things.
- Explain what plants need to live and grow.



# 1 Introduce

## ► Assess Prior Knowledge

Have children share what they know about living and nonliving things. Ask:

- How do you know if something is alive?
- Why are plants living things?

Record children's answers in the What We Know column of the class KWL chart.

## Warm Up

### Start with a Discussion

Invite children to share stories about plants or pets that they have or would like to have. Discuss how they would care for the plants and animals. Ask:

- How do you know plants and animals are living? **Possible answers:** They grow and change; they drink water.
- What do plants and animals need to live? **Possible answers:** water, sunlight, food, a place to grow, air
- What would happen if plants and animals did not get the things they need to live? **Possible answers:** They would not grow; they would die.



## Look and Wonder

### Before You Read

What living and nonliving things do you see here?

Possible answer: The plants, fish, and trees are living. The planters,

rocks, and Japanese garden lantern are not living.

### Essential Question

How are living and nonliving things different?

Answers will vary. Accept reasonable responses.

## Look and Wonder

Read the Look and Wonder question about living and nonliving things. Ask:

- How do you know which things are living and which are nonliving?
- What clues in the picture help you identify living things?

Write children's responses on the board and note any misconceptions they might have.

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.

## Explore

### What is living and nonliving?

#### What to Do

- 1 **Compare.** Look at a rock and a plant. Write about how they are alike and different.

Possible answer: A rock is hard and is nonliving. A

plant is green and has leaves and roots. It is also

living.

- 2 Put the rock in a bin. Water the rock and the plant for a week.

Step 2



#### You need



rock



plant



water



clear bin

## Explore



whole class



25 minutes

**Plan Ahead** Choose a fast-growing plant or a plant with flower buds so that children can easily see growth and change. This activity will require five minutes every day for one week for children to make observations.

**Purpose** This activity demonstrates what happens when living and nonliving things are watered.

### Structured Inquiry

#### What to Do

Have children name and describe living and nonliving things. Ask: **How do you know something is living?** **Possible answers:** It grows; it needs water.

- 1 Compare** Have children use their senses to see, feel, and smell the plant and rock. Encourage them to write down what they notice.
- 2** Water the plant and rock equally.

## Alternative Explore

### Is it living?

Collect magazine pictures of living and nonliving things. Be sure to include plants, animals, people, natural objects, and human-made objects in the collection.

Give children groups of pictures to **classify** into two groups: *living* and *nonliving*.

When children have finished the activity, have them share their work with a partner.

### 3 Observe. What happens?

Possible answer: The plant is growing. The rock does not change.

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### 4 Infer. How do you know if something is living or nonliving?

Possible answer: Something that is living can grow or change. Nonliving things do not change.

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### Explore More

### 5 Classify. Sort living and nonliving objects.

### Open Inquiry

Investigate other living things.

My question is:

Sample question: What other things do living things need?

---

**3 Observe** Have children look at the flowers and leaves for signs of growth. Encourage children to observe the rock. Invite children to write down their observations each day.

**4 Infer** Tell children that to *infer* means to use what they know to figure something out. Have children use what they learned about the plant and the rock to describe other living and nonliving things.

#### Guided Inquiry

#### Explore More

**5 Classify** Help children put living and nonliving things into groups using the need for water as a criterion.

#### Open Inquiry

Encourage children to explore further by asking:  
What other things, besides water, do living things need? How could you find out what something needs to live?

Check the class KWL chart to see whether children were confused about whether something was living or nonliving. Ask: How can you find out whether something is alive?

## Read and Respond .....

### What are living and nonliving things?

Plants and animals are living things. You are a living thing. **Living things** grow and change. They need food, water, and air to live. They make new living things like themselves.

#### Living and Nonliving Things

### Quick Lab

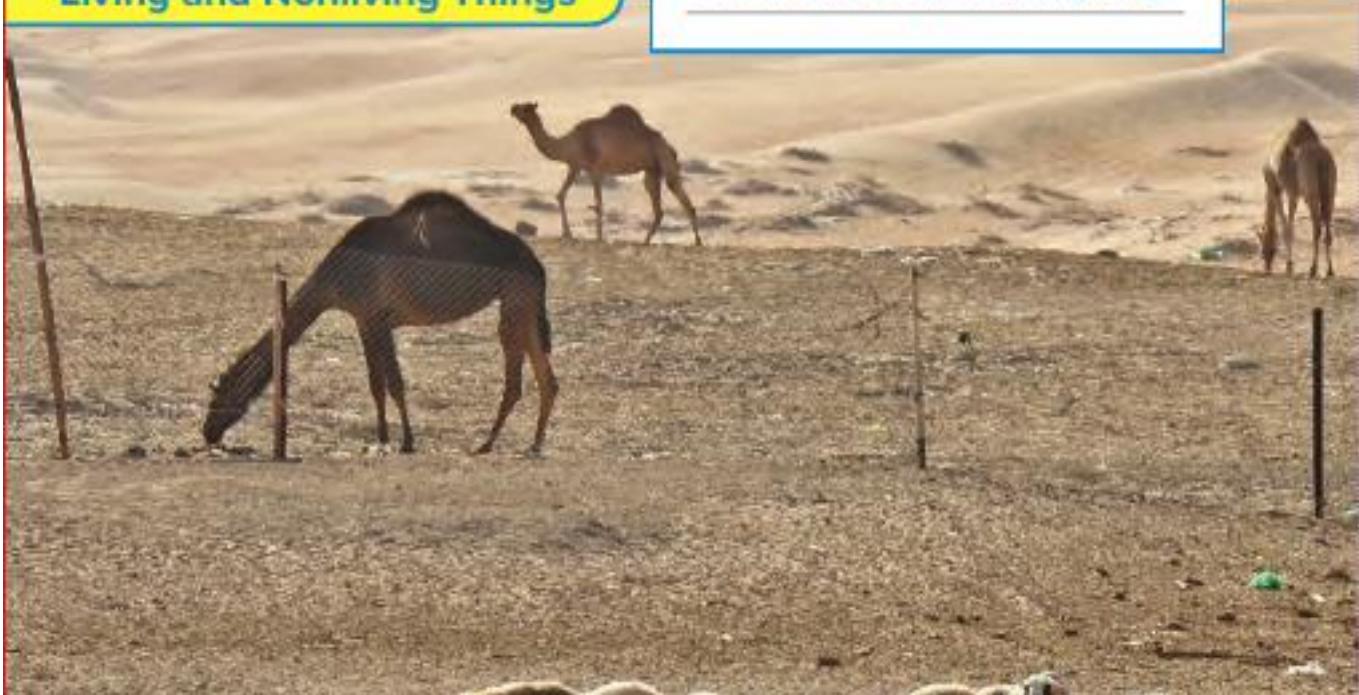
Find living and nonliving things in your classroom.

#### Read a Photo

What living and nonliving things do you see here?

Possible answer: Cows, trees, and grass are living things. The barn, fence, and house are nonliving things.

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## 2 Teach Read and Respond

**Reading Skill Main Idea and Details** The main idea is the most important idea in the reading selection. Details give more information about the main idea.



### What are living and nonliving things?

#### ► Discuss the Main Idea

**Main Idea** Living things grow and change. Nonliving things do not grow and change.

After reading together, ask:

- How could you tell if something is living or nonliving? **Possible answers:** Living things grow and change; they need food, water, and air. Nonliving things do not grow and change; they do not need food, water, or air.

### Science Background

**Living and Nonliving Things** Living things are made of one or many cells. They breathe and use energy. They grow, reproduce, and die. Living things respond to stimuli and adapt to their environment. Nonliving things may do some of these things, but only living things do them all.

## LA Support

**Compare and Contrast** Write the words *living* and *nonliving* on the board. Use picture cards or magazine clippings showing living and nonliving things. Ask each child to pick a picture and tape it under the correct heading on the board. Have children draw their own examples of living and nonliving things and add them to the board. Encourage children to describe their drawings and explain why the things in the pictures are living or nonliving.

**BEGINNING** Have children use the words *living* and *nonliving* to describe the pictures.

**INTERMEDIATE** Ask children to use short phrases to describe the pictures.

**ADVANCED** Have children use sentences to describe living and nonliving things.

**Nonliving things** do not grow and change. They do not need food, water, or air. They do not make new things like themselves. Books, pencils, and rocks are nonliving things. There are nonliving things all around you.

### Quick Check

1. How are living things different from nonliving things?

Possible answer: Living things

need food, air, and water to

survive.

### Read a Photo

Encourage children to study the picture. Ask:

- Are cows living? How do you know? Possible answer: Yes; cows grow, eat, drink, breathe, and make new cows.

### ► Develop Vocabulary

**living** *Scientific vs. Common Use* Write these two sentences on the board: *The plant is living. She makes a living as a police officer.* Discuss how the word *living* can be used to describe how someone makes money. Help children make sentences using both the scientific and common uses of *living*.

**nonliving** *Word Origin* Explain to children that the prefix *non-* means “not.” Have children infer the meanings of other words that have the prefix *non-*, such as *nonstop*, *nonsmoking*, and *nonpoisonous*.

# Quick Lab



Individual or  
small groups



10  
minutes

**Objective** Identify living and nonliving things in the classroom.

You need paper, crayons, magazines, paste

- 1 Have children **observe** items in the classroom. Ask: What things are living? What things are nonliving?
- 2 Ask children to draw or find clippings of what they see. Have them **classify** the images into *living* and *nonliving* categories.
- 3 Have children divide a piece of paper in half, then label one side *Living* and the other side *Nonliving*. Encourage them to paste their drawings and clippings on the appropriate side of the paper.



# What are human-made things?

## ► Discuss the Main Idea

**Main Idea** Many nonliving things are made by people.

Read the question at the top of the page and ask children to look around the room. What things do they see in the room that people made? Correct any misconceptions they may have. Ask:

- What do people use to make things? **Possible answer:** They use things they find in nature, like wood.
- Soap is a nonliving thing. A rock is a nonliving thing. Are they both human-made things? Explain why or why not. **Possible answer:** They are both nonliving, but only soap is human-made. Rocks are formed in nature.

## Read a Visual

Point out to children that the labels will help them understand the materials from which the items were made. Ask:

- What two items are made of plastic? **a bucket and a ball**
- Which human-made item is something that you have in your classroom? What would you add to a list of human-made items you can find in your classroom? **Answers will vary, but children might find glue, soap, and a bucket in the classroom. They should add more items to the list.**

### What are human-made things?

Many nonliving things are made by people. Things that are made by people are called **human-made things**. Plastic bottles, soap, crayons, paint, and some glues are nonliving things made by people.



### Human-made Things



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## LA Support

Children may have trouble understanding how the prefix *non-* changes the meaning of the word *living* to “not living.” What other words can children name with “*non-*”? Give children cards with words on them and have them add the prefix. Discuss with them how adding the prefix changes the meaning of the word. You might use the following words: *sense, stop, and fiction*.

### ► Develop Vocabulary

**human-made** Point out that the word *human-made* is a compound word made of two separate words: *human* and *made*. Some compound words have hyphens, while others do not. Some compound words are two words, while others are one. Have children name other compound words. Can they find examples in the classroom? (e.g., *chalkboard, lunchbox*)

Rocks and water are nonliving things too. These things cannot be made by people. These nonliving things are found in nature. You can not see air, but air is a nonliving thing found in nature too.



► People do not make rocks.



▲ Air inside this balloon is a nonliving thing found in nature.



### Quick Check

2. Is a car living or nonliving? Explain.

Possible answer: Nonliving; cars do not grow,

breathe, or make new cars.

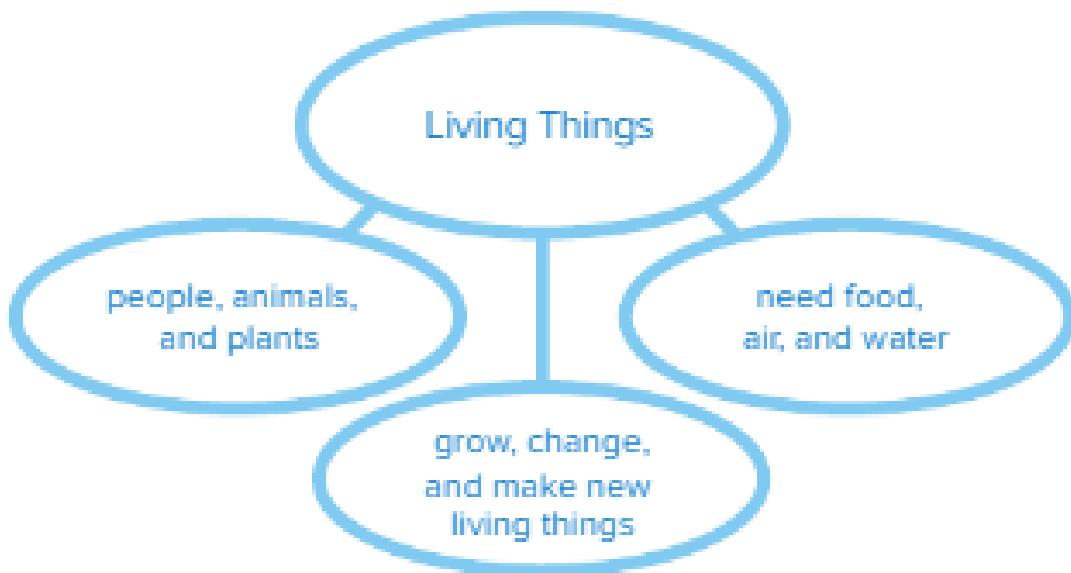
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about plants. Revisit the Big Idea question: **What are Earth's resources?** Help children add new information to the What We Learned column of the class KWL chart.

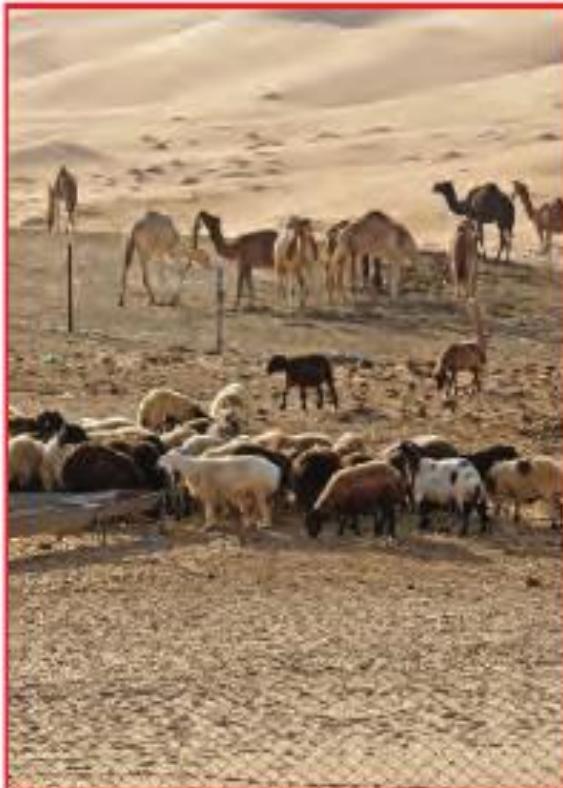
## ► Using the Reading Skill Main Idea and Details

Use the reading skill graphic organizer to identify the main idea and details of the lesson.



## Visual Summary

Write about what you learned.



### Living Things

Possible answer: Living things grow and

change; they need food, water, and air.

Plants and animals are living things.



### Nonliving Things

Possible answer: Nonliving things do

not grow and change; they do not need

food, water, or air. They do not make new

things like themselves. Nonliving things

can be found in nature or can be made by

humans.

# Think, Talk, and Write

## 1 Vocabulary. What are human-made things?

Things that are made by people.

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## 2 Main Idea and Details. Is a rock living or nonliving? How can you tell?

Possible answer: A rock is nonliving. Rocks do not grow, breathe, or make new rocks.

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**Essential Question** How are living and nonliving things different?

Possible answers: Living things grow and change. They need food, water, and air to live. Nonliving things do not grow and change. They do not need food, water, or air to live.

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## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Have children draw a picture with living and nonliving things in it. Ask them to label their picture. Encourage children to write a sentence about their picture using the words *living* and *nonliving*. Have children put their pages together to make a class book.

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## Inquiry Skill: **Observe**

### ► **Learn It**

Read the page together. Ask children to explain what it means to observe. Have them describe the rose in the picture using their sense of sight. Ask:

- What other senses could you use if this were a real rose? **Possible answers:** I could use my nose to smell it; I could use my hands to touch it.

Look at Mahmoud's chart together. Point out how his observations were recorded in the chart. Ask:

- What are some things we can't observe by looking at the picture? **Possible answers:** how the rose smells, how it feels
- Is there anything else you would add to Mahmoud's chart? **Possible answers:** The stem is green; the leaves are scratchy.

## Focus on Skills

### Inquiry Skill: Observe

You use your senses to **observe**. You can see, hear, taste, touch, or smell to find out about things.



### ► Learn It

Sameh wrote what he observed about a rose in this chart.

Rose	
See	The rose is red.
Touch	The flower is smooth.
Smell	The rose smells sweet.

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► Try It

Observe a plant.



1. What shape are the plant's leaves?

Students' answers will vary depending on the plants they observe.

Possible answers: heart-shaped, circular, pointy, rounded.

2. What does the plant feel like?

Possible answers: smooth, rough, silky, prickly.



3. Make a chart like Sameh's. Fill in the chart with what you observed.

## ► Try It

Read the Try It activity with children. Explain that they should closely observe the details of their plant.

1. Encourage children to share names of shapes that they know, and record their responses on the board. Have them draw a picture of the plant's leaves and write a sentence describing the shape of the leaves.
2. Invite children to share words that describe how things feel, and make another word list on the board. Encourage children to use two words from the list to write a sentence describing how the plant feels.
3. On chart paper, begin a chart like Mahmoud's chart. Invite volunteers to fill in what they observed about the plant.

## ► Apply It

Use a different plant, such as a cactus, to provide more practice observing.

Have children record their observations in a chart. Remind them to match their observations with the senses they used as they observed the plant.

## Lesson 2 Rocks and Minerals

### Essential Question

How do we use rocks and minerals?

### Reading Skill Classify


### Objectives

- Explain what rocks are and how they are used.
- Explain what minerals are and how they are used.

You will need a classification graphic organizer.



### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### 1 Introduce

Look and Wonder

#### 2 Teach

Discuss the Main Idea

#### 3 Close

Think, Talk, and Write

## Lesson 2 Rocks and Minerals

### Objectives

- Explain what rocks are and how they are used.
- Explain what minerals are and how they are used.

Lesson 2

### Rocks and Minerals



# 1 Introduce

### ► Assess Prior Knowledge

Have children share what they know about living and nonliving things. Ask:

- What are some words that describe rocks?
- Where can you find rocks?
- Why are minerals important?

Record children's responses in the What We Know column of the class KWL chart.

### Look and Wonder

#### Before You Read

Why might scientists study these rocks? How can we use rocks?

Possible answer: Scientists study rocks to learn more about the Earth.

#### Essential Question

How do we use rocks and minerals?

## Look and Wonder

Read the Look and Wonder questions about rocks.

Invite children to share their responses to the questions. Ask:

- Why do scientists study rocks? **Possible answer:** to learn about Earth and what kinds of rocks there are
- Why do people use rocks to make things? **Possible answers:** Rocks are hard and strong; they are interesting and pretty to look at.

Write children's responses on the class KWL chart and note any misconceptions that they may have.

## Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.

# Explore

## How can we sort rocks?

### What to Do

**1 Observe.** Look at your rocks with a hand lens. Describe what you see. How are they alike? How are they different?

Answers may vary. Possible answers: Some rocks

are small and others are big. Some are very light

and others are heavy. The rocks are different colors.

They all feel the same.

**2 Classify.** Put your rocks into groups. Write your groups on a chart. Record how many rocks are in each group.



### You need



rocks



hand lens

# Explore



individual



25  
minutes

**Plan Ahead** If you plan to take children outside to collect rocks for this activity, bring sturdy bags. If children are to collect rocks on their own, send a note home explaining the assignment and make sure children have adult supervision.

**Purpose** This activity will support children's observation and classification skills. They will use descriptive language to communicate the results of their classifications.

## Structured Inquiry

### What to Do

Have children describe the different ways they can sort rocks. Ask: What might scientists look for when they put things into groups to study them? **Possible answers: color, size, texture, weight**

- 1 Observe** Have children discuss the things they noticed with the hand lens that they didn't see with the naked eye. Ask: What things do you see with a hand lens that you didn't see before?
- 2 Classify** Have children sort their rocks into groups using their own sorting rule, such as size, shape, color, or texture. When making the charts, encourage children to create columns for each group. Have them use tally marks to count the number of rocks in each group.

## Alternative Explore

### Are all rocks alike?

Have a variety of different rocks available. Distribute one rock to each child.

Ask children to **observe** their rocks and write words to describe them. Have children **compare** their rocks with a partner.

Show children how to use a Venn diagram. Have them complete a Venn diagram to **compare** how their rocks are alike and different.

ENGAGE

**EXPLORE**

EXPLAIN

EVALUATE

EXTEND

**3 Communicate** Have children work with a partner to explain how they classified their set of rocks. Ask children to create another chart to show all the possible sorting groups.

#### Guided Inquiry

#### Explore More

**4** Ask them to write a list of rock classification questions that they would like to find out about. For example: **Are all rocks round?**

#### Open Inquiry

Encourage children to explore further by asking:  
**If you collected rocks from another location, would the rocks look the same?**

Supply reference materials for children to conduct their research.

## Inquiry Activity

**3** **Communicate.** Share your chart with a partner. Discuss how you put the rocks into groups.

### Explore More

**4** What other ways can you classify rocks?

Students may say that they can classify by size, color, shape,

texture, or weight.

### Open Inquiry

Learn more about rocks.

My question is:

Sample question: What are rocks made of?

# 2 Teach

## Read and Respond

Reading Skill **Classify** To put things that are alike into groups.



### What are rocks?

#### ► Discuss the Main Idea

**Main Idea** Rocks are a useful natural resource that are found all over Earth.

Before reading, ask children to describe things that are made from rocks.

After reading together, ask:

■ **What natural resources have you used today?**

Have children look around the classroom and identify an object that is made from a natural resource, such as a pencils or chairs made from wood. Ask:

■ **Why are rocks an important natural resource?**

**Possible answer:** People make many useful things from rocks.

#### Read and Respond .....

##### What are rocks?

Things people use from Earth are called **natural resources**. We use natural resources every day. Some of Earth's resources are air, water, plants, animals, and rocks.

A **rock** is a nonliving part of Earth. Most rocks are **hard**. Rocks can be different shapes and sizes. They can have a different feel or color.

Draw a circle around words that describe rocks.



► **Rocks come in all shapes and sizes.**

## Science Background

**Rocks** There are three main groups of rocks. *Igneous* rocks can have a lot of texture, but no layering because they are fresh, new rocks. They are mostly black, white, or gray. *Sedimentary* rocks are made from pressed layers of sand or clay-like rock. They are mostly brown, tan, or gray. *Metamorphic* rocks may have layers that were morphed and twisted due to pressure. They are various colors. Most gems come from metamorphic rock.

## LA Support

**Use Realia/Use Descriptive Words** Display a few different rocks and say the word *rocks*. When children touch the rocks, say words to describe them, such as: *hard*, *rough*, *round*, or *smooth*. Have children repeat the words.

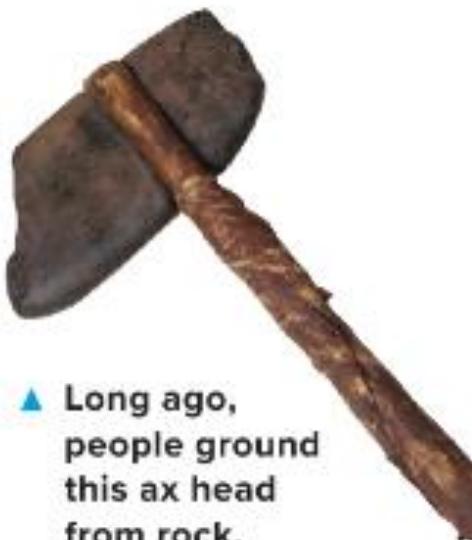
**BEGINNING** Have children complete a sentence frame about each rock. For example, say: *The rock is \_\_\_\_\_.* Encourage children to use a descriptive word to complete the sentence.

**INTERMEDIATE** Ask children to create short sentences to describe the rocks.

**ADVANCED** Encourage children to compare two of the rocks using complete sentences.

Rocks cover Earth. They are found below city streets. They are found below grass and soil. Rocks are even found at the bottom of the ocean!

How do we use rocks as resources? Rocks have been used as tools for thousands of years. Many rocks can be carved, chipped, or ground.



▲ Long ago, people ground this ax head from rock.

### Quick Check

1. How do people use rocks?

Possible answers: carving, tools, sculptures



▲ This statue in Egypt, called the Sphinx, was carved from rock thousands of years ago.

**263**  
EXPLAIN

## ► Address Misconceptions

Children may think that all rocks are very hard. Some rocks are harder or softer than others, depending on which minerals are in them.

**FACT** Some rocks are softer than your fingernail! If possible have some shale, limestone, gypsum, or rock salt available to break apart for children to see and feel soft rocks.

## ► Use the Visuals

Look at the pictures and read the captions. Ask:

- How did these rocks get their shape? **Possible answers:** from strong winds; heavy rains
- Why did people choose rocks to make ax heads? **Possible answer:** Rocks are hard and are less likely to break when cutting things.

## ► Develop Vocabulary

**natural resources** *Word Origin* Write *natural resources* on the board. Point out the base word *nature* in *natural* and explain that it means “relating to nature.” Explain that the word *resources* means “something that is useful.” Have children use the two meanings to write the definition for *natural resources*.

**rocks** *Scientific vs. Common Use* *rocks* can be used as a verb to describe a motion: *The father rocks the baby to sleep.* In science, *rocks* is a noun that means “naturally formed minerals or stones.” Have children write sentences reflecting both usages.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Give each child a few rocks. Display a variety of other rocks for the whole class to view. Model how to describe rock and sort them into groups. Have children place their rocks in the appropriate group. Ask children to explain why they chose each group.

**ENRICHMENT** Have children think of something they would like to see made from rock, such as a tool, a piece of jewelry, or a sculpture. Encourage children to draw a design of their object. Have children write a sentence about why they think rock is a good material for their object.

## What are minerals?

Have you ever looked at a rock and seen it sparkle? Minerals in rocks can make them shine.

**Minerals** are hard, nonliving parts of rock and soil. Rocks can be made of one or more minerals. The chart shows some ways people use minerals every day.



This rock is called granite. It is made of the minerals mica, quartz, and feldspar.

### Uses of Minerals



graphite



magnetite



fluorite



turquoise



### Read a Chart

Which mineral is used to make a pencil?

graphite

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# What are minerals?

## ► Discuss the Main Idea

**Main Idea** Rocks are composed of minerals, which are formed in the ground over long periods of time.

Read the question at the top of the page and ask children to describe rocks they have seen that sparkled. Encourage them to identify the places where they saw the rocks. Ask:

- Why is a hammer needed to break rocks? **Many rocks are hard, and hammers are used to strike hard things.**
- Why do people dig in the ground to get minerals? **They are formed in the ground, so it is likely they will be found there.**

## Read a Chart

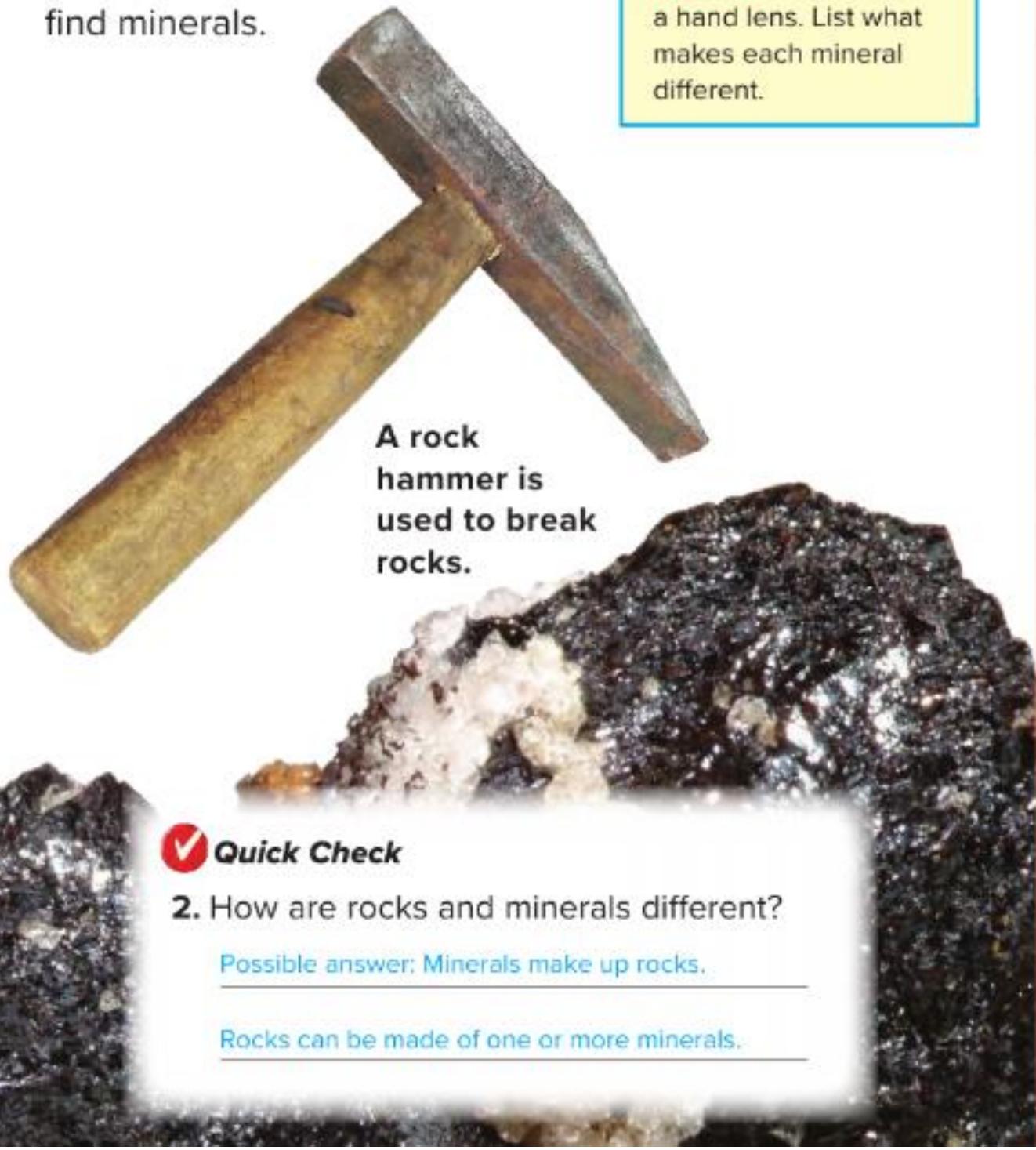
Point out to children that charts help to organize information so that it is easier to read. Ask:

- In the chart, which mineral is used to make jewelry? **turquoise**
- Which mineral is used to make something for cleaning your teeth? **fluorite**

Rocks and minerals form in the ground over millions of years. People dig in the ground to find minerals.

### Quick Lab

**Observe** minerals with a hand lens. List what makes each mineral different.



A rock hammer is used to break rocks.

#### Quick Check

2. How are rocks and minerals different?

Possible answer: Minerals make up rocks.

Rocks can be made of one or more minerals.

## ► Develop Vocabulary

**minerals** *Word Origin* Minerals comes from the Medieval Latin word *minerale*, which means “pertaining to mines.” Write *minerals* on the board and ask children to find the base word *mine*. Point out to children that *minerals* are nonliving things that occur naturally in the earth. Have them use the words *minerals* and *mine* in a sentence.

## Quick Lab



pairs



15 minutes

**Objective** Observe and compare minerals in rocks.

You need an assortment of rocks, hand lenses, colored markers, paper

- 1 Have children work in pairs. Allow them to choose a rock and **observe** it with a hand lens.
- 2 Ask children to describe their rocks and list how many minerals they see and the color of the minerals.
- 3 Have children **compare** their rock with another pair's rock. Ask children to describe how their rocks are similar and different using a Venn diagram.



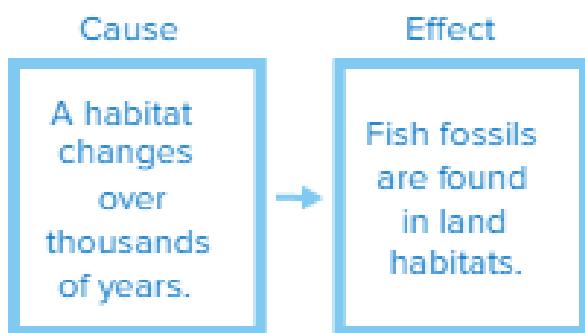
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about rocks and fossils. Record their responses in the What We Learned column of the class KWL chart.

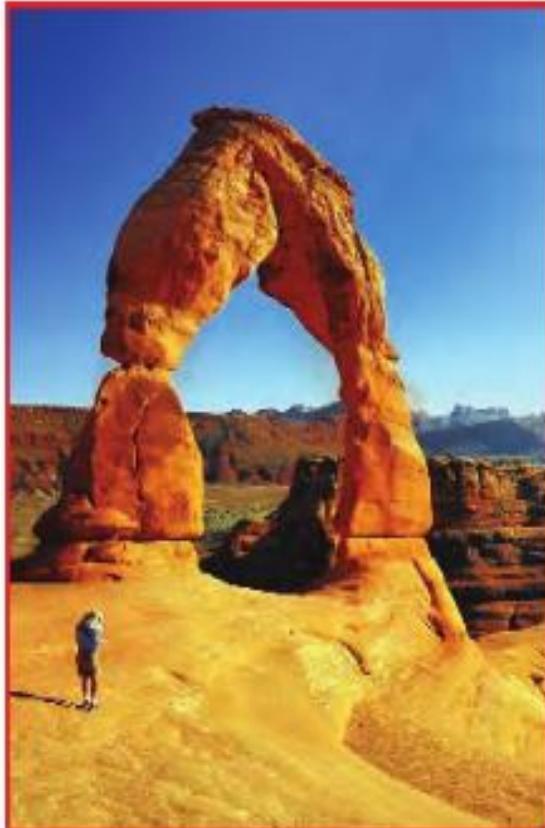
## ► Using the Reading Skill Cause and Effect

Use the reading skill graphic organizer to identify causes and effects in the lesson. Ask: What can scientists determine from examining fossils?



## Visual Summary

Write about what you learned.



### Rocks

Possible answer: Rocks are a nonliving

part of Earth. Rocks can come in different

shapes, colors, sizes, and textures.



### Minerals

Possible answer: Minerals are hard,

nonliving parts of soil. Graphite, granite,

fluorite are minerals that people use to

make things at home and school.

## Think, Talk, and Write

### 1 Vocabulary. What is a natural resource?

A natural resource is something that people use from Earth.

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### 2 Classify. Choose four rocks. Classify them by shape, size, color, and feel.

Accept all reasonable responses. Along with shape, size, color, and texture, children can also classify the rocks according to the type of minerals that make up the rocks.

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### 3 Where can you find rocks and minerals?

Rocks can be found below and on Earth's surface.

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### Essential Question

How do we use rocks and minerals?

Possible answer: People use rocks as tools and to build things. We may use minerals in toothpaste or for jewelry.

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## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Have children choose a rock with a fossil to draw and write about. Encourage them to explain how the fossil got in the rock and what we can tell by examining the fossil and the location in which it was found.

## Math in Science

# Rock Patterns

You can use rocks to make patterns. Look at the pattern below. What kind of rock do you think would come next? How do you know?



Possible answer: The next rock would be rough and jagged. I can tell because

there is a pattern of smooth—rough—smooth—rough.

# Math in Science

## Objective

- Construct a pattern using rocks.

## Rock Patterns

### Talk About It

Read the text together and have children study the rock pattern at the top of the page. Have children share patterns that they know. Remind children that a pattern is something that is repeated over and over again. Ask:

- What kind of texture does the first rock on the left have? **smooth**
- How do you think the second rock will feel? **rough**
- What pattern do you see? **Possible answers:**  
**The pattern is smooth—rough—smooth; rounded—jagged—rounded.**

### Learn About It

Discuss other properties of rocks that could be used to make patterns, such as size or color. Encourage children to list many different ways to make patterns.

Ask children how they could make a more complicated pattern. Model more complex alternatives if children need help going beyond a simple A-B-A-B pattern.

## Make a Pattern

Use rocks or draw pictures of rocks to make a pattern. Share it with a partner. Have your partner explain which rock he or she thinks will come next.

### Remember

A pattern has a unit that repeats.

## Try It

Have children use rocks to create their own pattern. If rocks are not available, ask children to draw rocks to make a specific pattern.

Remind children that a pattern must repeat in a regular way so that a person can tell what comes next.

Have children share their pattern with a partner. Ask the partner to identify what should come next and explain why.

Stop Here to

# Plan Your Lesson

## Lesson 3 Soil

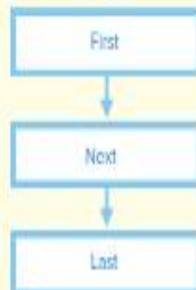
### Essential Question

Where does soil come from?

### Objectives

- Describe what things make up soil.
- Explain how soil is formed.

### Reading Skill Sequence



You will need a sequence graphic organizer.

FAST  
TRACK

### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### **1** Introduce

Look and Wonder

#### **2** Teach

Discuss the Main Idea

#### **3** Close

Think, Talk, and Write

## Lesson 3 Soil

### Objectives

- Describe what things make up soil.
- Explain how soil is formed.

# 1 Introduce

### ► Assess Prior Knowledge

Have children share what they know about soil.

Ask:

- Where have you seen soil?
- How would you describe the soil you have seen?
- Why are there different kinds of soils?

Record children's answers in the What We Know column of the class KWL chart.

# Soil



## Look and Wonder

### Before You Read

This soil contains tiny rocks. What else can we find in soil?

Possible answer: We can find dead animal and plant parts and a mix of  
clay.

### Essential Question

Where does soil come from?

Answers will vary. Accept reasonable responses.

## Look and Wonder

Read the Look and Wonder statement and question about soil.

Invite children to share their responses to the question.

Have children describe the soil in the picture. Ask:

- How do animals in this picture use soil? Possible answers: for homes; for finding food
- How could the worm in this picture be affecting the soil? Possible answers: by mixing the soil; by making tunnels

Write children's responses on the class KWL chart and note any misconceptions that they may have.

# Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.

## Explore



pairs



20  
minutes

**Plan Ahead** Have a couple of soil types available and a plan for distributing them. Be sure to have enough strainers and plates for each pair, and supplies on hand for cleaning up.

**Purpose** This activity helps children draw conclusions based on the observations made during the experiment. It enables children to communicate verbally and through drawings the results of their observations.

### Structured Inquiry

#### What to Do

Have children describe the different places where they have seen soil. Ask: What did the soil look like in each place?

**1 Be Careful!** Remind children that soil can contain harmful germs, and encourage them to wash their hands after handling it. As children shake the soil, ask: Which pieces go through the strainer first?

**2 Observe** Ask children to note the size of the soil particles. Encourage children to draw as many details as they can about their soil, such as the color and size of the particles.

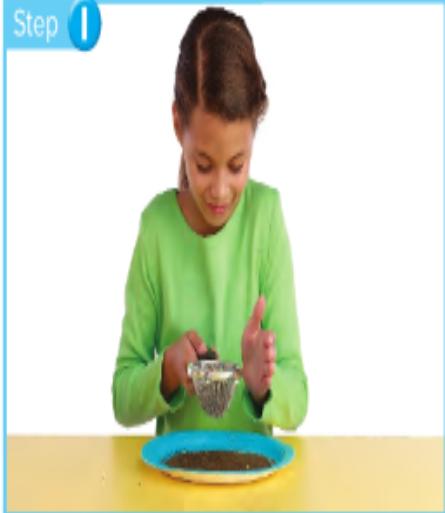
## Explore

### What is in soil?

#### What to Do

**1** Put some soil in a strainer. Gently shake it over a plate.

Step 1



**2 Observe.** Look at the soil on the plate. Use a hand lens. Draw what you see.

#### You need



soil



2 plates



strainer



hand lens

## Alternative Explore

### How are soils alike and different?

Display pictures of different kinds of soil, such as a sandy beach, a plowed field of dark soil, and clay.

Have children discuss and describe each picture of soil, and how the soil can be used.

Ask children to **compare** and discuss the color, texture, consistency, and location of the different kinds of soil.

**3** Have children take the soil left in the strainer and pour it onto another plate to observe and record. Ask them to compare their drawings. Ask: **What looks the same? What looks different?**

### Guided Inquiry

#### Explore More

**4 Communicate** Have children observe another kind of soil. Ask them to compare the new soil with the soil they strained. Encourage children to predict what will happen to the new soil after it is strained.

### Open Inquiry

Suggest to children that they explore further by researching soils in different places. Ask: **Do you think soil is different in other parts of our town?**

Encourage children to collect additional soil samples. Write a list of questions about soil, and experiment with the additional soil they collected.

3 Pour the soil left in the strainer onto another plate. Observe the soil. Draw what you see.



**Explore More**

4 **Communicate.** Use some new soil. Repeat this activity. Write about how the two soils are alike and different.

*Students' answers may vary depending on the soils they are observing.*

*Possible answer: The two soils are different in color and texture. One is*

*grainy and the other is rough.*

**Open Inquiry**

Learn more about soil in different places. Collect soil samples from different places in your community.

My question is:

*Sample question: Are there different types of soil where I live?*

## Read and Respond .....

### What is soil?

**Soil** is a mix of tiny rocks and bits of dead plants and animals. These small pieces become part of the soil and help plants grow.

Soil can have different colors and textures. It can have bits of rock of different sizes.

#### Quick Check

##### 1. What makes up soil?

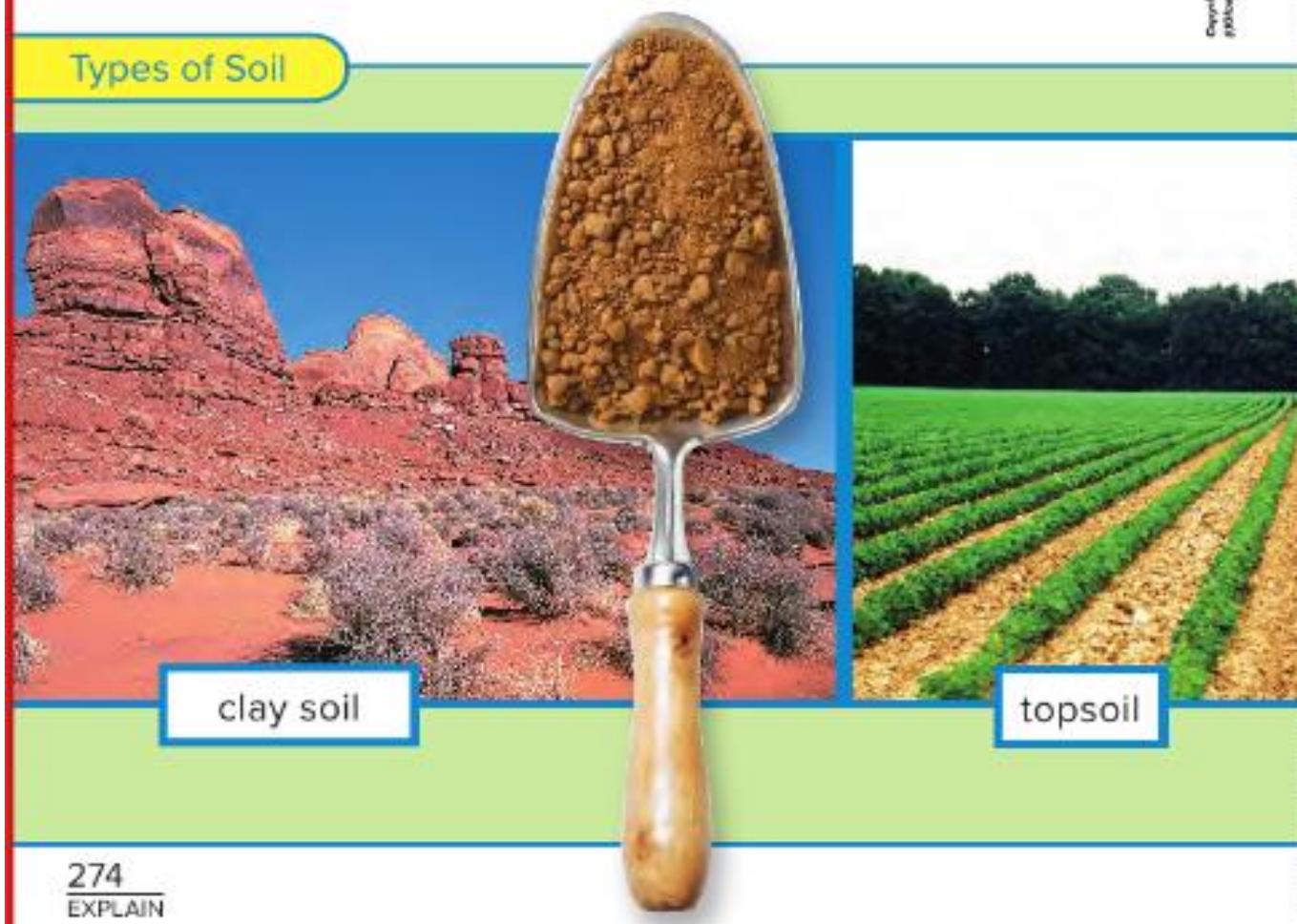
Possible answer: Soil is

a mix of rocks and dead

plants and animals.

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### Types of Soil



## 2 Teach

# Read and Respond

Reading Skill **Sequence** The order in which things happen.



### What is soil?

#### ► Discuss the Main Idea

**Main Idea** Different kinds of soil contain different combinations of plant and animal matter, and small rock pieces.

Before reading, ask children to describe soil.

After reading together, ask:

- What does soil look like where you live?

Have children think about the different kinds of soil they have seen in their area. Ask:

- How can soils look different? **Possible answers:** different colors and textures, rocks of different sizes

## Science Background

**Soil** Soil generally extends down from Earth's surface about 0.3 to 2 meters. Soil is classified by how much sand, silt, and clay are in the soil. Sand is a large particle in soil and feels rough. Silt particles are smaller than sand and feel smooth and powdery. The smallest particles are clay. Clay is often called a heavy soil because the small size of its particles allows it to be more densely packed. Less air space between particles means heavier soil.

## LA Support

**Use Pictures** Show children pictures of different kinds of soil (topsoil, clay soil, sandy soil). Say the name of each soil and have children repeat the words. Children will identify the soils, write sentences to describe the soils, and compare the soils.

**BEGINNING**

Point to each soil and read the caption. Next, point to pictures of soil and have children identify each indicated soil type.

**INTERMEDIATE**

Ask children to describe the soil in the pictures using complete sentences.

**ADVANCED**

Have children use complete sentences to compare the soils in two of the pictures.

Some soils are darker and hold more water. Other soils, such as gravel, are very rough. Some soils are sandy and others feel more like clay. Sometimes there are tiny pieces of broken rock in soil called silt. Silt and clay pieces are so small they feel smooth between your fingers.

### Read a Photo

Describe each soil.

Possible answer: The soils are

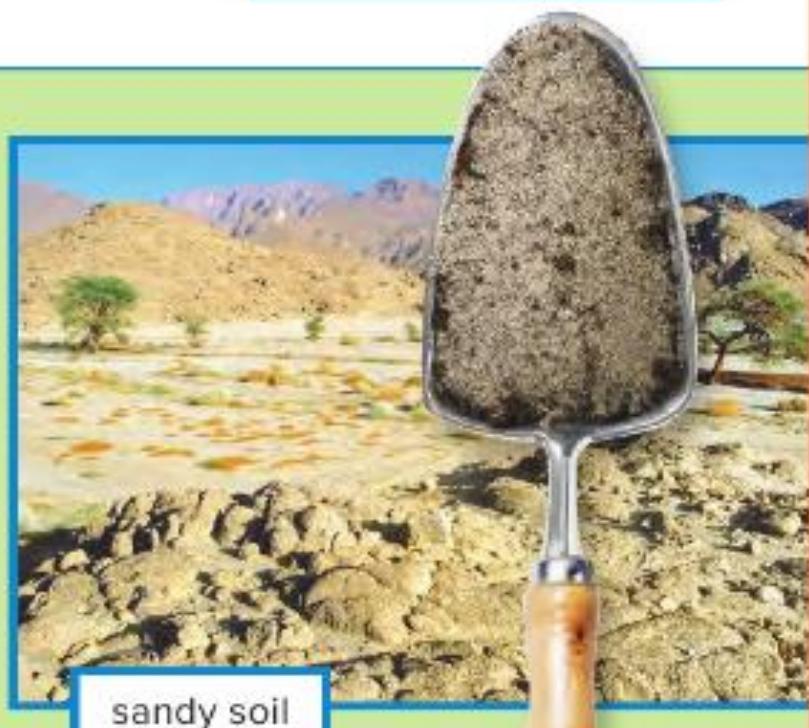
different colors: clay soil is an

orange color; topsoil is a brown/

black color; sandy soil is a gray/

brown color. The soils have

different textures and sizes.



**275**

EXPLAIN

## ► Address Misconceptions

Children may think that soil is alive. Some of the things soil is made from were once alive and there are things living in the soil, but soil is not a living thing. Children may also think that the color of soil determines its type. Point out that it is the size of the particles in the soil that determines the type of soil it is.

### Read a Photo

Point out to children that the photographs show where soil can be found. Ask:

- How do people use topsoil? **Possible answer:** to grow crops for food

## ► Develop Vocabulary

**soil** *Scientific vs. Common Use* Review the scientific definition of *soil* with children, “a mix of tiny rocks, dead plants, and animals.” Explain to children that in common usage *soil* means “to make dirty,” such as in the sentence: *I will have to wash my shirt if I soil it.* Have children create sentences using both definitions of *soil*, read the sentences aloud, and give a thumbs-up when they hear the scientific use of the word.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Fill three containers with sand, clay, and topsoil. Have children describe the color and texture of each soil. Encourage them to pour a bit of each soil through a strainer and **compare** the soil that went through the strainer with the soil left in the strainer. Ask children to determine whether the soil is sandy or contains silt.

**ENRICHMENT** Have children mix a small amount of water into sand. Ask children to record what happens to the water. Have them repeat with heavy clay soil, and then with topsoil. Discuss whether the water sinks into the soil, rolls on top, makes it clump, or mixes to form mud. Ask children how the interaction of the water with the three types of soil can affect how plants grow in each soil.

## How is soil formed?

### ► Discuss the Main Idea

**Main Idea** Rocks, minerals, and dead animals and plants take a long time to break down and decompose to become soil.

Read the question at the top of the page and discuss with children the different things that are found in soil. After reading together, ask:

- How do dead plants and animals make the soil healthy for growing plants? **Nutrients from dead plants and animals help plants grow.**

### ► Use the Visuals

Have children look at the pictures and read the captions. Ask:

- How is topsoil different from subsoil? **Possible answers:** Subsoil does not have as many roots in it. It has less animal and plant parts in it.
- Why are more nutrients in topsoil than in subsoil? **The things that add nutrients are on the surface of topsoil.**

## How is soil formed?

Soil takes a very long time to form. Over time, rocks and minerals break down into smaller pieces. Plant and animal parts rot, or **decompose**.

Mushrooms help break down the dead plants. Nutrients that were once in living things become part of the soil. These nutrients make the soil healthy.



► This layer of soil is topsoil. It is best for growing plants. It has mushrooms and rotting plant and animal parts.

► This layer of soil beneath topsoil is called subsoil.



You can see things decompose in the soil by making a compost pile. Compost is a mix of soil and rotting parts of plants and animals.



## Quick Lab

Make a compost pile. Stir the soil and **observe** the changes once a week.

◀ This rotting log will decompose and become part of the soil.



### Quick Check

2. What layer of soil is best for growing plants?

topsoil

3. Why are there more nutrients in topsoil than in subsoil?

There are more nutrients in topsoil because

there are more plant and animal parts that break

down into nutrients.

## ► Develop Vocabulary

**decompose** *Word Origin* Write the word *decompose* on the board and underline the prefix *de-*. Explain to children that the prefix *de-* means “undoing.” *Compose* means “to form or put together.” Therefore, *decompose* means “the undoing of something that is together,” such as dead plants and animals rotting into the soil.

Ask children to think of other words that have the prefix *de-*. Encourage them to give the definition of the word with and without the prefix.

## Quick Lab



small groups



10 minutes

**Objective** Predict and observe what happens to dead plants in soil.

**You need** clear plastic containers, lunch scraps, potting soil, pencils, paper

- 1 Have children add lunch scraps to a container half full of soil.
- 2 Ask children to **observe** the mixed materials, **record** their observations, and **predict** what will happen.
- 3 Each day, have children add scraps and water and mix the contents of the container.
- 4 After a week, ask: **How is the soil changing?**



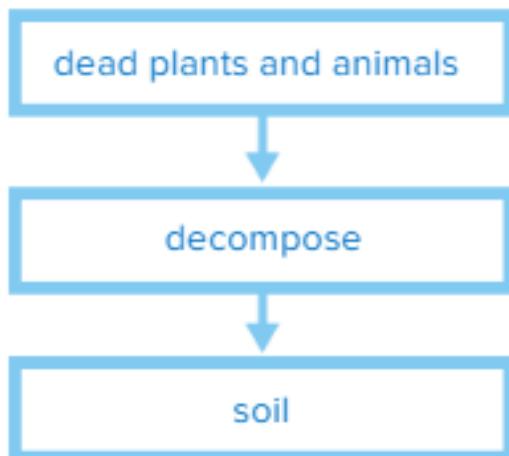
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about soil and how it is formed. Record their responses in the What We Learned column of the class KWL chart.

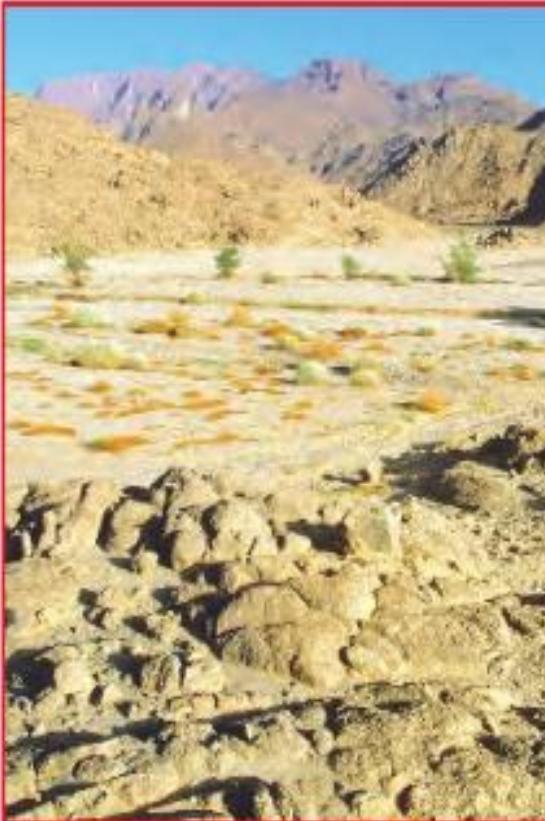
## ► Using the Reading Skill Sequence

Use the reading skill graphic organizer to show the sequence in which soil is formed.



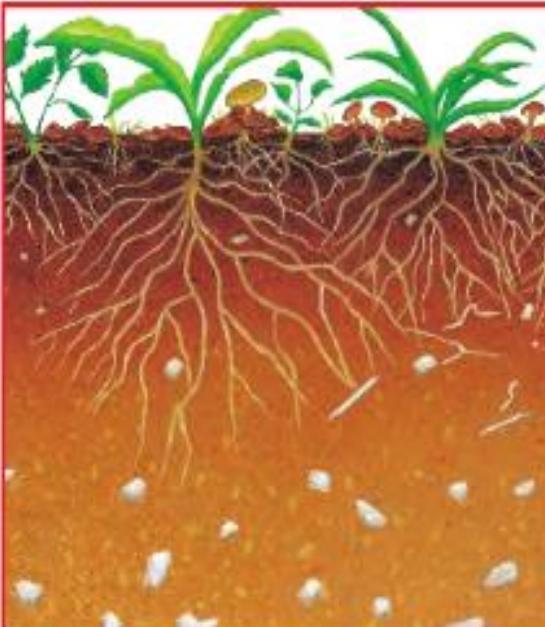
## Visual Summary

Write about what you learned.



### Types of Soil

Possible answer: Soil can have different colors and textures. Clay soil, topsoil, and sand are different types of soil. Some soil is darker and holds more water. Some soils are sandy and others have clay or tiny bits of rock.



### How Soil is Formed

Possible answer: Soil forms over a long period of time. Rocks and minerals break down into smaller pieces. Plant and animal parts rot to make nutrients that become part of the soil.

## Think, Talk, and Write

### 1 Vocabulary. What is soil?

Soil is a mix of tiny rocks and bits of dead plants and animals.

### 2 Sequence. How does a dead plant become part of the soil?

Over time, dead plants decompose.



Mushrooms break down the decomposing plants.



Nutrients from the dead plant get mixed into the soil by animals.

### 3 How are soils different?

Possible answers: There are different rocks, minerals, plants, and

animals in different soils. Some soils are sandy, others are dark and full

of rotting plants and animal materials.

### Essential Question Where does soil come from?

Possible answer: Soil comes from rocks and bits of dead plants and animals

that have broken down into small pieces.

## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Health Link

Discuss with children the different kinds of plants that grow in different environments, such as forests, deserts, mountains, and plains. Remind children that people eat different plant parts, such as leaves, fruits, and roots.

## Structured Inquiry

### What to Do

#### Which soil holds more water?

1 **Be Careful!** Sharp pencils can puncture skin.

Model for children how to carefully poke holes in the cups with a sharpened pencil. Remind children to label their cups A and B.

2 **Measure** Show children how to measure 240 milliliters using their measuring cups.

3 **Measure** Before they add soil to cup B, remind children that cup A is for sandy soil, and cup B is for clay-rich soil.

### You need



2 cups



sandy soil



clay-rich soil



#### Which soil holds more water?

Find out how different soils hold different amounts of water.

### What to Do

1 **Be Careful!** Use a pencil to poke three small holes in the bottom of each cup. Label the cups A and B.



Step 1

## Inquiry Investigation

4 **Predict.** Which cup will drip more water from the bottom of the cup? Why do you think so?

Possible answer: The cup with the sandy soil will drip more water

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because it holds very little water.

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5 Hold each cup of soil over a measuring cup. Have a partner pour 240 milliliters of water into each cup of soil.

6 **Measure.** After 5 minutes, measure how much water dripped into each cup.

Answers will vary.

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### Investigate More

**Predict.** Which type of soil is better for growing plants? Why do you think so? Try it.

Possible answer: The clay soil might be better for plants because it holds

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more water than the sandy soil.

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- 4 **Predict** Before children make their predictions, ask them to think about how the soil feels and what it looks like.
- 5 Remind children to check that their measurements are accurate by placing the cup on a stable, flat surface and reading the cup measurements from a position that is eye level with the waterline in the cup.
- 6 **Measure** Ask: Why did one soil hold more water than the other? Possible answer: There was less space in the soil for the water to get through.

### Guided Inquiry

#### Investigate More

**Predict** Discuss with children how the amount of water a soil holds can affect plants. Ask: What do plants need to grow? **sunlight, space, air, and water**

Supply children with seeds that sprout easily. Have children prepare two labeled cups with drainage holes—one with sandy soil and one with clay-rich soil—and place the same number of seeds in each soil cup. Have children water and observe the soils for a few weeks. Encourage children to record their findings.

## Open Inquiry

## Integrate Math

## Comparing Measurements

Have children **measure** different quantities of sandy and clay-rich soil and mix them together. For example, have children measure 120 mL of each soil for one mixture, and measure 180 mL of sandy soil and 60 mL of clay soil for the second mixture. Ask children to pour 240 mL of water through each mixture to find out how much water each soil mixture holds.

Remind children to make a **prediction** before each experiment and to measure carefully. Have children record their soil predictions and outcomes on a chart that indicates the mixtures of soils and the amount of water they absorb.

Help children think of other questions about soil that they would like to answer. If they are unable to generate researchable questions on their own, they may consider the following questions:

- What is in soil that plants need to grow?
- How do some plants grow in sandy desert soil and others grow in topsoil in forests?
- What type of soil is around the school?

Once children have decided what they want to find out, help them make a plan to get the information they need to answer their questions.

Here to

# Plan Your Lesson

## Lesson 4 Using Earth's Resources

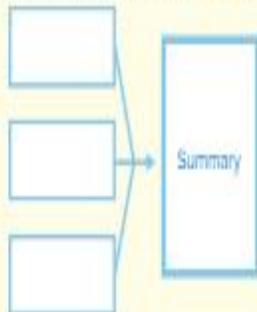
### Essential Question

How can we take care of Earth's resources?

### Objectives

- Describe how people use natural resources.
- Explain why people should take care of Earth's resources.

### Reading Skill Summarize



You will need a summarizing graphic organizer.



### **FAST TRACK**

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### **1 Introduce**

Look and Wonder

#### **2 Teach**

Use the Visuals

Discuss the Main Idea

#### **3 Close**

Think, Talk, and Write

## Lesson 4 Using Earth's Resources

### Objectives

- Describe how people use natural resources.
- Explain why people should take care of Earth's resources.

## 1 Introduce

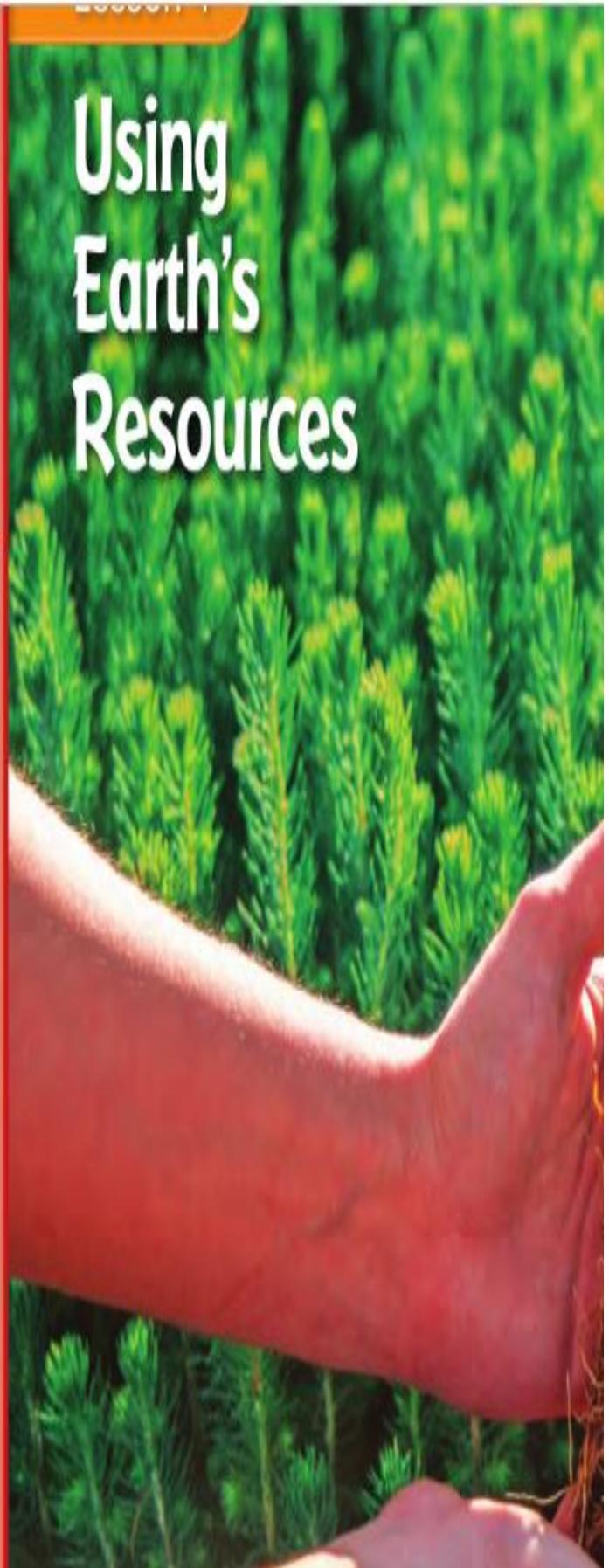
### ► Assess Prior Knowledge

Have children share what they know about how people use natural resources. Ask:

- Which natural resources have you used today?
- Why should we care about saving natural resources?
- How can people save natural resources?

Record children's answers in the What We Know column of the class KWL chart.

# Using Earth's Resources



# Warm Up

## Start with a Discussion

Display objects made from different natural resources and others that are made by people. Ask children to explain what each object is made from and whether or not it is made from a natural resource. Ask:

- What happens to these objects when people throw them away?
- Why are our natural resources important?

Have children make a list of objects they use daily. As children read their lists aloud, have the class identify whether the object is made from natural resources.

## Look and Wonder

### Before You Read

What natural resources do you see in this picture? Why do people care for them?

Possible answer: The natural resources include soil and trees. People take

care of them because they help humans and animals survive.

### Essential Question

How can we take care of Earth's resources?

Answers will vary. Accept reasonable responses.

## Look and Wonder

Read the Look and Wonder questions about natural resources. Invite children to give responses to the questions. Ask:

- How are the resources in this picture used?

Possible answers: Trees are used for wood, paper, and decoration. Soil is used to grow plants.

- Which natural resources are needed to help plants grow? **water, soil**

Write children's responses on the class KWL chart and note any misconceptions that they may have.

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.



## Explore



pairs

20  
minutes

**Plan Ahead** Have poster board, crayons, and markers available for children to use to make their charts.

**Purpose** This activity encourages children to formulate ideas and draw conclusions about why natural resources are important.

## Structured Inquiry

## What to Do

- 1 **Guide** children to create their charts by noting that they will need five rows and two columns. The natural resources should be the row titles.
- 2 **Communicate** Discuss with children how they use each resource. For example, ask: **What kinds of foods do you eat?** Have children classify the foods as plant or animal resources. Remind them to write their responses in the appropriate column.
- 3 After children have completed their charts, ask them to make a list of other things they use that come from Earth.

## How do we use Earth's resources every day?

## What to Do

- 1 Make a chart about how you use water, air, plants, animals, and rocks.
- 2 **Communicate.** Write down your ideas on the chart.

How We Use Earth's Resources	
Water	
Air	
Plants	
Animals	
Rocks	

- 3 Work with a partner. Think of other things you use from Earth. Write down your ideas.

Answers will vary. Accept all reasonable responses.

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## Alternative **Explore**

### **What are things made from?**

Distribute pictures of various objects.

Have children list the objects in their pictures and write the materials from which each one is made. If they are unsure what something is made from, ask them how they can find out.

In small groups, have children share their lists. Ask: What did you find out about natural resources?

4 **Draw Conclusions.** How are the things that come from Earth important to us?

Possible answer: The things that come from Earth are important because  
they help us live better lives. They help us build homes, grow food, and  
help us survive.

### Explore More

5 **Infer.** What if there were no more water or rocks on Earth? How would your life change? Write your ideas.

Possible answer: Without water, people, plants, and animals would not  
survive. Without rocks, we would not have roads and buildings.

### Open Inquiry

Learn more about natural resources you use daily.  
My question is:

Sample question: What resources from Earth do we use at home and  
school?

**4 Draw Conclusions** Have the class share their charts and lists. Ask: Which natural resources are the most important? How can people help keep natural resources safe?

### Guided Inquiry

#### Explore More

**5 Infer** Review with children all the ways water and rocks are used. First, have children write about how they use these resources. Next, ask them to write what life without these resources might be like.

### Open Inquiry

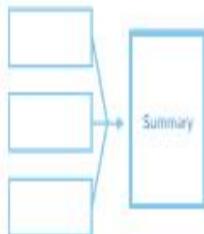
Encourage children to look around their homes to identify things that are made from natural resources. Have them write and draw pictures about what they discover. Ask children to share any questions they have about what they discovered.

If they do not have further questions to pursue, ask: **What material, other than wood, can be used to make furniture? How are some of these natural resources used outside of homes?**

# 2 Teach

## Read and Respond

Reading Skill **Summarize** To retell the most important ideas from a reading selection.



### How do we use natural resources?

#### ► Discuss the Main Idea

**Main Idea** Natural resources are used to make many things, and some take a long time to be replaced.

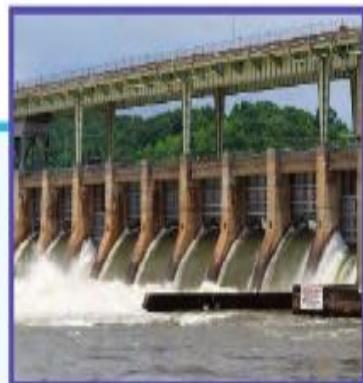
Read the question at the top of the page and invite children to respond. After reading together, ask:

- Which natural resources take a long time to be replaced? **Possible answers:** soil, oil, trees, minerals

### Read and Respond .....

#### How do we use natural resources?

We use living and nonliving natural resources every day. Air, plants, animals, rocks, and soil are natural resources we use. Natural resources give us many of the things we need to live. Some resources, such as water and wind, are replaced quickly by Earth.



- ▲ Moving water can make power to light and heat homes.



- ▲ Trees can be used for building homes and furniture.



- Wind can also make power to light and heat homes. ►

## Science Background

**Natural Resources** Natural resources are classified as renewable or nonrenewable. Renewable resources include water and wind. These resources can be replaced more quickly than nonrenewable resources. Minerals and fossil fuels are classified as nonrenewable resources because it takes a long time for them to be replaced.

## LA Support

**Use Realia** Show children samples of different natural resources and name each one. For wind, wave a fan to let children feel the wind.

**BEGINNING** Show children the pictures on these pages and read the captions. Next, name each resource used to make the pictured item and have children point to the correct picture. Have them repeat the name of the resource.

**INTERMEDIATE** Have children name each resource and pictured item. Ask them to use short sentences to describe each picture and identify whether the resource is replaced slowly or quickly.

**ADVANCED** Have children describe other ways the natural resources can be used.

Some natural resources are not made quickly by Earth. It can take millions of years for minerals to form. We use minerals every day. Once these resources are gone, they cannot be quickly replaced.

### Quick Check

1. What resources can be replaced quickly?

wind, water



▲ Animal parts can be used to make clothing and other products.



▲ Soil is used to grow crops. Soil is not made quickly by Earth.



▲ Oil comes from deep in the ground and is used for fuel.

Coal is a rock that is taken from the ground. It can be used to heat homes.



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EXPLAIN

### Use the Visuals

Look at the pictures and read the captions. Ask:

- What are some resources used to make power to heat homes? *oil, coal, water, wind*
- What other things are trees used for? *Possible answers: paper; planted for shade; wood made into bowls; wood made into spoons*
- What parts of animals do people use? *Possible answers: skins, meat, horns*
- Why is soil important? *Possible answer: to grow plants for food*

### Develop Vocabulary

Reinforce children's understanding of chapter vocabulary by drawing a word web on the board with the word *soil* in the center circle. Have children add words that describe how soil is formed and used in the outer circles.

### Explore the Main Idea

**ACTIVITY** Provide children with a variety of materials made from different natural resources, such as clay, paper, crayons, string, and cotton. Have children label each material with the kind of natural resource from which it is made. Ask children to tie each type of material to a hanger or stick to make a natural resources mobile.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Review with children what a natural resource is. Show children different objects around the classroom. Discuss with children which materials make up the objects. Name a natural resource and have children find something in the classroom made from that resource.

**ENRICHMENT** Ask children to choose one resource that cannot be replaced quickly. Have them research why it is not replaced quickly and what the consequences would be if the resource were used up. Have the children write about how to conserve the resource.

## Why should we care for Earth's resources?

### ► Discuss the Main Idea

**Main Idea** Pollution is harmful to Earth's natural resources.

Read the question at the top of the page and ask children to discuss ways people can take care of Earth's resources.

After reading, ask:

- Where have you seen pollution? **Possible answers:** litter on the street; smoke from cars
- Why is there pollution? **Possible answers:** People don't throw things away in garbage cans; oil is spilled in water.

### ► Address Misconceptions

Children may think there is always enough clean water available to drink. They may not know that besides lakes, rivers, streams, and ponds, water can also be found under ground. This water is called *groundwater*.

**FACT** Drinking water is not quickly replaced. It has to filter through the ground for a long time.

## Why should we care for Earth's resources?

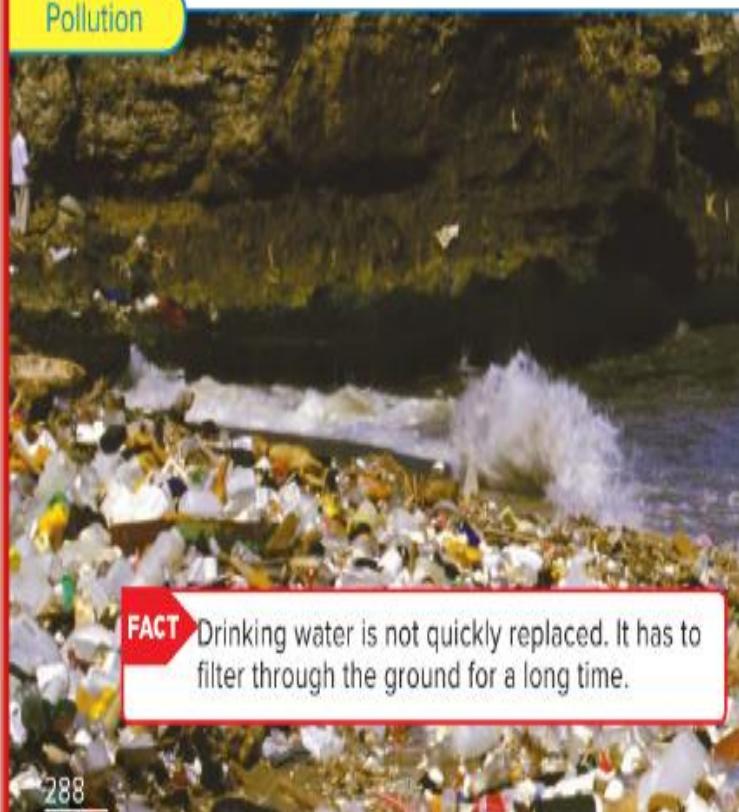
We need Earth's land, air, and water to live. When these resources are wasted or made dirty, we cannot use them.

**Pollution** is anything that makes water, air, or land dirty. Factories and cars can make air pollution. Oil spills and other garbage in the water can hurt animals.



▲ Cut up drink can rings before you throw them out so animals will not get caught in them!

### Pollution



**FACT** Drinking water is not quickly replaced. It has to filter through the ground for a long time.

## Classroom Equity

Encourage children to get hands-on with science. Studying pollution and natural resources is a great opportunity to help children understand that many scientific discoveries require people to dig in and get dirty. In the Quick Lab activity, encourage children to use “sense” words to describe how the materials in the *Reuse*, *Plastic* and *Metal*, and *Paper* bins appear and feel.

## LA Support

**Use Pictures** Show children pictures of different kinds of pollution. Point to the example of pollution and explain the concept of pollution in simple words, such as: Garbage is bad for water.

**BEGINNING** Describe to children each of the pictures showing pollution and have children point to the appropriate picture. Have children repeat the description of the picture.

**INTERMEDIATE** Point to a picture and have children use short sentences to describe the type of pollution shown.

**ADVANCED** Have children explain in complete sentences why there is pollution in each of the pictures.

Litter is garbage that people leave behind. People can pick up litter to help stop land and water pollution. After having a picnic or playing outside, it is important to clean up garbage.



These people are cleaning up litter.



#### Read a Photo

How might pollution hurt the living things in this river?

Possible answers: Oil and other garbage in the river

make the water dirty so living things cannot survive.

Living things may become ill from the pollution.



## Read a Photo

Encourage children to think of ways to solve the pollution problem shown in the photograph. Ask:

- How can the type of pollution shown in the photograph be prevented? **Possible answer:** There should be garbage cans in the area where people can put the trash.

## ► Develop Vocabulary

**pollution** Write the word *pollution* on the board.

Explain to children that the base word for *pollution* is *pollute*, which means “to make unclean.” Point out to children that *pollution* is a noun and *pollute* is a verb.

Ask children to practice using these parts of speech by completing the following sentences: *People can pollute Earth by \_\_\_\_\_. Pollution can harm the \_\_\_\_\_.*

## ► Explore the Main Idea

**ACTIVITY** Have children make an anti-pollution poster. Have them draw and write about how people can stop pollution. Encourage children to use the posters to make presentations about pollution to first-grade or kindergarten classes.

# Differentiated Instruction

## Leveled Questions

**EXTRA SUPPORT** Ask questions such as these to check children's understanding of the material.

- What is litter? **garbage that people leave behind**
- What can people do after a picnic to help keep Earth clean? **pick up garbage**

**ENRICHMENT** Use these types of questions to develop higher-order thinking skills.

- How do factories and cars cause pollution? **their fumes pollute the air**
- Why is clean soil important? **Possible answer: Plants need clean soil to grow well. People and animals need plants for food.**

## How can we save Earth's resources?

### ► Discuss the Main Idea

**Main Idea** People can conserve resources by reducing, reusing, and recycling.

Invite children to discuss ways to conserve natural resources. Ask:

- Why do people want to save resources for future use? **Possible answer:** The resources will be needed, and some resources take a long time to replace.

### ► Use the Visuals

Look at the pictures and read the captions.

- What is another way to conserve water? **Possible answer:** take quick showers
- How does it help to reuse things? **no energy or resources are used to make more things**



### How can we save Earth's resources?

When we conserve something, we save it for use in the future. We can help to conserve Earth's resources. There are three *Rs* you can remember to help save resources. They are reduce, reuse, and recycle.

◀ **Reduce** means to cut back on how much you use something. Shut off the water while you brush your teeth!



▲ **Reuse** means to use something again. This egg carton now holds paint.

We can also make less pollution in the air and on land. How can we help? Ride bicycles more and ride in cars less. Put trash in garbage cans.

### Quick Lab

Set up bins for reusing and recycling in your classroom. **Predict** how many items you will save in one week.

### Quick Check

2. Why is it important to reduce, reuse, and recycle?

Possible answer: to conserve natural resources so there will be

enough to use later

3. Why is it important to keep Earth's resources clean?

Possible answers: so that we can have resources to use in the

future, so animals can live

ENGAGE

EXPLORE

**EXPLAIN**

EVALUATE

EXTEND

### ► Develop Vocabulary

**reduce** Ask children for examples of how to reduce things people use. Have them use the word *reduce* in their responses.

**reuse** Explain to children that *re-* is a prefix that means “to repeat or do again.” Ask children to give examples of *reusing* something, incorporating the word *reuse* in the sentence.

**recycle** Write *recycle* on the board. Underline *cycle* and explain that the word comes from the Greek word *kuklos*, meaning “circle.” Adding the prefix *re-* means “to repeat the circle again.” Have children complete the following sentence frame: *I can recycle \_\_\_\_\_.*

# Quick Lab



whole class



15 minutes

**Objective** Predict and observe how much recyclable materials are collected in the classroom.

**You need** three recycling bins

- 1 Set up three bins labeled: *Reuse*; *Plastic and Metal*; and *Paper*. Ask children to **predict** how much trash can be reused or recycled in one week.
- 2 Point out to children that things such as rags and egg cartons can be placed in the *Reuse* bin and used again.
- 3 After one week, have children **compare** their predictions with the actual amount of things they collected in each category.



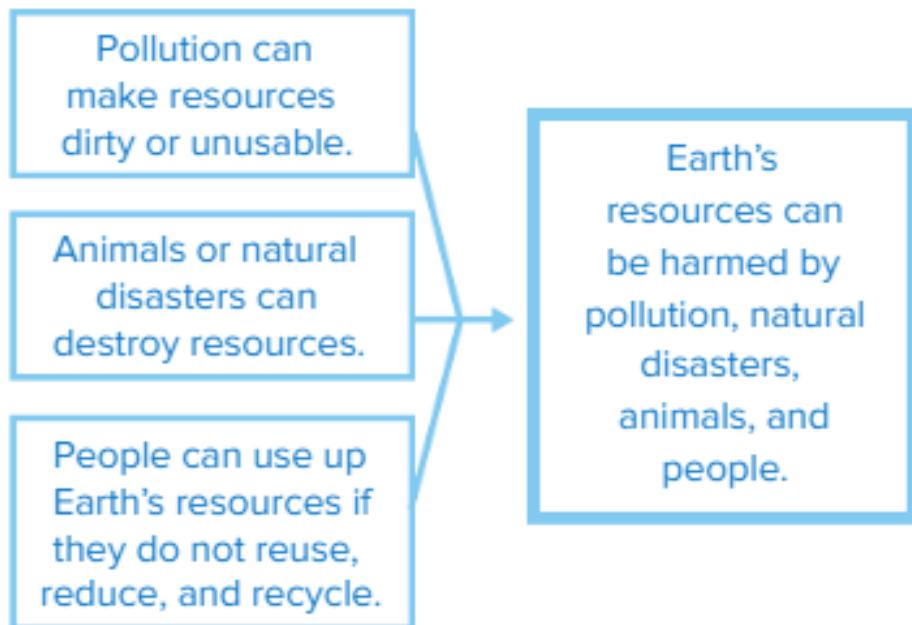
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about using and saving natural resources. Record their responses in the What We Learned column of the class KWL chart.

## ► Using the Reading Skill Summarize

Use the reading skill graphic organizer to summarize how Earth's resources might be harmed.



## Visual Summary

Write about what you learned.



### Uses of Natural Resources

Possible answer: We use living and nonliving resources every day. Trees can be used to build homes and furniture. Wind can be used to make power that gives homes heat and light. Soil can be used to grow crops.

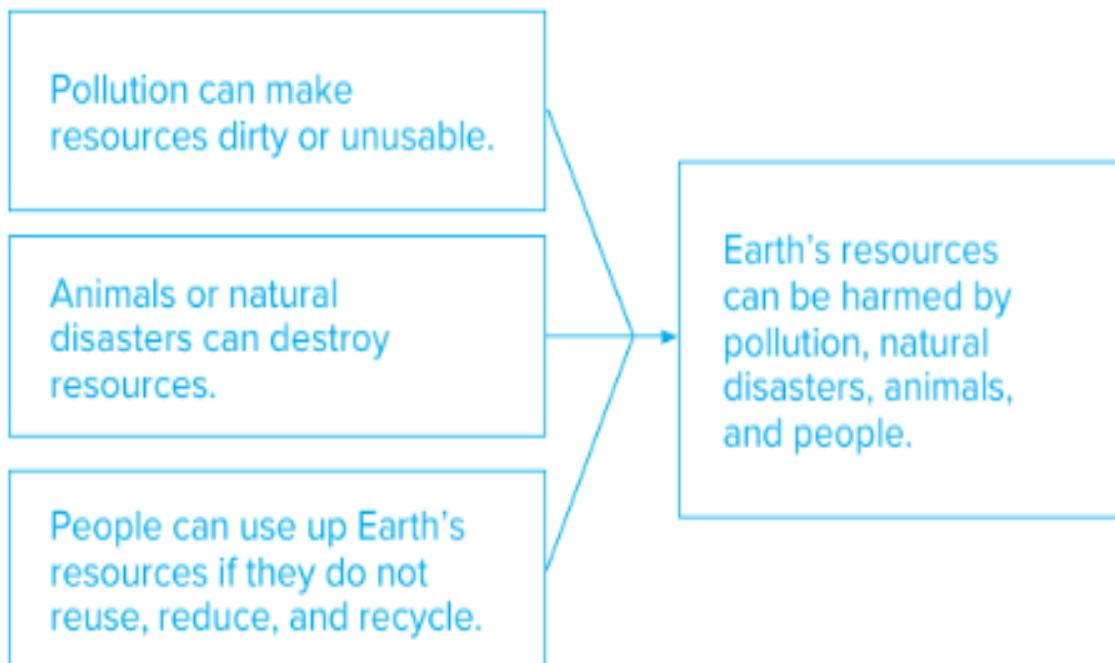


### Saving Earth's Natural Resources

Possible answer: Some natural resources take a long time to replace. We can help conserve, or save, Earth's resources by reducing how much we use; reusing things; and recycling paper, glass, and plastic.

# Think, Talk, and Write

## 1 Summarize. What harms Earth's resources?



## 2 What are some of Earth's natural resources?

Possible answers: air, water, wind, rocks, soil, plants, animals

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**Essential Question** How can we take care of Earth's resources?

Possible answer: People can reduce, reuse, recycle. We can prevent pollution

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and litter by getting rid of garbage in the right way.

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## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Have each child choose one natural resource. Have children show how the resource is used. Ask them to write about how it can be conserved.

# Reading in Science

## Objective

- Describe how people in Peru use wool as a natural resource.

### Reading in Science

#### A World of Wool



Where does wool come from? Many people all over the world use sheep or goats to get wool. Some people get wool from other animals. Scientists at the American Museum of Natural History collect letters from people around the world. The scientists learn how people in other countries get wool.

## A World of Wool

**Genre: Nonfiction** Stories or books about real people and events.

Have children read the title and look at the photographs. Read the captions together. Ask:

- What different things does the writer use in the article to tell about real people and events?  
**Possible answer: map, letter, photographs**

## Before Reading

Explain that they are going to read a letter from a girl who lives in the Andes Mountains in the country of Peru. Ask a volunteer to locate both Peru and the Andes Mountains on a world map or globe. Ask:

- Do you think the weather in the Andes Mountains is cold? How do you know?  
**Possible answers: It's cold, because some mountains have snow and the people are wearing warm clothing.**

## During Reading

Read the text together. Ask:

- Who wrote the letter? **Juana, a girl who lives in Peru**
- What do llamas look like? **Possible answers: They look like small camels with thick fur, long necks, and long legs.**
- Why do farmers in Peru raise llamas? **to use their wool for clothing and other items**

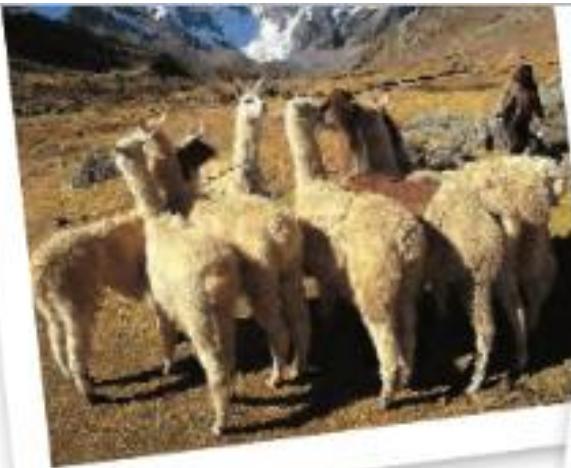
## LA Support

**Use a Word Web** Draw a word web on the board. Write *llama* in the center. Say the word and have children repeat. Have children describe llamas using the pictures and text. Write the words in the outer circles. Ask questions, such as: What color are llamas? What kind of fur do llamas have?

**BEGINNING** Have children say a few words to describe the llamas in the pictures. Write their responses in the word web.

**INTERMEDIATE** Ask children to use the word web to form short sentences to describe llamas and how they help people.

**ADVANCED** Encourage children to use the word web to describe llamas and how they are a natural resource.



▲ Workers spin the wool from the llama into yarn.

What would happen if there were no sheep to raise wool?

What if there were no more sheep raised for wool?



Other animals would have to be raised for their wool.



The wool from other animals would be used.

## ► Address Misconceptions

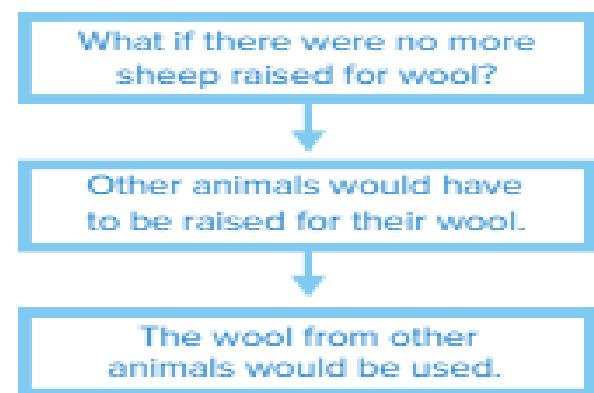
Children may think that all wool comes from sheep. Some wool does come from sheep, but it can also come from llamas, alpacas, and other animals. Angora wool is the fur of Angora rabbits. The fur of these animals is sheared, cleaned, brushed, and spun into yarn.

## After Reading

Discuss with children how a natural resource can come from different sources. For example, paper can be made from a number of different trees, such as oak, pine, and cedar. Ask:

- How would people get wool if there were no more sheep? **Possible answer: People would use wool from other animals, such as llamas or goats.**

Remind children that a problem is what needs to be done, found out, or changed. A solution fixes the problem. Show children how to write the problem in the top box, steps to a solution in the second box, and a solution in the bottom box of the graphic organizer.



Wool can be spun into yarn and used to make clothing. Explain that wool, from both sheep and llamas, are turned into yarn in the same way.

Invite children to list clothing that is made from wool from sheep. Explain that these clothes can also be made with wool from llamas. Ask children to reread the letter and identify similarities between how people in Peru use wool from llamas and how others use wool from sheep.

## Extended Reading

### Look for Adjectives

Explain that words that describe things are called *adjectives*.

Ask children to find words that describe llamas and their fur. List the words on the board.

Have children think about an item of wool clothing. Ask them to describe the item. List these words on the board, alongside the other list. Ask children to **compare** the two lists to see which words have similar meanings. Invite children to use the adjectives in sentences.

# CHAPTER 9 Review

## ► Use the KWL Chart

Review the KWL chart that the class made at the beginning of the chapter. Help children compare what they know about natural resources now with what they knew then. Add any additional information to the What We Learned column of the KWL chart.

## CHAPTER 9 Review

### Vocabulary

Use each word once for items 1–4.

1. Water, rocks, and minerals are examples of nonliving things.
2. When plants and animals die, their bodies decompose.
3. You can help to save Earth's resources. You can recycle, reduce, and reuse items that you might throw in the garbage.
4. It can take Earth thousands of years to make rocks and soil.

decompose

nonliving  
things

recycle

reduce

reuse

rocks

soil

## Science Skills and Ideas

Answer the questions below.

5. **Compare.** How are these rocks alike and different?



Color	Texture
1. purple	1. pointy, sharp edges
2. pink, black, white	2. rough, uneven edges
3. bluish green, brown	3. smooth, uneven edges

## 6. How are these soils alike and different?



Possible answers: They are different colors and have different things in them.

them. Some soils would feel smooth and some would feel rough. The

soils are alike because they all have plants growing from them.

## Science Skills and Ideas

5. **Compare** Encourage children to complete the classify graphic organizer.

# CHAPTER 9 Review

## Science Skills and Ideas

7. **Problem and Solution** Encourage children to complete the problem and solution graphic organizer.
9. Children should list the different resources discussed in the chapter: rocks, soil, trees, plants, animals, water, air, and minerals.



## CHAPTER 9 Review

7. **Problem and Solution.** List two or more natural resources. How do we harm them? Why is it important to take care of them?

Problem: **dirty air and water**



Steps to Solution: **less fumes and less garbage**



Solution: **ride bicycles, throw garbage in garbage cans; it is important to take care of Earth's resources because we need them to live.**

8. List five human-made things you use in a normal day.

Possible answers: a pencil, a chair or desk, chalk, a book, forks and spoons, and so on



9. What are Earth's resources?

Accept all reasonable responses.

## Test Prep

1. Lubna made a chart of ten rocks she collected. Which statement describes the rocks she found?
  - A Seven rocks are smooth.
  - B Eight rocks are rough.
  - C Three rocks are soft.
  - D Nine rocks are hard.



2. Look at the picture.

How do mushrooms make soil healthy?



3. Which of these is not a way to help save Earth's resources?
  - A Take a quick shower instead of a long shower.
  - B Reuse an old can as a pencil holder. Don't buy a new plastic one.
  - C Recycle old newspapers and magazines.
  - D Turn up the heat in your house to keep it warm.

# Test Preparation

1. The bar graph also shows 1 rock is soft, 7 rocks are rough, and 3 rocks are smooth.
2. Mushrooms do not grow in the subsoil or add water to the soil. Many mushrooms are edible, but this does not help the soil.
3. Reusing, recycling, and reducing the resources we use can help save Earth's resources.

## Depth of Knowledge

**Level 1 Recall** Level 1 requires memory of a fact, a definition, or a procedure. At this level, there is only one correct answer.

**Level 2 Skill/Concept** Level 2 requires an explanation or the ability to apply a skill. At this level, the answer reflects a deep understanding of the topic.

**Level 3 Strategic Reasoning** Level 3 requires the use of reasoning and analysis, including the use of evidence or supporting information. At this level, there may be more than one correct answer.

**Level 4 Extended Reasoning** Level 4 requires the completion of multiple steps and requires synthesis of information from multiple sources or disciplines. At this level, the answer demonstrates careful planning and complex reasoning.



# Careers in Science

## Objective

- Explain what gems are and what gemologists do with gems.

## Gemologist

**Genre: Nonfiction** Stories or books about real people and events.

Discuss what children know about nonfiction. Ask:

- What books have you read about real people or events?

Use children's responses to discuss the difference between nonfiction and fiction.

## Talk About It

Read the text with children. Have children describe gems they have seen. Ask:

- What was the color, size, and shape of the gem?

## Learn About It

Discuss why people would use a gemologist. Ask:

- Why would someone go to see a gemologist?  
*to find out the value and quality of gems*

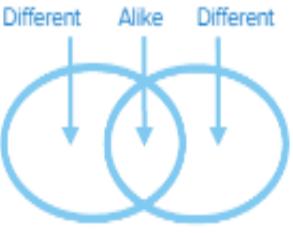
Discuss the magnifying instrument that the gemologist is using. Ask:

- How do these instruments help gemologists?  
*They help gemologists look closely at gems to find cracks.*

## Write About It

Have children write about a gem and describe how it is different than other minerals. Ask children to identify the gem by its color, texture, and use.

# CHAPTER 10 Planner

Lesson	OBJECTIVES AND READING SKILLS	VOCABULARY
<b>1 Why Seasons Happen</b>  <b>PACING:</b> 2 days <b>FAST TRACK:</b> 1 day	<ul style="list-style-type: none"><li>Describe seasonal and annual patterns on Earth.</li><li>Relate seasonal patterns to Earth's orbit around the Sun.</li></ul> <p>Reading Skill Compare and Contrast</p> 	orbit
<b>2 The Moon and Stars</b>  <b>PACING:</b> 3 days <b>FAST TRACK:</b> 1 day	<ul style="list-style-type: none"><li>Observe the Moon and its phases as it orbits Earth.</li><li>Recognize that the Sun is the closest star to Earth.</li></ul> <p>Reading Skill Predict</p>	phase star
<b>3 The Solar System</b>  <b>PACING:</b> 2 days <b>FAST TRACK:</b> 1 day	<ul style="list-style-type: none"><li>Explain the relationship between the planets and the Sun.</li><li>Describe the planets in the solar system.</li></ul> <p>Reading Skill Sequence</p>	planet solar system

# Activity Planner

## EXPLORE Activities

### Explore PACING: 15 minutes



**Objective** Compare and contrast the characteristics of various seasons.

**Skills** **classify, draw conclusions**

**Materials** paper, markers, magazines, scissors, glue sticks

**★ PLAN** Provide a variety of magazines (nature, sports, travel) showing pictures of people in all seasons.

### Explore PACING: 15 minutes



**Objective** Understand how the Moon is visible from Earth at night.

**Skills** **make a model, draw conclusions, investigate**

**Materials** flashlights, white foam balls

**★ PLAN** Have balls of different colors available for children for the guided inquiry.

### Explore PACING: 20 minutes



**Objective** Compare the orbits of the planets around the Sun.

**Skills** **measure, make a model, draw conclusions**

**Materials** poster paper, crayons, rulers

**★ PLAN** Have extra poster paper available for children whose orbit paths become too large for the original poster paper.

## QUICK LAB Activities

### Quick Lab PACING: 10 minutes



**Objective** Communicate information about each season.

**Skills** **communicate**

**Materials** paper plates, crayons, brass fasteners, scissors

**★ PLAN** Poke fasteners in the center of the top plates before handing them out to the children to save time during class.

### Quick Lab PACING: 10 minutes



**Objective** Observe and record data about the night sky.

**Skills** **observe, record**

**Materials** data recording forms (Name, Date, Time), crayons

**★ PLAN** Make sure children are supervised by an adult for their night observations.



### Quick Lab PACING: 10 minutes



**Objective** Make a model of the solar system.

**Skills** **put in order**

**Materials** paper plates, string, scissors, tape, crayons, construction paper

**★ PLAN** To save time, cut out one large circle, four medium-sized circles, and four small circles for each group beforehand.



## Academic Language

When learning, students need help in building their understanding of the academic language used in daily instruction and science activities. The following strategies will help to increase children's language proficiency and comprehension of content and instruction words.

### Strategies to Reinforce Academic Language

- **Use Context** Academic language should be explained in the context of the task. Use gestures, expressions, and visuals to support meaning.
- **Use Visuals** Use charts, transparencies, and graphic organizers to explain key labels to help children understand classroom language.
- **Model** Use academic language as you demonstrate the task to help children understand instruction.

### Academic Language Vocabulary Chart

The following chart shows chapter vocabulary and inquiry skills. Vocabulary words help children comprehend the main ideas. Inquiry Skills help children develop questions and perform investigations.

#### Vocabulary

orbit  
phase  
star  
planet  
solar system

#### Inquiry Skills

make a model  
classify  
draw conclusions  
investigate  
measure

## Vocabulary Routine

Use the routine below to discuss the meaning of each word on the vocabulary list. Use gestures and visuals to model all words.

**Define** Each changing shape of the Moon as we see it from Earth is called a *phase*.

**Example** The moon *phase* changes each night.

**Ask** During which moon *phase* can we see all of the Moon from Earth?

Children may respond to questions according to proficiency level with gestures, one-word answers, or phrases.

## Vocabulary Activities

Help children understand the Moon's phases.

**BEGINNING** Encourage children to discuss how the Moon looks different every night. Explain that the different ways we see the Moon are called *phases*. Write the word and have children say it after you. Have children describe how much of the Moon they see in each of the four phases shown.

**INTERMEDIATE** Form 4 groups. Give each a large ball of yellow clay (the Sun), a medium ball of blue clay (Earth), and a small ball of white clay (the Moon). Assign each group a phase of the Moon to model by positioning the clay balls accordingly. Have each group explain their model.

**ADVANCED** Show children a calendar that shows the occurrence of the phases of the Moon. Find the month you are in and have children write the dates on which the phases occur.

## CHAPTER 10

# Earth and Space



**THE BIG IDEA** How do things move in the night sky?

**Chapter Preview** Have children read the Essential Questions in this chapter. Review how models represent objects and the way they interact in a way that is easier to observe and understand. Ask children to predict how models could be used in this chapter.

### ► Assess Prior Knowledge

Before reading the chapter, create a **KWL** chart with children. Ask the Big Idea question, and then ask:

- Which planet do we live on?
- What can you see in the night sky?
- Why is daytime warmer than nighttime?

Answers shown represent sample student responses.

Follow the **Instructional Plan** after assessing children's prior knowledge of chapter content.

## CHAPTER 10

# Earth and Space



**How do things move in**

Answers will vary. Accept all reasonable responses.

### Vocabulary



**orbit** the path Earth takes around the Sun



**phase** the Moon's shape as we see it from Earth

# Differentiated Instruction

## Instructional Plan

**Chapter Concept** Objects in space move or seem to move.

**EXTRA SUPPORT** Children who need to explain the cause of day/night, or a year, should cover **Lesson 1** (year), before continuing with the rest of the chapter.

**ON LEVEL** Children who can explain the cause of day/night and a year can go directly to **Lesson 2**, to explore the Moon, why it seems to change shape, and the stars.

**ENRICHMENT** Children ready to enrich their understanding may explore how planets move around the Sun, **Lesson 3**.

# Vocabulary

- Have a volunteer read the **Vocabulary** words aloud to the class. Ask children to find one or two of the words in the chapter by using the given page references. Add these words and their definitions to a class Word Wall.
- Encourage children to use the illustrated glossary in the Student Edition's reference section.

Before reading this chapter, write down what you already know in the first column. In the second column, write down what you want to learn. After you have completed this chapter, write down what you learned in the third column.

## Earth and Space

What We Know	What We Want to Learn	What We Learned
Our planet is called Earth.	Does the Sun move?	The Sun's position seems to change because of Earth's rotation.
Earth has one moon.	Why does the Moon seem to change shape?	The Moon takes one month to orbit Earth. From Earth, the amount of the Moon that is lit up by the Sun changes. The Moon appears to change shape.
Stars are in the night sky.		

Stop Here to

# Plan Your Lesson

## Lesson 1 Why Seasons Happen

### Essential Question

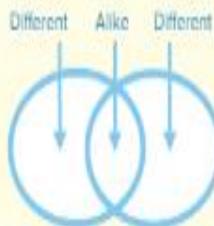
How do the seasons change during a year?

### Objectives

- Describe seasonal and annual patterns on Earth.
- Relate seasonal patterns to Earth's orbit around the Sun.

Reading Skill Compare and

Contrast



You will need a compare-and-contrast graphic organizer.



### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### 1 Introduce

Look and Wonder

#### 2 Teach

Use the Visuals

#### 3 Close

Think, Talk, and Write

**Lesson 1****Lesson 1 Why Seasons Happen****Objectives**

- Describe seasonal and annual patterns on Earth.
- Relate seasonal patterns to Earth's orbit around the Sun.

**1 Introduce****► Assess Prior Knowledge**

Have children share what they know about seasons. Ask:

- What words would you use to describe the seasons where we live?
- What do you think causes the changes from one season to the next?

Record children's answers in the What We Know column of the class KWL chart.



## Look and Wonder

### Before You Read

What time of year is shown here? How can you tell?

Possible answers: Fall. The colors of the leaves on the trees.

### Essential Question

How do the seasons change during a year?

## Look and Wonder

Share responses to the Look and Wonder question together. Invite children to study the picture. Ask:

- What clues in the picture tell you about the season? **The leaves are changing color.**
- What season comes next? **winter**
- What changes take place between one season and the next? **Possible answers: The temperature changes. The length of day changes.**

Write children's responses on the class KWL chart and note any misconceptions they may have.

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.



## Explore



whole class



20 minutes

**Plan Ahead** Provide a variety of magazines (nature, sports, travel) showing pictures of people in all seasons

**Purpose** Help children to draw conclusions about seasonal weather by classifying clothing into groups by season.

### Structured Inquiry **What to Do**

Have children describe what they know about the different seasons. Ask: How is spring different from fall?

- 1 Ask volunteers to identify the spelling of the seasons on a classroom chart or by spelling aloud.
- 2 **Be Careful!** Make sure children are using safety scissors. Allow children to trade magazines so they can find pictures for all the seasons.
- 3 **Classify** Children may notice that some clothes are suitable for more than one season. Have them divide these items between the groups.
- 4 **Draw Conclusions** Discuss how the clothing people choose to wear often reflects the weather conditions for a particular season.

## What clothes do people wear in each season?

### What to Do

- 1 Write the name of a different season in each corner of your paper.
- 2 Cut out pictures of different kinds of clothes from magazines.

#### Step 2



- 3 **Classify.** Glue the pictures near the seasons where they belong.

4

**Draw Conclusions.** What do people wear in different seasons?

Answers will vary depending on the season and weather conditions.

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**Explore More**

5

**Classify.** Sort your clothes at home by season.

Explain how you grouped your clothes.

Answers will vary depending on how students grouped clothing.

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**Open Inquiry**

Investigate how and why the seasons change.

My question is:

Sample question: What is the difference between the seasons in a place far

---

from where I live?

---

**Guided Inquiry** **Explore More**

**5 Classify** Encourage children to draw pictures of their clothing by season. Have children share their drawings and explain why the clothing they wear in each season may not be appropriate in every place in the United States.

**Open Inquiry**

Ask children what other questions they have about how and why the seasons change.

If children have difficulty formulating additional questions, ask them if they have ever wondered about the seasons in a place that is far from where they live, for example: **What is summer like in Alaska? What is the difference between the seasons in a place near the equator?**

Help children make a plan to find the answers to their questions.

## Alternative Explore

What clothing do you wear during a season?

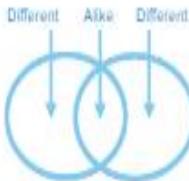
Have each child make a list of clothing that they think could be worn in each season. Allow children to **record** their data on a class chart.

Have the class decide whether or not they think the clothing items could belong in more than one season. Encourage children to share what they know about seasonal temperature variations where they live.

## 2 Teach

### Read and Respond

Reading Skill **Compare and Contrast** To compare is to decide how things are alike. To contrast is to decide how things are different.



### What are the seasons like?

#### ► Discuss the Main Idea

**Main Idea** Weather characteristics for each season can be observed and described.

After reading, have children describe today's weather. Ask:

- How do you know what the season is now? **Possible answers:** by the weather, by the month

Show children a monthly calendar. Have them identify the season and the weather for each month.

- How will you know when the next season has arrived? **Possible answers:** The weather will have changed. It will be a different time of year.

### Read and Respond .....

#### What are the seasons like?

Each season has a different kind of weather. In fall the air can become cool. Leaves on some trees turn colors and fall off.

In winter the air is cold. In some places it snows. Animals must keep warm. Some birds fly to warmer places. People wear warmer clothes.

#### Quick Lab

Divide a plate into four parts to show each season. Draw and **communicate** what you do in each season.



▲ **There are fewer hours of daylight in autumn.**

▲ **In many places it can snow in winter.**

## Science Background

**Orbiting Earth** Earth is held in its orbit around the Sun because of the pull of the Sun's gravity. For part of the year, the Northern Hemisphere is tilted toward the Sun, and the Southern Hemisphere is tilted away from the Sun. This explains why seasons are the opposite of one another in the northern and the southern hemispheres. It is the orbital motion and tilt of Earth's axis that cause the change of seasons on Earth.

## LA Support

**Use Pictures** Review the seasonal pictures with children. The different types of clothing, activities, and the physical objects in each picture can be used to discuss aspects of each season.

**BEGINNING**

Point to and name things in each picture. Ask children to repeat the words and point to the picture they describe.

**INTERMEDIATE**

Have children describe something they see in each picture. Help children use simple sentences to describe the weather in each picture.

**ADVANCED**

Have children describe what is happening in each picture. Encourage children to talk about what they like to do during each season.

## Quick Check

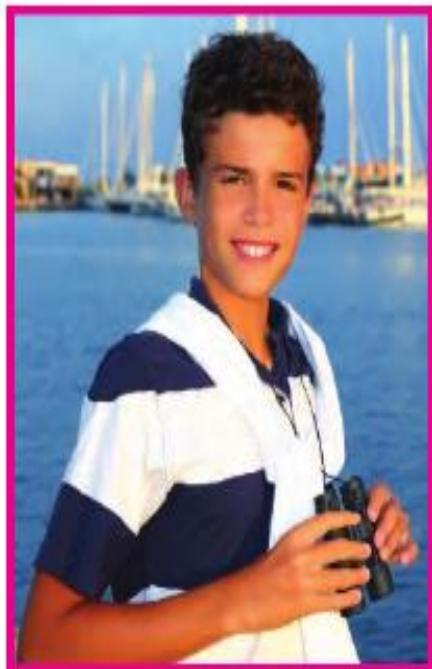
1. How is summer different from winter?

Possible answers: Summer is

warm and the days are longer.

Winter days are shorter and

colder.



▲ The days are hot and

ENGAGE

EXPLORE

EXPLAIN

EVALUATE

EXTEND

## ► Use the Visuals

Have children look at each photograph and draw conclusions about each season. Ask

- What clues in the fall picture help you to decide what the temperature might be? **Possible answers:** yellow leaves on the ground, children wear sweaters.
- What clues in the winter picture help you to decide what the temperature might be? **Possible answers:** the snow; children wear hats, coats, boots, mittens
- What clues in the spring picture help you to decide what the temperature might be? **Possible answer:** Children are not wearing gloves, hats, or scarves, and there are leaves on the tree and grass on the ground, so it is not too cold.
- What clues in the summer picture help you to decide what the temperature might be? **Possible answers:** sleeveless shirts, lemonade

## ► Develop Vocabulary

To reinforce unit vocabulary, invite children to write their own captions for each of the seasonal pictures shown. Encourage them to write about the likely temperature and the type of precipitation shown.

# Quick Lab



pairs



10  
minutes

**Objective** Communicate information about each season.

**You need** paper plates, crayons, brass fasteners, scissors

- 1 Have children divide the plate into four sections and draw pictures of activities they like to do in each season.
- 2 Guide children in cutting out a quarter section of a second plate and fasten it to the top of the plate with the drawings. Ask children to turn the top plate to expose one season at a time. Have children guess the season and **communicate** other activities they like to do in each season.



Uncorrected first proof - for train

## What causes the seasons?

### ► Discuss the Main Idea

**Main Idea** Seasons are caused by Earth's orbit around the Sun and the tilt of Earth's axis..

### Read a Diagram

Point out to children that this diagram does not show the true distances between the Sun and Earth, and that the shape of the orbit is not exact. The diagram is intended to illustrate the idea that there are points in Earth's orbit that causes seasons.

The left globe that represents summer may confuse children because the United Arab Emirates is in shadow. Remind children that the tilt of Earth shows the season, while the rotation of Earth causes night and day.

## What causes the seasons?

### Quick Check

2. The Earth takes about 365 days to orbit the Sun.

Did you know that Earth moves around the Sun? The path Earth takes around the Sun is called its **orbit**. Earth takes about 365 days, or one year, to orbit the Sun.

We know there is day and night because Earth spins on its axis. The axis also is tilted. Earth always tilts in the same direction on its axis.



# Differentiated Instruction

## Leveled Activities

### EXTRA SUPPORT

Display large pieces of paper on a wall with pre-drawn stick figures on each. Label each paper with a season. Show children photographs of weather in different seasons, preferably without people in the pictures. Have children draw appropriate clothing for each pictured season on a stick figure.

### ENRICHMENT

Have children create a three-dimensional mobile of Earth's orbit around the Sun. Materials for the activity may include paper plates, thread, and foam balls. Have children indicate the equator on each ball before they attach it to the mobile. Encourage children to show and label Earth at all four locations along its orbit, indicating the different seasons.

As Earth moves around the Sun, the tilt of Earth causes the seasons. The part of Earth that tilts toward the Sun is warmer. The part of Earth that tilts away from the Sun is colder.

### Quick Check

3. What happens on Earth during one orbit around the Sun?

During one orbit around the Sun, Earth goes

through one cycle of seasons, and 365

days, or one year, goes by.



### Read a Diagram

Which season shows the top half of Earth tilted away from the Sun?

winter

### ► Develop Vocabulary

**orbit** *Word Origin* Orbit comes from the Latin word *orbitis*, which means “path.” Have children use their fingers to trace the path Earth travels around the Sun in the diagram. Then have them fill in this sentence: *The path Earth travels around the Sun is called an \_\_\_\_\_.*

### ► Address Misconceptions

Children may think that the Northern and Southern hemispheres have the same seasons at the same time. *vv*

**FACT** When it is winter in the United Arab Emirates it is summer in South America. Point out the Northern and Southern hemispheres in the diagram to help children to understand that they have opposite seasonal patterns.

# Formative Assessment

## Chart Seasonal Differences

Have children record the differences between the seasons on a chart. Create a chart with three columns labeled: *Seasons*, *Clothing*, *Weather*, and four rows, one for each season. Have children write and draw what they know about each season.

Seasons	Clothing	Weather
Winter	scarf	show * * *

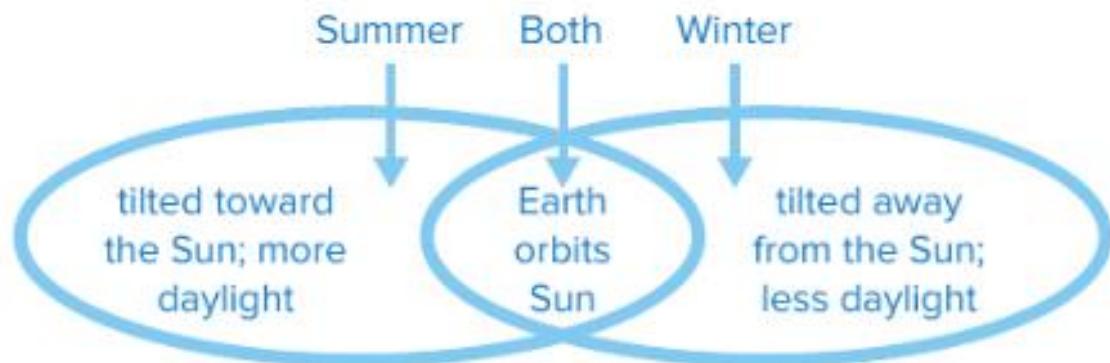
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about how Earth's orbit around the Sun creates seasons. Record their responses in the What We Learned column of the class KWL chart.

## ► Using the Reading Skill Compare and Contrast

Use the reading skill graphic organizer to compare and contrast the seasons. For example:



## Visual Summary

Write about what you learned.



### Weather in Four Seasons

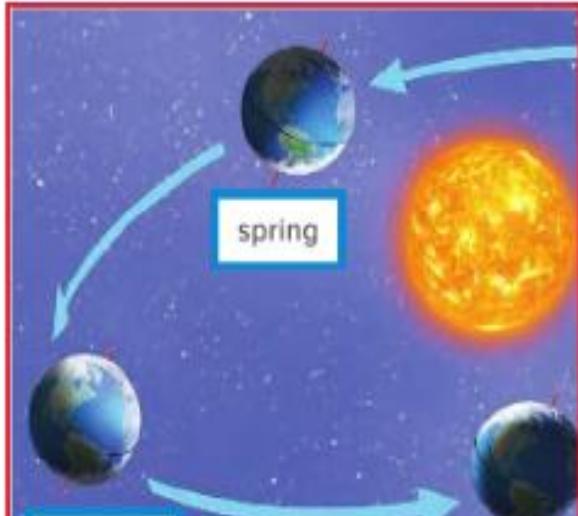
Possible answer: In fall, the air is cool

and leaves fall off trees. In winter, air is

cold and some places get snow. Spring

has warm weather and is often rainy.

Summer is the hottest season.



### Earth's Orbit

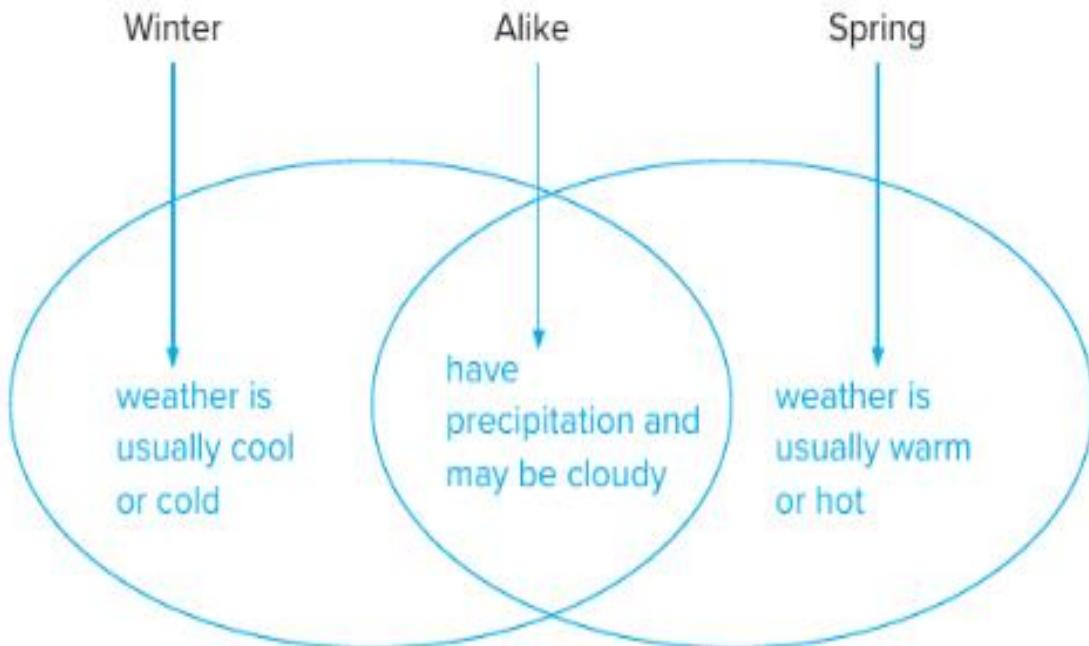
Possible answer: The orbit is the path

Earth takes around the Sun. One orbit

takes one year and causes the seasons.

# Think, Talk, and Write

**1 Compare and Contrast.** How is the weather alike in winter and in spring? How is it different?



**2** What causes summer and winter?

Possible answers: Summer is caused by parts of Earth tilting toward the

Sun. Winter is caused by parts of Earth tilting away from the Sun.

**Essential Question** How do the seasons change during a year?

Possible answers: Different seasons have different weather and hours of

sunlight in a day. Summer and spring have longer days and warmer weather

than fall and winter.

## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Have students use colored paper to make four collages, one for each season. Before children begin, have the class brainstorm how the seasons make them feel, what they like to do, and which colors they associate with each season.

## Math in Science

## Math in Science

## Objective

- Arrange the order of whole numbers and fractions.

## How Much Sunlight?

## Talk About It

Direct children's attention to the chart. Remind children that a chart is a good way to organize information so that it can be easily read. Ask:

- Which season has the most sunlight? **summer**
- Which season has the least amount of sunlight? **winter**

## Learn About It

Point out to children that it is easier to compare information by looking at the chart. Ask:

- How can we find out how much more sunlight we get in the summer than the winter? **subtract the number of summer hours from winter hours**

Have children look at the whole numbers first. Draw a circle on the board with a line drawn down the middle to represent half of a whole. Explain to children that the fraction shows half of one whole.

## How Much Sunlight?

We get more sunlight in summer than we do in winter. How many hours of sunlight do we get in each season? Use this chart to find out.



# Integrate Math

## Light and Dark

Remind children that there are 24 hours in 1 day. Ask:

- If there are 17 hours of sunlight a day in the summer, how many hours of darkness are there? **7 hours**
- If there are 9 hours of sunlight a day in winter, how many hours of darkness are there? **15 hours**

Guide children in writing number sentences for the subtraction problems.

### Put in Order

Put the seasons in order from fewest to most hours of sunlight.

#### Remember

Look at the whole numbers first to put numbers in order.

winter, autumn, spring, summer

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EVALUATE

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### Try It

Have children work with a partner to make a chart showing the sunlight hours in order from least to most hours of sunlight. Ask:

- Which season will be first on your chart? **winter**
- Which season will be last on your chart? **summer**

Invite children to find the difference between the number of hours of sunlight between summer and fall, summer and spring, and fall and spring.

Encourage children to share their solutions to the problem.

## Lesson 2 The Moon and Stars

### Essential Question

How does the night sky change?

Reading Skill **Predict**

### Objectives

- Observe the Moon and its phases as it orbits Earth.
- Recognize that the Sun is the closest star to Earth.

What I Predict	What Happens

You will need a predict graphic organizer.



### **FAST TRACK**

**Lesson Plan** When time is short, follow the Fast Track and use the essential resources.

#### **1 Introduce**

Look and Wonder

#### **2 Teach**

Read a Diagram

Discuss the Main Idea

#### **3 Close**

Think, Talk, and Write

## Lesson 2

## Lesson 2 The Moon and Stars

### Objectives

- Observe the Moon and its phases as it orbits Earth.
- Recognize that the Sun is the closest star to Earth.

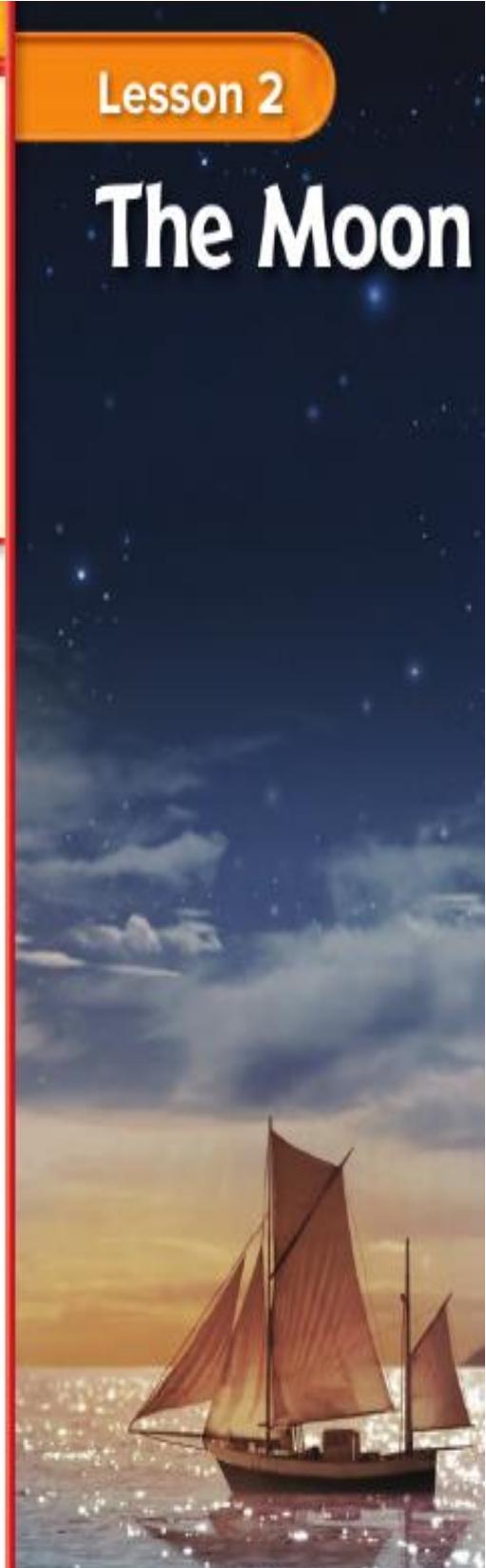
## 1 Introduce

### ► Assess Prior Knowledge

Have children share what they know about the Moon and stars. Ask:

- What does the Moon look like? Possible answers: **white, yellow, round, crescent-shaped**
- What do stars look like? **bright, small**
- Where do you see the Moon and stars? **in the night sky**

Record children's answers in the What We Know column of the class KWL chart.



## Look and Wonder

### Before You Read

The Moon is bright in the night sky. Where does the Moon's light come from?

Possible answers: It is lit by the Sun, or sunlight.

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### Essential Question

How does the night sky change?

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## ENGAGE

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EXTEND

## Look and Wonder

Read the Look and Wonder statement and question about the Moon. Invite children to share their responses. Ask:

- What do you see in the picture? **the Moon, stars**
- What is the brightest object in the pictured sky? **the Moon**
- Why is the night sky darker than the day sky? **Possible answers: The Moon and the stars do not give off much light. The Sun is not in the sky.**

Write children's responses on the class KWL chart and note any misconceptions they may have.

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.



# Explore



whole class



20  
minutes

**Plan Ahead** Draw the shades before turning off the lights to make the experiment more effective. Have different colored balls available for the Explore More.

**Purpose** Making models helps children visualize and understand large-scale planetary actions. This model will allow children to conceptualize how the Sun shines on the Moon, which makes the Moon visible on Earth.

## Structured Inquiry    **What to Do**

Have children describe the size, shape, and color of the Moon. Ask: **What did the Moon look like last night?**

- 1 Ask children to hold the ball at arm's length so both partners have a clear view of the Moon. Point out to children that the Moon is actually a light gray color, not white.
- 2 **Make a Model** Have children observe how much of the Moon is lit by the Sun. Ask:
  - What part of the Moon is lit by the Sun? **the part facing the Sun**
  - Where is the Moon not lit by the Sun? **the part facing away from the Sun**
- 3 **Draw Conclusions** Have children draw a diagram replacing the flashlight with the Sun and the white ball with the Moon.

## Explore

### How do we see the Moon at night?

#### What to Do

- 1 Use a white ball as the Moon. Turn out the room lights. Is it easy to see the Moon?

Student responses may vary depending on their

location, but students may say that it is difficult to

see in the dark.

- 2 **Make a Model.** Shine a flashlight on the Moon. The flashlight is the Sun. Is the Moon easier to see now? Why?

Answers will vary, but students may

say this the Moon is easier to see

because the light is shining on it.

#### You need



flashlight



white ball

#### Step 2



**3 Draw Conclusions.** Where does the Moon's light come from?

The Moon is lit by the Sun. The Sun shines on the Moon, which makes the Moon visible on Earth.

**Explore More**

**4 Investigate.** What if the Moon were a different color? How would that affect the brightness of the Moon? Make a model to find out.

Possible answer: If the Moon were a lighter color, it would be brighter and it would be easier to see. If it were a darker color, it would not stand out against the night sky.

**Open Inquiry**

Investigate stories that you have heard about the Moon.

My question is:

Sample question: How can you determine whether these stories are fact or fiction?

**Guided Inquiry****Explore More**

**4 Investigate** Have children choose a different colored ball to use for their model. Ask them to make drawings to show the similarities and differences between the two models.

**Open Inquiry**

Discuss stories children may have heard about the Moon. For example, they may have heard that it is blue or made of cheese. Ask: **How can you check whether these stories are fact or fiction?**

Ask children to choose a moon question to investigate. Have print and non-print resources about the Moon available for children to conduct their research.

## Alternative Explore

### What makes the Moon visible from Earth?

Have children place different colored rocks on pieces of black construction paper to **model** the Moon in the night sky. They should place one rock per page.

**Compare** how visible the rocks are in a dark room with the lights out and when lit with a flashlight. Guide children to **draw conclusions** that the Moon is like the lit rock. It stands out against the night sky when it is lit by sunlight.

## Read and Respond.....

### Why can we see the Moon from Earth?

The Moon does not shine the way the Sun does. The Moon is made of rock! We see the Moon because light from the Sun shines on it.

Look at the picture below. Point to where it is night on Earth. Then point to the part of the Moon that is lit by the Sun. You sometimes see this part of the Moon at night.

#### Quick Check

Answer true or false.

1. We can see the Moon because light from the Moon shines on the Sun.

false

#### How the Moon Moves



The Sun's light shines on the Moon.

# 2 Teach

## Read and Respond

Reading Skill **Predict** To make an educated guess about what might happen next.

What I Predict	What Happens

### Why can we see the Moon from Earth?

#### ► Discuss the Main Idea

**Main Idea** The Moon can be seen from Earth because it is lit by the Sun.

Before reading, review on a globe how Earth rotates on its tilted axis once every day.

- What light shines on Earth as it rotates? **sunlight**

After reading, hold up a rock and explain that, like this rock, the Moon does not create its own light. Ask:

- What light shines on the Moon that makes it possible for it to be seen from all parts of Earth? **sunlight**

## Science Background

**Moon Face** The Moon takes about 29 days to orbit Earth. The Moon completes one rotation during an orbit of Earth. This causes the same side of the Moon to be facing Earth at all times. From Earth, large shaded areas on the Moon's surface look like eyes, a nose, and a mouth. These areas, called seas, were originally thought to be oceans, but are now known to be old lava plains.

## LA Support

**Share Information** Provide children with word cards labeled *Moon*, *Earth*, and *Sun*, with pictures for each. Have children match a label to a picture. Then, describe each picture one by one. Ask children to identify each description.s

### BEGINNING

Have children practice saying the words on the labels.

### INTERMEDIATE

Invite children to use labels and short phrases to describe each picture.

### ADVANCED

Encourage children to make sentences to describe the relationship between the three pictures. Ask children to describe the Sun using short phrases.

The Moon does not just stay still in the night sky. The Moon moves in a path around Earth. It takes the Moon about one month to make one orbit around Earth. The Moon's path around Earth repeats again and again.

#### Read a Diagram

When can we see the most light on the Moon?

The Moon to the right of Earth shows the point  
when people on Earth can see the most light  
on the Moon.



▲ **The Moon has a light color because it is covered in dust.**



## Read a Diagram

Explain to children that the diagram shows how the Sun lights the Moon as it orbits Earth. Point to the arrows and explain how they show the direction of the Moon's orbit. Tell children that the diagram does not give the true distances or the actual shape of the Moon's orbit. The diagram is to help children understand the basic concept of the Moon's orbit.

Have children compare how the Sun shines light on Earth and the Moon. Explain how, just like Earth, the side of the Moon facing the Sun will always be lit, while the part facing away from the Sun will be in shadow.

## ► Develop Vocabulary

Reinforce chapter vocabulary by playing an orbiting game. Pair children and assign them to be either Earth or the Moon. Have moon partners orbit Earth partners. Reinforce the word *orbit* by asking children to demonstrate orbits that are close and far from Earth.

## ► Explore the Main Idea

**ACTIVITY** Model the diagram using a globe, a ball, and a flashlight. Have one child slowly spin the globe to show Earth's rotation. Another child will carry the ball around Earth to show the Moon's orbit. For the Sun, shine a flashlight at the Moon and Earth. Invite children to observe which parts of Earth and the Moon are lit by the Sun.

# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Give children paper with pre-drawn Moon and Sun circle outlines, as shown in the Read a Diagram of the Moon's orbit. Have children color the part of the Moon that is lit by the Sun. Ask: How did you know which part of the Moon to color? **The part of the Moon facing the Sun will be lit.**

**ENRICHMENT** Have children suppose they are standing on Earth in the diagram. Point to different places on Earth in the diagram and have children draw how the Moon would look from that location. Invite children to share and discuss their drawings with a partner.

# Why does the Moon seem to change shape?

## ► Discuss the Main Idea

**Main Idea** Phases are a pattern of changing moon shapes seen from Earth each month.

Explain that the half of the Moon facing the Sun is always lit by sunlight. The Moon appears to change shape because the amount of the Moon's surface that is lit by the Sun changes during the Moon's monthly orbit. Only the part of the Moon that has light from the Sun shining on it is visible from Earth:

- Why does it take about a month to see all of the moon phases? **The Moon takes about a month to orbit Earth**

## ► Use the Visuals

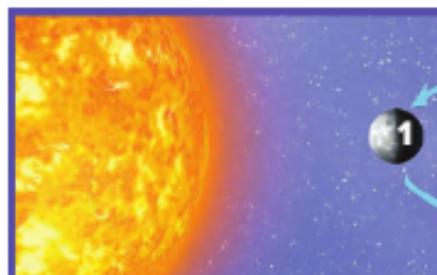
Tell children that the photographs show the Moon as seen from Earth at different times during the Moon's monthly orbit. The amount of the Moon seen versus what is in shadow depends on the position of the Moon in relation to Earth and the Sun.

Guide children in matching the numbers in the diagram with the numbered photographs. After studying the diagram and photographs, and reading the captions, ask:

- Which photograph shows the Moon between Earth and the Sun? **first, new moon**
- How much of the lit part of the Moon can we see in the first photograph? **none**

### Change Shape:

From Earth the Moon looks like it is changing shape. The Moon does not really change shape. The shape of the Moon changes as the Moon moves during one month.



When the Moon is between Earth and the Sun, we can not see the Sun's light shining on the Moon. It looks as if there is no moon at all!

**322**  
EXPLAIN

## Differentiated Instruction

### Leveled Questions

# Differentiated Instruction

## Leveled Questions

**EXTRA SUPPORT** Ask questions such as these to check children's understanding of the material.

- How long does it take the Moon to orbit Earth? **a month**
- What do the phases of the Moon show? **different amounts of the Moon lit by sunlight as seen from Earth over a month**

**ENRICHMENT** Use these types of questions to develop children's higher-order thinking skills.

- Why do the phases of the Moon occur in the same order every month? **The Moon orbits Earth in the same direction.**
- How can you tell the position of the Sun by looking at the Moon? **The Sun is facing the side of the Moon that is lit.**

## ► Address Misconceptions

Children may think that the Moon can only be seen at night. Explain to children that the Moon is big and brightly lit by the Sun, so it is possible to see the Moon in a cloudless sky during the day.

**FACT**

The Moon can sometimes be seen during the day. Encourage children to go outside with an adult in the late afternoon or around sunset to see the Moon and Sun in the sky at the same time.

## ► Develop Vocabulary

**phase** *Word Origin* The word *phase* comes from *phasis*, which means “appearance of a star or a moon.” A *phase* is a part of a repeating cycle. Each phase of the Moon shows the Moon’s appearance during one part of its monthly cycle. Have children describe the shape of the Moon during one *phase*. Have them describe a moon phase using sentences similar to the following: *During a full moon, the Moon’s shape looks like a round circle.*

## ► Explore the Main Idea

**ACTIVITY** Ask children to observe the Moon in the night sky (with an adult) and to make a drawing of it. The next day in class, guide them in highlighting the part of the Moon that was lit. Then, ask children to shade in the part of the Moon that was in shadow.



► The Moon is Earth's closest neighbor in space.

### Quick Check

Fill in the blank.

2. The Earth takes about 365 days to orbit the Sun.

On different nights we see different amounts of sunlight shining on the Moon. Each shape of the Moon we see during one month is called a **phase**. The phases appear in the same order every month. The phases repeat each month.



The Moon moves to a new place by the next week. We can see all of the Moon's lit side. This phase is called a full moon.

By the third week, the Moon is three quarters of its way around Earth. This phase is called a last quarter moon.

#### FACT

The Moon can sometimes be seen during the day.

## Classroom Equity

Today, people of all ethnicities are making important scientific contributions to the study of our solar system and universe. Have children work in groups to research science pioneers. You might also invite scientists from diverse cultural backgrounds within your community to come speak to the class during your lesson.

## What are stars?

### ► Discuss the Main Idea

**Main Idea** Stars are made of hot gases that give off light and heat.

Explain to children that most stars look tiny because they are far away. The Sun looks large because it is close to Earth.

After reading, have children use what they know about the Sun to describe what other stars might be like. Ask:

- Why don't all stars warm Earth the way the Sun does? **The other stars are too far away to warm Earth.**

### ► Use the Visuals

Point out to children that the largest and brightest stars are used to create the shape of Orion the Hunter.

Explain to children that star patterns are known as "constellations." Many years ago, poets, farmers, and astronomers created constellations to help identify stars. Discuss the features of the pattern that resemble a tunic, belt, sword, arm, and bow.

Ask:

- How can you tell from looking at the star pattern that Orion was a hunter? **He holds a bow and carries a sword.**

# Quick Lab



individual



15 minutes

**Objective** Observe and record data about the night sky.

**You need** data recording forms, crayons

- 1 Ask children to observe the night sky with an adult for one evening. Have children **record** the date and time of their observations. Ask them to draw what they see.
- 2 Encourage children to write a sentence to describe the night sky. Ask: **What shape was the Moon? How many bright stars were there?**
- 3 Invite children to share their observations with the class.



## ► Develop Vocabulary

**star** *Scientific vs. Common Use* Explain that famous people are often called stars because they “stand out in a crowd.” In scientific use, stars are “objects that give off heat and light,” which makes them shine brightly in the night sky. Invite children to use the scientific word *star* in a sentence.

is an average-sized star. It looks large to us because it is close to Earth.



▲ The Sun lights up the sky during the day. We can not see other stars in the sky until night.



### Quick Check

**Fill in the blank.**

3. A star is an object in space that gives off heat and light.

4. Explain how stars are different from each other.

Stars are different sizes and colors. They are different distances

from Earth.

## Formative Assessment

### Label the Night Sky

Distribute copies of pre-drawn pictures of moon phases. Have children label and write a short sentence about each picture.



# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about stars and the Moon. Record their responses in the What I Learned column of the class KWL chart.

## ► Using the Reading Skill Predict

Use the reading skill graphic organizer to predict what happens a week after a full moon.

What I Predict	What Happens
I will see a part of the Moon.	The Moon has completed $\frac{3}{4}$ of its orbit around Earth.

## Visual Summary

Write about what you learned.



### The Moon's Orbit

Possible answer: We can see the Moon because the Sun's light shines on it. The Moon takes about one month to make one orbit around Earth.



### Moon Phases

Possible answer: The Moon seems to change shape because of its position to the Earth and how much sunlight is shining on it. Each shape is called a phase. The Moon's phases repeat each month.



### Stars

Possible answer: Stars are made of hot, glowing gases that give off heat and light. Stars can be different colors and sizes, and some of them make patterns in the sky.

# Think, Talk, and Write

## 1 Vocabulary. What is an orbit?

The path an object takes around something in space.

## 2 Predict. What do you think the Moon will look like a week after a new moon?

What I Predict	What Happens
Possible answers: I will see a part of the Moon.	Possible answer: I see a first-quarter moon. The Moon has completed one quarter of its orbit around Earth.

## 3 Why does the Moon appear to move in the sky?

Possible answer: The Moon appears to move because Earth is rotating.

## Essential Question How does the night sky change?

Possible answer: The shape of the Moon appears to change slowly over one month. The Moon and stars seem to move across the sky in one night.

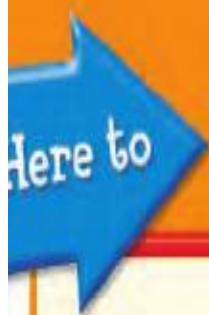
## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Art Link

Review the picture of the Little and Big Dipper. Have children draw a pattern of stars on paper. Encourage them to make their stars different sizes and levels of brightness. Ask children to name their star pattern and write a sentence to tell why they gave it that name.



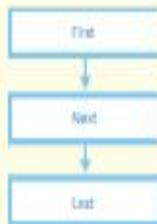
# Plan Your Lesson

## Lesson 3 The Solar System

### Essential Question

How are the planets alike and different?

### Reading Skill Sequence



### Objectives

- Explain the relationship between the planets and the Sun.
- Describe the planets in the solar system.

You will need a sequence graphic organizer.



### FAST TRACK

Lesson Plan When time is short, follow the Fast Track and use the essential resources.

#### **1** Introduce

Look and Wonder

#### **2** Teach

Read a Diagram

#### **3** Close

Think, Talk, and Write

## Lesson 3 The Solar System

### Objectives

- Explain the relationship between the planets and the Sun.
- Describe the planets in the solar system.

# 1 Introduce

### ► Assess Prior Knowledge

Have children share what they know about the solar system. Ask:

- What are some words that describe the solar system?
- What objects are in the solar system?
- How do scientists learn about the solar system?

Record children's answers in the What We Know column of the class KWL chart.

# The Solar System



## Warm Up

### Start with a Visual

Show children photographs of a NASA space shuttle and a NASA Mars Rover. Explain that people travel into space on the shuttle, but the shuttle stays close to Earth. Machines with no onboard staff, such as a Mars Rover, explore space farther from Earth. These machines have special tools that collect data about rocks and minerals. The Mars Rover helped scientists discover that Mars had water on it at one time. Ask:

- Why is it important to learn about other planets?

Possible answer: People study other planets to find out how they are similar and different from Earth.

Tell children it took the Rover over two and a half years to reach Mars, the planet closest to Earth. Discuss with children the varying distances between the planets and the Sun. Some are closer to the Sun than Earth, and others are far away.

## Look and Wonder

### Before You Read

Earth orbits the Sun. How do other planets move?

Possible answer: Like Earth, other planets also revolve around the Sun.

### Essential Question

How are the planets alike and different?

## Look and Wonder

Read the Look and Wonder question about planets.

Invite children to share their responses to the question. Ask:

- What do you think Earth would look like from space? Possible answers: round, blue, brown, green.

Write children's responses on the class KWL chart and note any misconceptions they may have.

### Essential Question

Have children read the Essential Question. Tell them to think about it as they read through the lesson. Advise children that they will return to this question at the end of the lesson.



## Explore



whole class



20 minutes

**Plan Ahead** Have plenty of 45 x 60 centimeter poster or construction paper available for children whose orbit paths become large. Consider providing string or yarn for children to measure drawn orbits.

**Purpose** Making models helps children visualize large-scale planetary actions. This model will allow children to conceptualize how the size of an orbit changes depending on a planet's distance from the Sun.

### Structured Inquiry

#### What to Do

Review with children how long it takes Earth to orbit the Sun. Ask: If Earth was closer to the Sun, how long would it take to orbit the Sun?

- 1 **Make sure** when children draw the Sun that they allow enough room for their orbit circles.
- 2 **Measure** Have children look at the photograph to see how the Xs should be aligned.
- 3 **Make a Model** Ask children to use their rulers to draw Xs to the left of the Sun so the full path of each orbit will be the same distance from the Sun as the Xs on the right. Children may prefer to make each orbit a different color.
- 4 **Draw Conclusions** Encourage children to measure their orbits with string to compare the lengths. Have children think about a planet's orbit in relation to its distance from the Sun. Ask: How would a planet orbiting closer to the Sun be different than a planet orbiting farther away from the Sun? **Possible answer:** The closer planet might be warmer than the planet farther away.

## How are orbits alike and different?

### What to Do

- 1 **Draw** the Sun in the middle of poster paper.
- 2 **Measure.** Draw an X 6 centimeters to the right of the Sun. Measure another 6 centimeters from that spot. Draw another X.



Step 2

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EXPLORE

**3 Make a Model.** Draw a path around the Sun for each X. Each path shows an orbit.

**4 Draw Conclusions.** Which orbit is larger? How do you know?

Possible conclusion: The planet farther away would have a larger orbit. A

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planet orbiting closer to the Sun would have a smaller orbit.

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#### Explore More

**5 Make a Model.** Continue drawing Xs until you have 8 Xs. Show which orbit is largest.

Students' orbits should be numbered from smallest to largest, with the

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largest being the planet orbiting farther from the Sun.

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#### Open Inquiry

Investigate the shapes of orbits. My question is:

Sample question: How does the size and shape of an orbital path affect the  
length of time it takes to complete it?

---

**Guided Inquiry****Explore More**

**5 Make a Model** Have children number their orbits from smallest to largest.

**Open Inquiry**

Ask children to share their thoughts on the shapes of orbits. List the planets and moons and children's predicted orbit shapes. Encourage children to choose an orbital path and research its shape. They may also explore the time elapse for the completed orbit. Provide references to assist their research.

**Alternative Explore****How long does it take to complete an orbit?**

Have children use a model to **compare** the length of time it takes to travel around different sized orbits. Use string to make four circles on the floor around a chair. **Measure** each circle one meter from the previous circle.

Ask children to compare how long it takes to walk around each orbit. Guide children to **draw conclusions** about the size of an orbit and the length of time it takes to complete it.

## Read and Respond.....

### What goes around the Sun?

We live on the planet Earth. A **planet** is a huge object that moves around the Sun. Our **solar system** is made of planets, moons, and the Sun. Solar means “of the Sun.” The picture below shows the eight planets in our solar system.

#### The Solar System

#### Quick Check

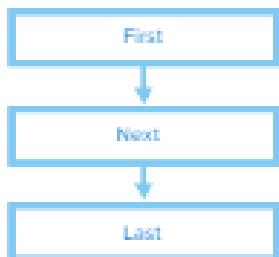
Fill in each blank.

1. Earth is one of the \_\_\_\_\_ in the \_\_\_\_\_.

# 2 Teach

## Read and Respond

Reading Skill **Sequence** The order in which things happen.



### What goes around the Sun?

#### ► Discuss the Main Idea

**Main Idea** The solar system has eight planets orbiting the Sun at the center.

Before reading, ask children to describe what they see in the sky during the day and at night.

After reading together, ask:

- How are the planets in the solar system the same? **They all orbit the Sun.**

Review how it takes Earth about a year to orbit the Sun. Ask:

- Why does it take Saturn a longer time to orbit the Sun than Earth? **It is farther away from the Sun than Earth.**

## Science Background

**Is Pluto a Planet?** Until recently, Pluto was considered a planet. A 2006 decision by the International Astronomical Union (IAU) reclassified Pluto as one of several dwarf planets. The IAU will probably announce more dwarf planets in coming years.

## LA Support

**Use Acrostic Poem** Create an acrostic poem for the word Sun. Provide children with sample words or phrases for each letter that describes the Sun. For example: Star; *Unable to touch; No planet is bigger*. Use repetition and visual aids to reinforce the words or phrases.

**BEGINNING** Have children practice saying the words or phrases for each letter.

**INTERMEDIATE** Encourage children to use short phrases to describe the Sun.

**ADVANCED** Have children write sentences about the Sun.

## Read a Diagram

Point out to children that the diagram does not show the complete orbit of each planet because the distances of the planets in the outer solar system are much farther away from the Sun. The distances and shape of the orbits are not exact in the diagram. Ask:

- Which is the largest planet in the solar system?  
**Jupiter**
- Which planet has the largest orbit? **Neptune**
- Why might Uranus and Neptune be colder than Earth? **They are farther away from the Sun.**

Have children compare how the Sun's heat might be felt on the planets closest to it and on the planets farthest away from it.

### ► Develop Vocabulary

**planet** *Word Origin* The root words of *planet* are the Latin *planeta* and the Greek *planetes* or *planes*, which means "to wander." Ask: How do the planets wander around the Sun? **in orbits**

**solar system** *Word Origin* Solar comes from the word *solaris*, which means "relating to the Sun." A *system* is "a group of bodies interacting in an orderly way." The planets in the *solar system* all interact by orbiting the Sun. Identify other words or phrases that contain the word *solar*, such as *solar panel*, *solar energy*, or *solar eclipse*, and have children apply what they have learned about solar to figure out the meanings.

The Sun is at the center of the solar system. The Sun is the strongest and brightest part of the solar system.

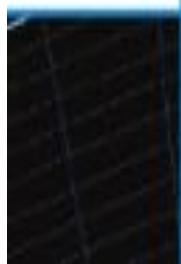
Like Earth, each of the planets moves around the Sun. Planets closest to the Sun take less time to make one trip around it.

Planet	Orbit Time
Mercury	88 days
Venus	225 days
Earth	365 days
Mars	687 days
Jupiter	12 years
Saturn	29 years
Uranus	84 years
Neptune	165 years

### Read a Diagram

How many planets are closer to the Sun than Earth is? What are they?

two; Mercury and Venus



# Differentiated Instruction

## Leveled Activities

**EXTRA SUPPORT** Have children draw and label pictures of each planet. Make photographs and descriptions of the planets available for reference. With children's help, post their pictures around the classroom in the order of their distance from the Sun.

**ENRICHMENT** Have children use the library to research one planet in more detail. Encourage them to create a poster about their chosen planet. Provide time for children to make a presentation to the class about their planet.

## What are the planets like?

### ► Discuss the Main Idea

**Main Idea** All eight planets in our solar system orbit the Sun, but each planet is quite different and unique.

After children read the next couple of pages, ask:

- How can you check whether the planets are shown in the correct sequence? **Possible answer:** Check them against the order of the planets shown in the text.
- How many planets have more than one moon? **Possible answer:** five; Mars, Jupiter, Saturn, Uranus, Neptune

### ► Use the Visuals

Play a game of “I Spy” to encourage children to study the details in each picture. For example, say: *I spy the smallest planet* and have children point to the smallest planet. Ask a volunteer to read its description aloud.

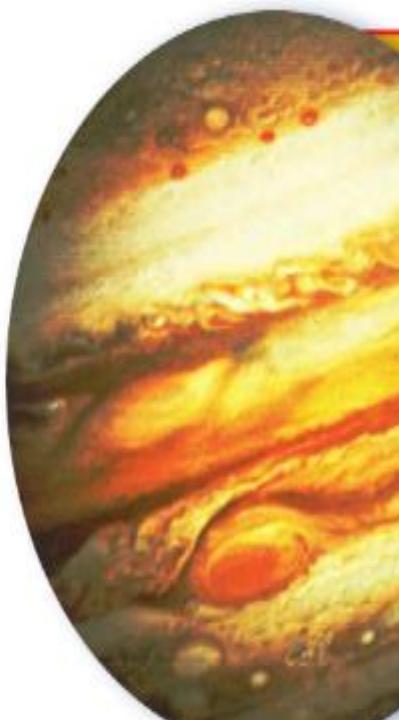
Invite children to spy the reddest planet, the planet closest to the Sun, the planet with the most moons, and so on. Continue playing the game until all of the descriptions have been read.

## What are the planets like?

Each planet in our solar system is different. Look at the pictures and captions to learn about each planet.

### Inner Planets

	<b>Mercury</b> is the closest planet to the Sun. It is rocky like our Moon.	<b>Venus</b> is the hottest planet! Thick clouds trap the Sun's heat.	<b>Earth</b> water air. It has a moon.
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# Quick Lab



individual

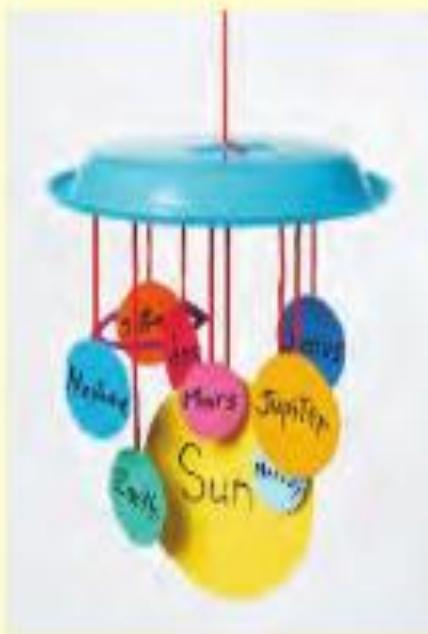


15  
minutes

**Objective** Make a model of the solar system.

You need paper plates, string, scissors, tape, crayons, construction paper

- 1 Have children poke nine holes in a paper plate, one for each planet and the Sun.
- 2 Ask children to cut a large circle for the Sun, medium circles for the four largest planets, and small circles for the other four planets. Have them color and label each planet, and tape each to a piece of string.
- 3 Instruct children to pull each string through a hole in the plate and tie a knot. Challenge children to hang the planets **in order**, from closest to the Sun to the farthest.



 **Quick Check**

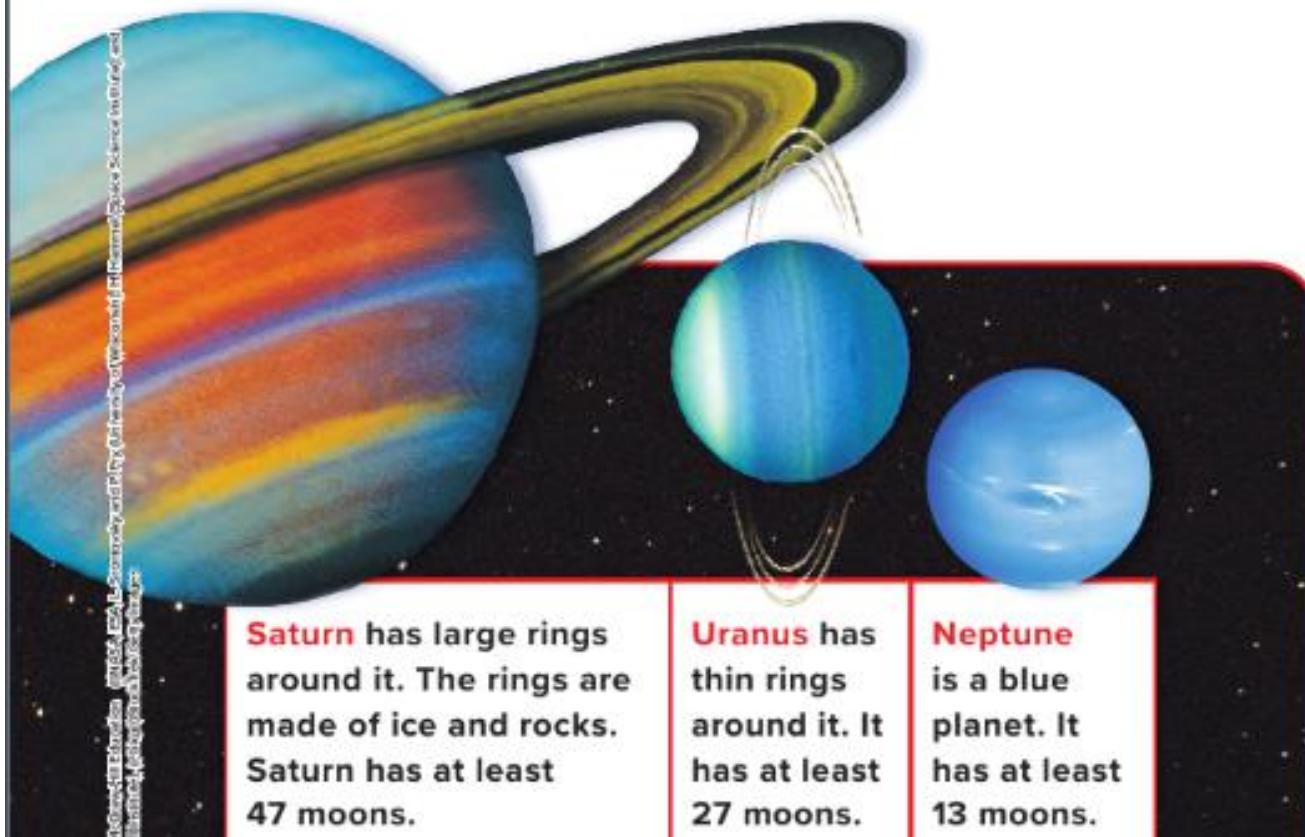
2. What is in our solar system?

the Sun; planets; moons

3. List two ways Saturn and Uranus are different.

Saturn has large rings and Uranus has thin rings.

Saturn has more moons than Uranus.



Saturn has large rings around it. The rings are made of ice and rocks. Saturn has at least 47 moons.

Uranus has thin rings around it. It has at least 27 moons.

Neptune is a blue planet. It has at least 13 moons.

## ► Develop Vocabulary

Reinforce lesson vocabulary by encouraging children to write a definition for *planet* by describing what is the same about the planets in the diagram. For example: *A planet is a large object in space that orbits the Sun.*

## ► Address Misconceptions

Children may think that all planets are rocky. Explain that some planets are made mostly of gases. With no solid material, people would not be able to walk on those planets.

## Formative Assessment

### Naming the Planets

Distribute a pre-drawn diagram showing the Sun with the eight planets in the correct order from the Sun. Label the planets 1 to 8.

The planet closest to the Sun is number 1.

On a separate piece of paper, have children write the number of each planet, its name, and a sentence describing it.



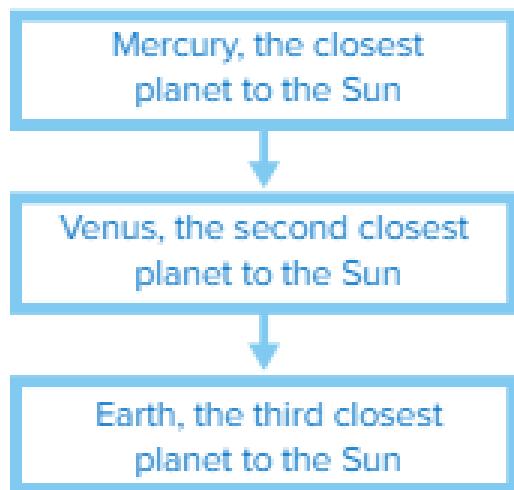
# 3 Close

## ► Using the KWL Chart

Review with children what they have learned about the planets in the solar system. Record their responses in the What I Learned column of the class KWL chart.

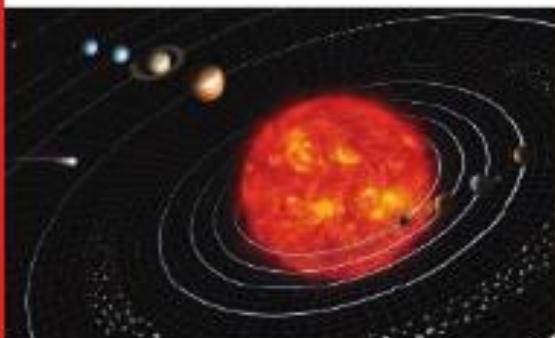
## ► Using the Reading Skill Sequence

Use the reading skill graphic organizer to sequence the order of the planets closest to the Sun.



## Visual Summary

Write about what you learned.



### Solar System

Possible answer: Our solar system

is made of planets, moons, and the

Sun. The Sun is the center of the solar

system. There are eight planets that

orbit the Sun.



### Planets

Possible answer: There are four inner

planets and four outer planets. Jupiter

is the largest planet. Mercury is closest

to the Sun and very hot. Saturn has

large rings made of ice and rocks. Each

planet has different numbers of moons.

## Think, Talk, and Write

**1 Vocabulary.** What is a planet?

a huge object that moves around the Sun

**2 Sequence.** List the eight planets in order. Start with the planet closest to the Sun.

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

**3** Which planets have rings?

Saturn and Uranus

**Essential Question** How are the planets alike and different?

Possible answers: All the planets in our solar system move around the Sun.

Planets may be different sizes or colors. They may have different features on

their surface. Some planets have moons or rings while other planets do not.

## Essential Question

Remind children that they read this question at the beginning of this lesson. Have them use what they learned to write a response.

Children should demonstrate that they have an understanding of the lesson material.

## Math Link

Ask students to determine which planet has the longer orbit: Saturn or Jupiter. How much longer is it? Help children set up a subtraction equation using the information on the orbit times of Jupiter and Saturn. Make sure they put the larger number, Saturn's orbit time (29), above the smaller number, Jupiter's orbit time (12). Invite children to check their answers with a partner.

## Reading in Science

### Objective

- Explain how people use stars to navigate.

### Starry, Starry Night

**Genre: Nonfiction** Stories or books about real people and events.

Have children look at the pictures and read the captions. Ask:

- What is this article about? **Possible answer:** How people have used stars to find their way.

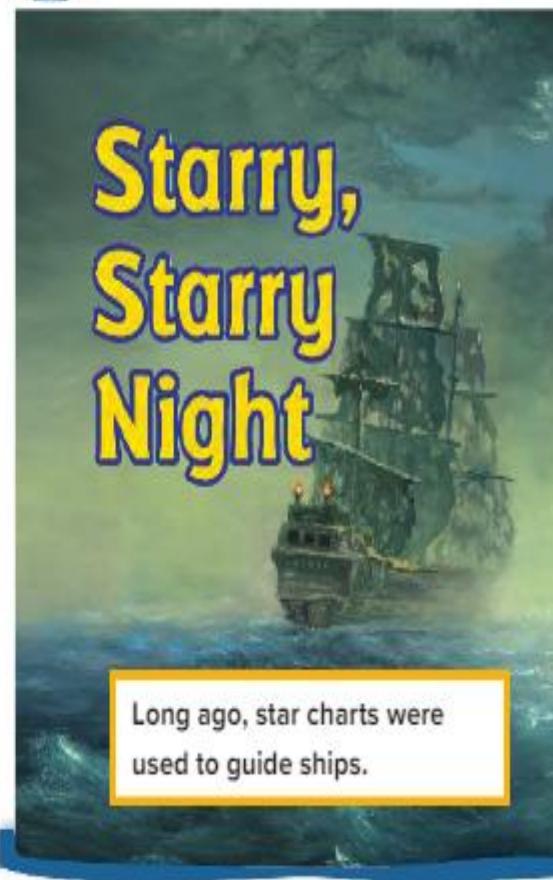
### Before Reading

Encourage children to think about how they can describe their location in the classroom. Point out nearby, large objects, such as chairs, desks, or doors, they might use to describe their relative position. Ask:

- How could you describe where you are sitting? **Possible answer:** by describing a nearby object
- If the items around you moved, would it be easier or more difficult for a person to find you again? **Possible answer:** It would be more difficult because that person may look for the item to find me and it may have moved far away from me.



### Reading in Science



Long ago, star charts were used to guide ships.

Look at the starry night sky. How could looking you?

Thousands of years ago, ancient sailors used to find out which way was north. This star appears to the North Pole. The North Star is also called these both good names for the star?

Today, people still use stars for directions. Astronomers use star charts to guide telescopes in space and on Earth. They show millions of stars!

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EXTEND

## During Reading

Read the text together. Help children to understand that the North Star or Polaris are good names for that star because it is appears in the sky closest to the North Pole. Ask:

- What is the first step in finding the North Star? **find the Big Dipper**
- How could you tell if a particular star moved in the night sky over time? **Possible answer: You could observe the star and make a map of the star's position in the sky from week to week.**

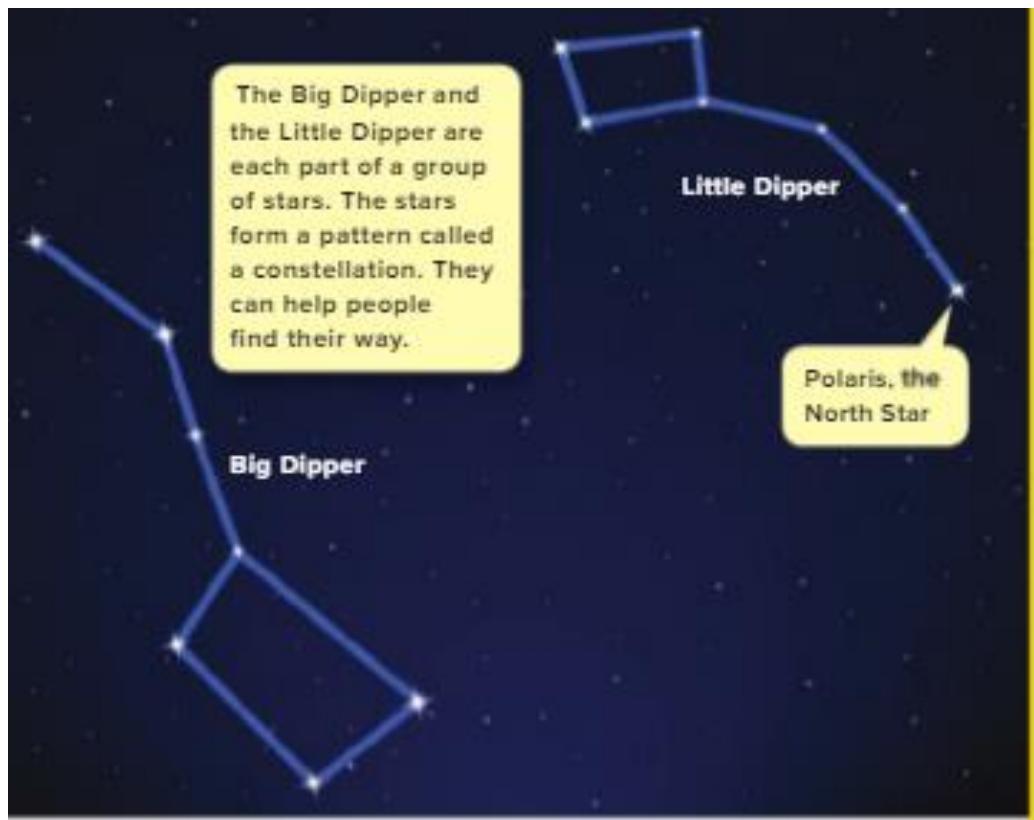
### LA Support

**Use Visual Information** Walk students through *How to Find the North Star* as they trace the lines in the picture above it. Ask: **Why do sailors need to find the North Star?** Have students work in groups to find the answer in the article.

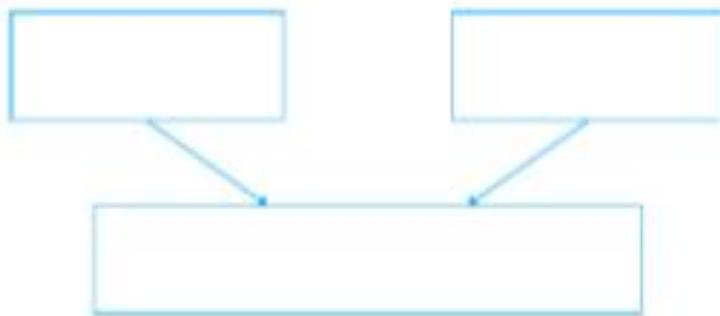
**BEGINNING** Have children point to and say: *Big Dipper, Little Dipper, and North Star.*

**INTERMEDIATE** Ask children to use words and phrases to explain how sailors used stars as a guide.

**ADVANCED** Encourage children to use complete sentences to explain how to find the North Star, and how stars can be used as a guide.



**Summarize.** List the most important ideas in the chart below. Then summarize the article.



## ► Address Misconceptions

Constellations like Ursa Minor look like a connect-the-dots picture, but this flat pattern is an illusion. Stars exist in a three-dimensional space, where some stars are actually billions of miles farther away than others.

## After Reading

Have children read “How to find the North Star”.

Point out that doing the steps of a task in the correct order will yield the best results.

Draw a sequence graphic organizer on chart paper. Explain to children that sequencing means putting events in the order in which they happen. Ask:

- To find the North Star, what is the first thing you have to do?
- What do you do next?
- What is the last thing you need to do?

Write children’s responses in the appropriate boxes of the graphic organizer.

Find the Big Dipper.



Find the two stars that form the outside of the Big Dipper.



Follow the line up to the last star of the handle of the Big Dipper.  
That is the North Star.

Review the pictures and captions in the article. Have children point to the illustration that most resembles a star chart and explain why it is a type of star chart. If necessary, explain that it appears to be a small map of the stars in the night sky.

Ask a volunteer to read aloud “How to find the North Star.” Discuss how there are few landmarks in open water, and how knowing one of the cardinal directions could help people steer in the direction in which they wanted to go.

# CHAPTER 10 Review

## ► Use the KWL Chart

Review the KWL chart that the class made at the beginning of the chapter. Help children compare what they know about Earth and space now with what they knew then. Add any additional information to the What We Learned column of the KWL chart.

## CHAPTER 10 Review

### Vocabulary

Use each word once for items 1–6.

1. The planets, the Moon, and the Sun make up our solar system.
2. The Moon's changing shapes are called phases.
3. We have day and night because Earth rotates once every 24 hours.
4. Our solar system has eight planets.
5. Every year Earth makes one orbit around the Sun.
6. This bright, hot star is also known as our Sun.

orbit  
phases  
planets  
rotates  
solar  
system  
star

## Science Skills and Ideas

Answer the questions below.

7. What season do you think this photo shows? Why?

Possible answers: It is spring or

summer. The grass is green and

flowers are blooming.



8. **Draw Conclusions.** Describe how Earth and the Moon travel around the Sun. Use balls and a flashlight to help describe what happens.



Have children make a drawing of how they modeled Earth and the Moon orbiting around the Sun each year.

# CHAPTER 10 Review

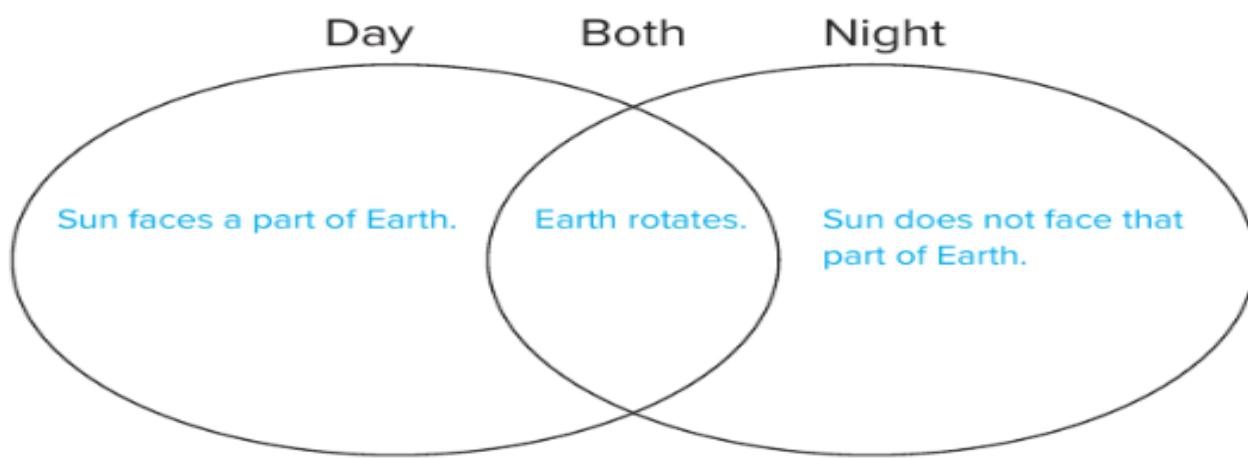
## Science Skills and Ideas



10. **Accept all reasonable answers.** Children should address the concepts taught in each lesson: Earth rotates on its axis, causing day and night; as Earth orbits the Sun it is tilted on its axis causing the seasons; the Moon orbits Earth causing the moon phases; moons and planets all orbit the Sun in our solar system.

## CHAPTER 10 Review

9. **Compare and Contrast.** How are day and night different? How are they alike?



10. How do things move in the sky?

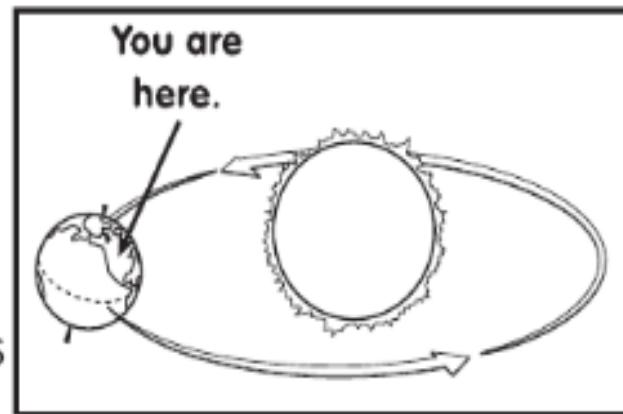
Accept all reasonable answers.

## Test Prep

1. Look at the picture.

What do you know  
about where you are?

- A It is daytime and it is summer.
- B It is nighttime and it is summer.
- C It is daytime and it is winter.
- D It is nighttime and it is winter.



3. How are all of the eight planets alike?

- A They are the same size.
- B They travel around the Sun.
- C They have one or more moons.
- D They have rings around them.

## Test Preparation

1. **A: It is daytime and it is summer.** Our side of Earth is turned toward the Sun during the day. Our part of Earth is tilted toward the Sun in summer and away from the Sun in winter.
2. **B: 12:00 noon.** The Sun is low in the sky early in the morning and late in the day. We cannot see the sun at midnight.
3. **B: They travel around the Sun.** All the planets are different sizes. Not all planets have rings or moons.

## Careers in Science

### Objective

- Describe different careers in which people communicate scientific information.

## Science Writer

**Genre: Nonfiction** Stories or books about real people and events.

Explain to children that a title tells what the story will be about. Ask children to list good titles for nonfiction stories about science students, and use children's responses to assess what they know about nonfiction.

### Talk About It

Read the text together. Ask:

- Why do people want to learn about what scientists are doing? **Possible answer:** to find out about the new ways scientists are learning to help people
- Why do science writers have to make their writing easy to understand? **Possible answer:** The reader may not know much about science.

### Learn About It

As a class, have children list helpful article topics, such as news about new medications.

### Write About It

Have children think about a science story they would like to write. Guide children to write an outline for their stories. Have resources available for children to conduct their research.

### Science Writer

If you like to read and write about science, you could become a science writer. Science writers talk to scientists about their work. Then the writers tell about the new things that scientists are learning.

Many science writers work for newspapers and magazines. They have to write about science in a way that makes it easy for others to understand.



science writer

Why do science writers have to make their writing easy to understand?

Possible answer: The reader may not know much about science.

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EVALUATE

### Integrate Writing

#### Science for Kindergarten

Explain to children that they will use what they have learned to write an article about weather or outer space and share their article with a kindergarten child.

Remind children that this is what science writers do. They write about a topic so that people who don't know very much about it can understand the topic.

## Integrate Writing

### Science for Kindergarten

Explain to children that they will use what they have learned to write an article about weather or outer space and share their article with a kindergarten child.

Remind children that this is what science writers do. They write about a topic so that people who don't know very much about it can understand the topic.

Encourage children to pick a topic that they want to **communicate** to a kindergartner. Suggest that they favor topics that their audience is likely to understand. Recommend that children discuss what they want to write with a partner before they begin drafting their articles. Partners may provide pointers for clarifying the information. Ask children to illustrate their pieces, and to work hard to make their scientific illustrations as realistic as possible.

# Chapter **11** Drawing and Graphics

**Objective** Students are introduced to the Drawing and Graphics chapter and are familiarized with the ways people use drawing and graphics applications.

**Prerequisites** Students should be comfortable with using the mouse and basic navigation skills before beginning this chapter.

**What to Expect** Students who have been exposed to an arts curriculum will have a familiarity with most of the material covered in this chapter.

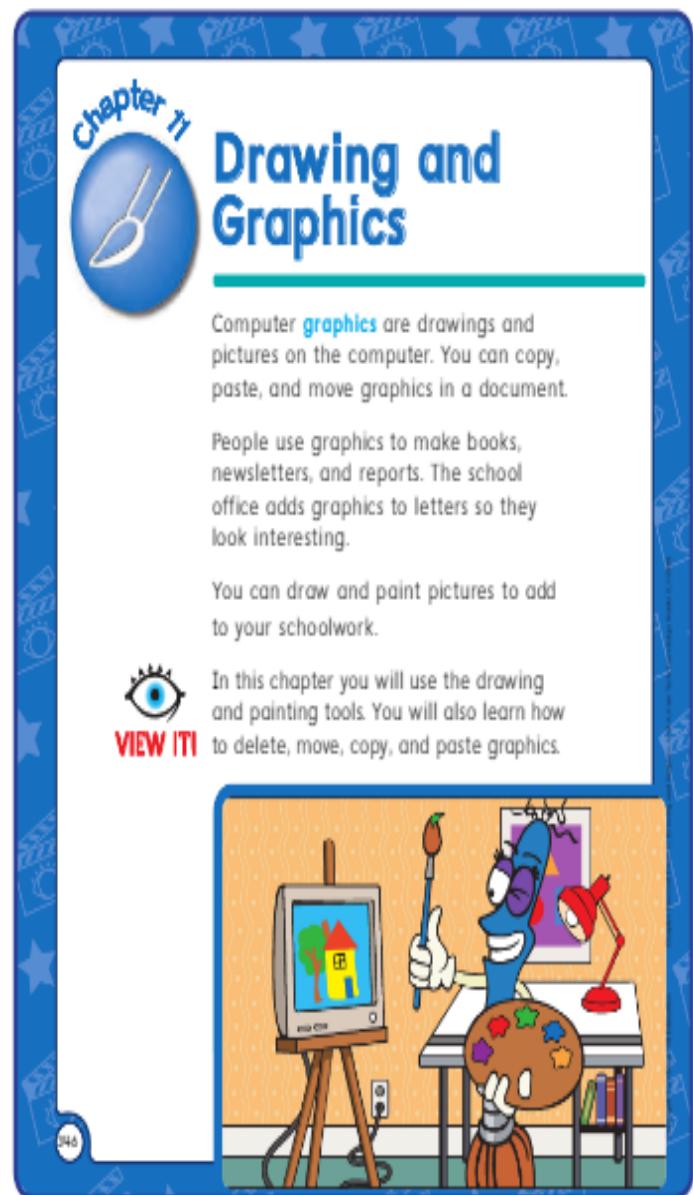
*"You will learn about drawing and graphics and the ways people use drawing applications."*

- Read the Chapter Opener together.
- Ask students to share how they could use drawing and graphics when doing school or personal projects.

## Informal Assessment



Ask students to identify jobs that might use drawing and graphics skills.



**Chapter 11**

## Drawing and Graphics

Computer **graphics** are drawings and pictures on the computer. You can copy, paste, and move graphics in a document.

People use graphics to make books, newsletters, and reports. The school office adds graphics to letters so they look interesting.

You can draw and paint pictures to add to your schoolwork.

**VIEW IT!**



## What Are . . .

# What Are . . .

## **Drawing and Graphics**

Computer graphics are versatile tools that are used in many different daily applications. Computer graphics are images or pictures that are created, displayed, or stored on a computer. Illustrations, photographs, clip art, and graphs are all examples of computer graphics.

Drawing refers to the way that graphics are created. The tools people use to draw computer graphics vary with each computer program. To learn how drawing programs work, students will be using simple paint and draw programs, so the choice of drawing tools is limited. Professional graphic artists use much more sophisticated programs to create illustrations and graphics on the computer.

## LESSON 1

# The Paintbrush Tool

**Objective** Students will learn to use the Paintbrush tool to make a picture.

*"You are going to use the Paintbrush tool to make a picture."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate selecting and using the Paintbrush tool.
- Students might not be proficient in manipulating the mouse with the accuracy needed to draw a picture, so allow them time to practice.
- You might want to introduce The Paintbrush Tool and The Erase Tool together as students might want to learn how to erase their work.
- Students' pictures will be drawn in the default color (usually black).
- If students save their files, make sure they each choose different file names for later identification.
- Have students complete the lesson. Award 15 points upon completion.

**FYI** Students should use *Paint* if using *Windows*. For *Macintosh*, they can download one of the many free painting programs available on the web.

## Informal Assessment



Observe students' monitors as they use the Paintbrush tool.

## Technology Challenge

Click Image and then show students how they can use the Flip/Rotate command.

## Language Acquisition

### *Paintbrush*

Show and explain the purpose of a paintbrush to the class, and compare it to the Paintbrush tool.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file and draw a fishing boat.

- ◆ Award 5 points for completing the Extra Credit.



# The Eraser Tool

**Objective** Students use the **Eraser** tool to edit.

*"You can use the Eraser tool to edit your pictures."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Eraser tool.
- ◆ Have students complete the lesson. Award 15 points upon completion.

### Informal Assessment



Observe students' monitors as they use the Eraser tool.

### Technology Challenge

Show students the **Clear Image** command in the **Image** menu.

### Language Acquisition

#### *Pencil eraser*

Show and explain to students what a pencil eraser is, and then compare it to the Eraser tool.



### Integration

#### EXTRA CREDIT



Have students open a paint or draw file, draw three squares, and then erase one.

- ◆ Award 5 points for completing the Extra Credit.



# The Color Palette

**Objective** Students use the Color Palette and Paintbrush tool to make a picture.

*"You can use the Color Palette to add color to your pictures."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Color Palette.
- Explain that the computer's Color Palette is like an artist's palette.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** In *Paint* click directly on a color in the Color Palette.

### Informal Assessment



Observe to see whether students can change colors on the Color Palette. If you have a color printer, have students print their work.

## Technology Challenge

Show and explain to students the **Define Custom Colors** option in the **Image** menu, and see which colors they can create and use.

## Language Acquisition

### *Artist's palette*

Show and explain what an artist's palette is, and compare it to the Color Palette in the graphics program.



## Integration

### EXTRA CREDIT



Tell students to open a paint or draw file. Then have them draw and color a plant for a science project.

- ◆ Award 5 points for completing the Extra Credit.



## Chapter 11 Drawing and Graphics

### LESSON 2

# The Spray Can or Airbrush Tool

**Objective** Students use the Spray Can or Airbrush tool to make a picture.

*"You can use the Spray Can or Airbrush tool to make a picture."*



- Direct students' attention to the screen as you demonstrate how to select and use the Spray Can or Airbrush tool.
- You may want to have students open a new file for Steps 4 through 6.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** To change the spray size in *Paint*, select one of the pictures underneath the drawing tools when the Airbrush tool is selected.

### Informal Assessment



Observe to see whether students can use the Spray Can or Airbrush tool and change the spray size.

## Language Acquisition

### *Spray can or Airbrush*

Demonstrate and explain what spray cans and airbrushes are, and compare them to the Spray Can or Airbrush tool.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file. Tell students to think about their favorite books and draw interesting book covers for them.

◆ Award 5 points for completing the Extra Credit.



## Chapter 11 Drawing and Graphics

# The Shape Tools

**Objective** Students select and use the **Shape** tools to draw pictures.

*"You can select several different Shape tools to create pictures."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Shape tools.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** In *Paint*, left-click a color in the Color Palette to choose the border color, and right-click to select a fill color. The Polygon Shape tool might be difficult for some students to use. To use the tool, click once after drawing each line of the polygon. Double-click to finish the shape.

### Informal Assessment



Observe students' monitors to see whether they can make pictures using different Shape tools.

## Technology Challenge

Show the students the **Stretch** and **Skew** commands in the **Image** menu by drawing shapes with the Shape tools and altering them using these commands.

## Language Acquisition

### Polygon

Explain to students that the root of *polygon* is *poly-*, which means “many.” Tell students that a polygon is a shape with many sides.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file. Then have them

draw and color a design using five different shapes.

- ◆ Award 5 points for completing the Extra Credit.





# The Fill Tool

**Objective** Students use the Fill tool to color shapes and backgrounds.

*"You can use the Fill tool to color shapes and backgrounds."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Fill tool.
- ◆ Have students complete the lesson. Award 15 points upon completion.

### Informal Assessment



Observe students' monitors as they make pictures and add color using the Fill tool.

### Technology Challenge

Demonstrate how to use the **Invert Colors** command in the **Image** menu to change colors.

### Language Acquisition

#### *Empty*

Demonstrate and explain the word *empty*. Draw a square or circle on the board and use chalk and an eraser to fill and empty it.



### Integration

#### EXTRA CREDIT



Have students open a paint or draw file. Have them draw a rocket and fill it with color.

◆ Award 5 points for completing the Extra Credit.



### LESSON 3

# The Line Tool

**Objective** Students use the **Line** tool to make a straight line and a picture.

*"You can use the Line tool to make a straight line and a picture."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Line tool.
- Teach students how to e-mail ideas for their pictures to classmates when working on group projects.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** To choose a line color in *Paint*, left-click a color in the Color Palette. To change the width of the line, select a line width from underneath the tools when the Line tool is selected.

### Informal Assessment



Observe students' monitors as they use the Line tool to make a straight line and a picture. Have students print their drawings as a record of their work.

## Technology Challenge

Demonstrate how to set artwork as wallpaper on the desktop. After completing a picture, select the **File** menu and then select **Set as Background (centered)**.

## Language Acquisition

### *Line*

Demonstrate what a line is by drawing one on the board.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file.

Then have students draw a building using straight lines.

◆ Award 5 points for completing the Extra Credit.



## Chapter 11 Drawing and Graphics

# The Pencil Tool

**Objective** Students use the **Pencil** tool to draw simple figures.

*"You can use the Pencil tool to draw simple figures."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Pencil tool.
- ◆ Have students complete the lesson. Award 15 points upon completion.

### Informal Assessment



Observe students' monitors as they use the Pencil tool to create designs.

Have students print their designs as a record of their work.

### Language Acquisition

#### Pencil

Demonstrate what a pencil is and how it is used. Show students how the Pencil tool is like a pencil in the computer.



### Integration

#### EXTRA CREDIT



Have students open a paint or draw file.

Have them draw and design the letters *UAE*.

◆ Award 5 points for completing the Extra Credit.



## Chapter 11 Drawing and Graphics

# Text Boxes

**Objective** Students use the Text tool to insert a text box and label a picture.

*"You can use the Text tool to label a picture."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Text tool.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** In *Paint*, the text color is the same as the background fill color. Students are taught to change text box fonts in the next level.

### Informal Assessment



Observe students' monitors as they make pictures and insert text boxes to label them.

## Technology Challenge

Show students how to use the **Text Toolbar** by right-clicking the text box.

## Language Acquisition

### Text

Demonstrate what *text* is by holding up a book or magazine and pointing out the different kinds of text, such as headlines and body text.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file. Have them draw a bug and label it.

- ◆ Award 5 points for completing the Extra Credit.



## Chapter 11 Drawing and Graphics

### LESSON 4

# Delete Graphics

**Objective** Students use the **Select** tool to delete a graphic.

*"You can use the Select tool to delete a graphic."*



- Direct students' attention to the screen as you demonstrate how to select and use the **Select** tool.
- Make sure students do not confuse the rectangular **Select** tool with the **Rectangle Shape** tool.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** A selected graphic can be deleted by selecting **Cut** from the **Edit** menu.

### Informal Assessment



Observe students' monitors as they use the **Select** tool to delete part or all of a graphic.

## Language Acquisition

### Select

Demonstrate to the class the word *select* by selecting a student or students to come to the board to share their work with the class.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file.

Have students draw a face using the Paintbrush tool. Have them delete part of the face.

◆ Award 5 points for completing the Extra Credit.





## Chapter 11 Drawing and Graphics

# Move Graphics

**Objective** Students use the **Select** tool to highlight and move a graphic to another place within the same document.

*"You can use the Select tool to highlight and move a graphic to another place within the same document."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Select tool to move a graphic.
- Have students draw a picture that is small and easy to move.
- Teach students how to print their pages.
- ◆ Have students complete the lesson. Award 15 points upon completion.

### Informal Assessment



Observe students' monitors as they use the Select tool to move graphics within a document.

## Technology Challenge

Demonstrate how to flip or rotate a graphic using the Select tool. Highlight a graphic. Then go to the **Image** menu and select **Flip/Rotate**. Choose from **Flip horizontal**, **Flip vertical**, and **Rotate by angle**.

## Language Acquisition

### *Graphic*

Demonstrate and explain what a graphic is by holding up a magazine or book. Explain that the graphics in these materials are similar to what the students are creating on their computers.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file. Then have them draw the moon and move it across the paint area.

- ◆ Award 5 points for completing the Extra Credit.



# Rotate and Flip Graphics

**Objective** Students use the Rotate or Flip option to change the direction of a graphic.

*"You can use the Rotate or Flip tool to change the direction of a graphic."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Rotate or Flip option to change the direction of a graphic.
- Have students draw a picture. Then, ask them to rotate it right 90° and flip it vertically.
- ◆ Have students complete the lesson. Award 15 points upon completion.

### Informal Assessment



Observe students' monitors as they use the Rotate or Flip option to move graphics in different directions within a document.

## Technology Challenge

Show students how to use Color 1 and Color 2 options. Demonstrate the difference between Color 1 (foreground color) and Color 2 (background color).

## Language Acquisition

### Rotate

Demonstrate what *rotate* is by holding up a picture and point out the different kinds of direction the picture can have, such as left or right, vertical or horizontal.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file. Then have them draw a picture of a butterfly and rotate it 90° (degrees).

• Award 5 points for completing the Extra Credit.





# Copy and Paste Graphics

**Objective** Students use the **Select** tool to copy and paste an image.

*"You can use the Select tool to copy and paste an image."*



- Have students open a new paint or draw file.
- Direct students' attention to the screen as you demonstrate how to select and use the Select tool to copy and paste an image.
- Explain to students that a graphic is selected if they can see handles or marching ants.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** In *Paint*, students can choose to apply either an opaque or a transparent background when cutting and pasting an object.

### Informal Assessment



Observe students' monitors as they duplicate a graphic within the same document.

## Technology Challenge

Demonstrate the **Copy To and Paste From** commands. Have students create another blank paint or draw file so they can copy and paste graphics.

## Language Acquisition

### Copy

Demonstrate the word **copy** by showing students two copies from a copying machine. Explain how the **Copy** command is similar to making copies on a copying machine.



## Integration

### EXTRA CREDIT



Have students open a paint or draw file.

Have students draw a design, and then copy and paste three more designs in the document.

- ◆ Award 5 points for completing the Extra Credit.





## Chapter 11 Drawing and Graphics

### Performance Assessment

# Chapter 11 Test

**Objective:** Students demonstrate an understanding of the material presented in the Drawing and Graphics chapter.

*"Now it's time to show what you learned in the Drawing and Graphics chapter."*

- Review the process for using drawing tools before beginning the assessment.
- Have students open a paint or draw file.

### Formal Assessment



#### Performance Assessment

Check students' work to see that they accurately performed all tasks. Apply the assessment rubric below.

#### Scoring Rubric

Total	Points	
	5	Successfully completed
	3	Completed three steps
	1	Completed one step
	0	Did not complete



## Chapter 11 Drawing and Graphics

### Project

Use Technology to . . .

## Illustrate a Job in Art

**Objective** Students use a drawing and graphics program to create pictures of themselves working at a job.

*"You can use a drawing and graphics program to create pictures."*

- Explain to students that in the Chapter Project they will apply drawing and graphics skills. They can use these skills to make any illustration.
- Discuss with students different types of art-related jobs: advertising, computer graphics, architecture, landscaping, painting, sculpting, weaving. Have students identify the kinds of things a person would do in each job.
- Have students describe the drawing and graphics tools they could use in different aspects of their pictures.
- Allow students to adapt the assignment to make an illustration of something they are currently studying.
- Have students share their pictures in small groups. Each student should describe what his or her classmates' pictures show.
- ◆ Have students complete the Chapter 11 Project using a copy of the Project Scorecard as a checklist for the project's requirements.  
Approximate time needed to complete the project: 30 minutes.

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## Project Assessment



Check students' work to make sure that they accurately performed all of the tasks required. Use the **Project Scorecard** as a rubric to assign a final score for each student.



# Project Scorecard

Art

Use Technology to . . .

## Illustrate a Job in Art

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Basic Computer Skills	Point Value	My Score	FINAL SCORE
<b>Create a picture. (Step 4)</b> Lesson 1: The Paintbrush Tool Lesson 1: The Color Palette <input type="checkbox"/> Lesson 2: The Spray Can or Airbrush Tool Lesson 2: The Shape Tools Lesson 2: The Fill Tool Lesson 3: The Line Tool	4		
<input type="checkbox"/> <b>Insert a text box. (Step 5)</b> Lesson 3: Text Boxes	2		
<input type="checkbox"/> <b>Edit a picture. (Step 6)</b> Lesson 1: The Eraser Tool <input type="checkbox"/> Lesson 4: Move Graphics Lesson 4: Copy and Paste Graphics	4		
<b>SUBTOTAL</b>	10		

Art Skills	Point Value	My Score	FINAL SCORE
<input type="checkbox"/> Use technology to illustrate.	2		
<input type="checkbox"/> Use different colors, lines, and shapes.	2		
<input type="checkbox"/> Express ideas about others' artworks.	1		
<b>SUBTOTAL</b>	5		

# Chapter **12** Internet

**Objective** Students learn to use the Internet.

**Prerequisites** Pointing and clicking are skills needed for viewing the Internet.

**What to Expect** Many students will have used the Internet at home.

*"We are going to learn to use the Internet. It is a wonderful tool for finding information, connecting with other people, and playing games"*

- Read the Chapter Opener together.
- Ask students whether they have Internet access at home.
- Review with students the safety and ethical-use standards.

## Informal Assessment



Ask students to tell what they know about the Internet.

# Browser

**Objective** Students open and close a Web browser and learn Web terminology.



*“The World Wide Web, or the Web as we usually call it, is one part of the Internet. We’re going to begin exploring the Web.”*

- Explain what kinds of information can be found on the Web, and open a Web browser.
- Explain that a browser is needed to view Web pages. Web pages are created by people and stored on computers. Identify the home page.
- Tell students they need to evaluate the information they find on the Internet to see if it is appropriate for what they are working on and from a knowledgeable source.
- Tell students they cannot copy anything from a Web page without the creator’s permission.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** If your Web browser does not automatically open to a home page, change the browser’s preferences (usually found in the Edit menu). Always preview a Web page before providing students the URL.

## Informal Assessment



Ask students questions to see whether they are using the correct terminology.

## Technology Challenge

Show students how to use online **Help** features.

## Language Acquisition

### Browser

Explain to the students that a *Web browser* is a tool that helps us move around the Web.



## Integration

### EXTRA CREDIT



Open the Web browser to a home page about science that is suitable for children. Have the students view the Web page and discuss it.

◆ Award 5 points for completing the Extra Credit.

# URLs

**Objective** Students view a Web page by entering a URL.

*"We are going to learn to use URLs. URLs are addresses that direct the computer to specific Web pages."*



 **Prepare** **Ahead** Select appropriate Web pages for students, and write the URLs on the board. You might want to choose a Web page with a short URL and one with a longer URL.

- Demonstrate how to key a URL using exact punctuation and capitalization. Explain that URL stands for *Uniform Resource Locator* and is like an address for a Web page. It tells the Web browser where to find a Web page.
- Tell students that they will need to evaluate the information they find on the Internet to see if it is appropriate for what they are working on and from a knowledgeable source.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** If a URL is highlighted, the old URL is erased as you type the new one. It is not necessary to key `http://` at the beginning of a URL because most browsers automatically fill that in for you. URLs might be case sensitive. URLs should always be typed as you see them.

## Informal Assessment



Quiz students orally about how they can find a Web page if they have its URL.

## Technology Challenge

Remind students that URLs are case sensitive.

## Language Acquisition

### *Address*

Show students envelopes with addresses. Explain that a *Web address*, or URL, works like a street address.



## Integration

### EXTRA CREDIT



Provide the URL to an art gallery that is suitable for children.

Have the students enter the URL and look at the words and pictures.

- ◆ Award 5 points for completing the Extra Credit.

# Browser Buttons

**Objective** Students use the **Back**, **Forward**, and **Home** buttons to go back and forth between Web pages.

*“We are going to learn to use Browser buttons.”*



## Prepare Ahead

Select a few appropriate Web pages.

- Explain to students that they can “jump” between Web pages using buttons.
- Direct students’ attention to the screen as you demonstrate entering URLs and using the Back, Forward, and Home buttons to move back and forth between pages. Remind students to highlight an old URL to erase it before entering a new URL.
- Tell students that they will need to evaluate the information they find on the Internet to see if it is appropriate for what they are working on and from a knowledgeable

- Tell students that they will need to evaluate the information they find on the Internet to see if it is appropriate for what they are working on and from a knowledgeable source.
- Show students how to use online Help features to evaluate their progress.
- ◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** In general the icons for the browser buttons **Back**, **Forward**, and **Home** are similar on all browsers, with the **Back** and **Forward** buttons to the left of the **Home** button.

## Informal Assessment



Check students' monitors as they enter URLs and use the **Back**, **Forward**, and **Home** buttons to move between Web pages.

## Technology Challenge

You might want to give students more URLs to practice navigation.

## Language Acquisition

### *Back, Forward*

Demonstrate the terms *back* and *forward* by using the words as you move backward and forward.



## Integration

### EXTRA CREDIT



Provide the URL to a Website about animals. Have students enter the URL and use the browse buttons to move between Web pages.

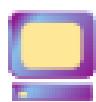
◆ Award 5 points for completing the Extra Credit.



# The Stop and Refresh Buttons

**Objective** Students use the Stop button to interrupt a download.

*"There will be times when you want to stop the computer from downloading something. We are going to learn to use the Stop button."*



**Prepare  
Ahead** Select a Website, to use with this lesson.

- Explain that *downloading* means requesting a Web page from a computer and receiving it. Direct students' attention to the screen as you demonstrate entering a URL and using the **Stop** button to interrupt the download.

- Show students how they can tell whether a page is still downloading. Discuss reasons for using the Stop button, such as the wrong URL was entered, the page is taking too long to load, and so on.
- Tell students that they will need to evaluate the information they find on the Internet to see if it is appropriate for what they are working on and from a knowledgeable source.

◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** All browsers indicate in some way that a Web page is in the process of loading; for example, an icon in the upper-right corner that shows movement of some type or a fill bar in the lower corner of the screen.

## Informal Assessment



Check students' monitors as they enter a URL and use the Stop button to interrupt a download.

## Technology Challenge

Make sure that you have a list of a dozen or so sites for the students to visit.

## Language Acquisition

### Stop

Demonstrate the meaning of the word stop with a toy stop sign and a car, or have the students act out starting and stopping.



## Integration

### EXTRA CREDIT



Provide the URL for your country's Website. Have students enter the URL, and then stop the Web page from downloading.

◆ Award 5 points for completing the Extra Credit.



### LESSON 2

# The Print Button

**Objective** Students use the Print button to print a Web page.

*“Today we are going to learn to print pages from Internet Websites.”*



**Prepare  
Ahead** Select a URL, to use with this lesson.

- Explain that sometimes people need to print a Web page to include with a report or to use for future reference.
- Direct students' attention to the screen as you demonstrate entering a URL and using the **Print** button to print the Web page.

◆ Have students complete the lesson. Award 15 points upon completion.

**FYI** If there is no **Print** button on the Web browser's toolbar, check through Preferences to see whether you can add one.

## Informal Assessment



Students' printed pages can serve as assessment.

### Technology Challenge

Make sure that you have a list of a dozen or so sites for the students to visit.

### Language Acquisition

#### *Print*

Demonstrate the meaning of the word *print* by printing a page from your printer.



## Integration

### EXTRA CREDIT



Provide the URL to a Web site that contains maps of the United Arab Emirates. Have students enter the URL and then print a map.

◆ Award 5 points for completing the Extra Credit.

# Images

**Objective** Students will learn how to download digital images from the Web.

*“Today we are going to learn to download digital images from the Web.”*



## Prepare Ahead

Select a URL, to use with this lesson.

- Explain that sometimes people need to download a picture from a Web page to include with a report or to use for future reference.
- Direct students' attention to the screen as you demonstrate entering a URL, selecting and downloading the digital picture from the Web page.
- You can have students print the digital images they downloaded.

◆ Have students complete the lesson. Award 15 points upon completion.

# Informal Assessment



Observe students' monitors as they follow the steps to download digital images from a Web page.

## Technology Challenge

Teach students how to insert digital images in a presentation or in a word document.

## Language Acquisition

### Digital Image

Explain to students that a *digital image* is a picture that a computer can read.



## Integration

### EXTRA CREDIT



Provide the URL to a Website that contains paintings. Have students enter the URL and then download the image of the painting they prefer.

- ◆ Award 5 points for completing the Extra Credit.



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## LESSON 3

# Hyperlinks

**Objective** Students will learn how to make a hyperlink.

*“Today we are going to learn to make a hyperlink.”*



**Prepare Ahead** Select a URL, that pertains to information about cheetahs, to use with this lesson.

- Explain that sometimes people need to make a hyperlink in a document or in a Web page to redirect readers to a specific Web site for more information.
- Show students how they can tell whether an underlined section in a text is a hyperlink.
- Direct students' attention to the screen as you demonstrate creating a hyperlink.
- ◆ Have students complete the lesson. Award 15 points upon completion.

# Informal Assessment



Observe students' monitors as they follow the steps to make a hyperlink.

## Technology Challenge

Teach students how to make a hyperlink in a presentation.

## Language Acquisition

### Hyperlink

Explain to students that a *hyperlink* is a way of joining words to another Web page so that you can move from one to the other in an easy way.



## Integration

### EXTRA CREDIT



Provide the URL to a Web site that contains information about a famous author. Have students make a hyperlink and then show it in class.

- ◆ Award 5 points for completing the Extra Credit.



# E-mail

**Objective** Students write and send an e-mail message.

*“Today we are going to learn to send e-mail messages.”*



**Prepare Ahead** Bring in a letter and envelope that you received.

- Review what electronic mail (e-mail) is. Show your letter and envelope and discuss the name and address. Explain that we use e-mail addresses to send electronic mail just as we use street addresses or mailbox numbers to send regular mail. Provide students with their e-mail addresses and another student’s e-mail address. Give them your address for the Cc.

**FYI** If the Cc box is not showing, change the program's preferences. The fields might have different names in your e-mail program.

## Informal Assessment



used.

Check the e-mail you received from students. Make sure the fields were filled in and that proper manners were

### Technology Challenge

Discuss how students should respect others' electronic work.

### Language Acquisition

#### Mail

Explain that a person delivers mail to homes and businesses. The computer delivers e-mail (electronic mail).



### Integration

#### EXTRA CREDIT



Provide students with their own e-mail addresses and another student's address. Have students key their favorite poem in an e-mail and send it to a classmate.

- ◆ Award 5 points for completing the Extra Credit.

# Reply to an E-mail

**Objective** Students reply to an e-mail.

*“Today we are going to learn to reply to an e-mail message.”*



## Prepare Ahead

Prepare and send an e-mail with a subject to the students so that it appears in their Inbox.

- Explain that it is important to reply to e-mails we receive from our friends and from people we know. Stress the importance of not providing any personal information on the Web, especially to people we do not know.
- Remind students the appropriate manners to use in e-mail: Be polite and write when you are calm.
- Teach students how to format their text by changing the font size.
- ◆ Have students complete the lesson. Award 15 points upon completion.

## Informal Assessment



Check the e-mail you received from your students.

## Technology Challenge

Teach students the difference between *Reply* and *Reply All*.

## Language Acquisition

### *Reply*

Explain the term *Reply* by asking questions to students and requesting them to answer.



## Integration

### EXTRA CREDIT



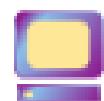
Send an e-mail to students asking them what they learned today. Have students reply to the e-mail.

- ◆ Award 5 points for completing the Extra Credit.

# Delete an E-mail

**Objective** Students delete an e-mail.

*“Today we are going to learn to delete an e-mail message.”*



**Prepare Ahead** Prepare and send an e-mail with a subject to the students so that it appears in their Inbox.

- Explain that it is important to delete e-mails we have already replied to in order to free space for more incoming e-mails.
- Direct students' attention to the screen as you demonstrate deleting an e-mail.
- ◆ Have students complete the lesson. Award 15 points upon completion.

## Informal Assessment



Observe students' monitor as they follow the steps to delete an e-mail.

## Technology Challenge

Teach students other ways to delete an e-mail.

## Language Acquisition

### Delete

Explain the term *Delete* by writing something on the board and then erasing it.



## Integration

### EXTRA CREDIT



Send an e-mail to students. Have students delete the e-mail.

◆ Award 5 points for completing the Extra Credit.



## Chapter 12 Internet

### Performance Assessment

# Chapter 12 Test

**Objective** Students demonstrate an understanding of the material presented in the Internet chapter.

*“Today you will get to show what you know about using the Internet.”*



#### Prepare Ahead

You will need to provide two appropriate URLs for students to access.

### Formal Assessment



#### Performance Assessment

Check students' work to see that they accurately performed all tasks. Apply the assessment rubric below.

## Scoring Rubric

Total	Points	
5	5	Successfully completed
	3	Completed three steps
	1	Completed one step
	0	Did not complete

# Project

**Use Technology to . . .**

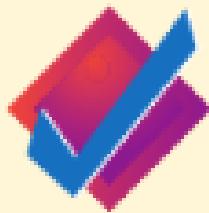
## Research Animals

**Objective** Students use the Internet to research cheetahs, and send an e-mail communicating their results.

*"You can use the Internet to find information about animals."*

- Explain to students that in the Chapter Project they will apply the Internet skills that they learned in this unit. They can use these skills every time they want to do research on the Internet.
- Open a Website of your choice.
- Demonstrate for students how to open other Web pages on a Website by clicking on the links.
- Encourage students to adapt the project to research something they are currently studying.
- ◆ Have students complete the Chapter 12 Project using a copy of the **Project Scorecard** a checklist for the project's requirements.

## Project Assessment



Check students' work to make sure that they accurately performed all of the tasks required. Use the **Project Scorecard** as a rubric to assign a final score for each student.

# Project Scorecard

Science

Use Technology to . . .

## Research Animals

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Basic Computer Skills	Point Value	My Score	FINAL SCORE
<input type="checkbox"/> Open a Web browser. (Step 2) Lesson 1: Open a Web Browser	2		
<input type="checkbox"/> Enter a URL and view a Web page. (Step 3) Lesson 1: URLs	3		
<input type="checkbox"/> Print a Web page. (Step 6) Lesson 2: The Print Button	2		
<input type="checkbox"/> Write and send e-mail messages. (Step 10) Lesson 3: E-Mail	3		
<b>SUBTOTAL</b>	10		

Science Skills	Point Value	My Score	FINAL SCORE
<input type="checkbox"/> Use technology to research an animal.	2		
<input type="checkbox"/> Collect and analyze information	1		
<input type="checkbox"/> Identify characteristics of a living organism.	1		
<input type="checkbox"/> Communicate results of an investigation.	1		
<b>SUBTOTAL</b>	5		

**TOTAL SCORE** \_\_\_\_\_

Teacher Initials \_\_\_\_\_

**Arctic** an icy and cold place near the North Pole.  
Plants in the Arctic grow close to the ground.



**المنطقة القطبية الشمالية** مكان جليدي وبارد قريب من القطبين الشمالي والجنوبي.  
تنمو النباتات في المنطقة القطبية بالقرب من الأرض.



**attract** to pull toward something.  
A magnet can attract some objects.



**جذب** هو الشد تجاه الشيء.  
يمكن للمغناطيس جذب بعض الأجسام.



## B

**brainstorm** to think of as many ideas as possible.  
The children had to brainstorm solutions.



**عصف ذهني** التفكير في أكبر عدد ممكن من الأفكار.  
يحتاج الأطفال لأجراء عصف ذهني بحثاً عن حلول.



**classify** to group things by how they are alike.

You can classify animals by how many legs they have.



**تصنيف** تجميع الأشياء حسب أوجه الشبه بينها.  
يمكنك تصنیف الحیوانات حسب عدد الأرجل  
التي لدى كل منها.



**communicate** to write, draw, or tell your ideas.

You can communicate the ways you can change a piece of clay.

### Changing Clay

1. I roll the clay.
2. I pinched the clay.
3. I squeezed the clay.
4. I poked the clay.

**تواصل** هي كتابة أفكارك أو رسومها أو التعبير عنها أو مشاركتها مع الآخرين.  
يمكنك مشاركة الطرق التي يمكنك من تغيير قطعة سلصال.

### تغيير قطعة سلصال

1. صنعت لدلي قطعة سلصال
2. أمسكت لقطعة سلصال وأرساني
3. دهشت على لقطعة سلصال
4. دهشت رسمت على لقطعة سلصال

**compare** to observe how things are alike or different

You can compare how a cat and a dog are alike and different.



**مقارنة** ملاحظة مدى التشابه أو الاختلاف بين الأشياء.  
يمكنك مقارنة مدى التشابه والاختلاف بين  
القطط والكلاب.



**continent** a large piece of land on Earth.  
There are seven continents on Earth.



**قاره** قطعة يابسة كبيرة من الأرض.  
يوجد في الأرض سبع قارات.



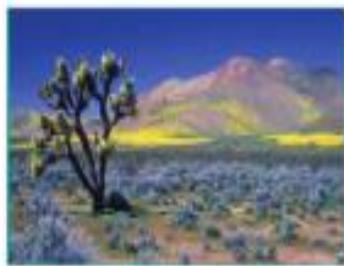
**decompose** when plant and animal parts rot or break down.  
This log will decompose over time.



**تحلل** عملية طبيعية تحدث للإكائنات الحية تؤدي إلى انفصال عناصرها وتحللاها بعد موته الحي بفعل البكتيريا.  
سوف يتحلل جذع الشجرة هذا مع مرور الوقت.



**desert** a dry place.  
Cactus plants can live in the desert.

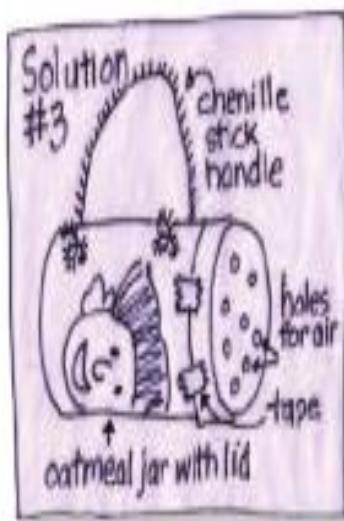


**صحراء** مكان جاف وحار، يتميز بقدرة سقوط الأمطار.  
بإمكان نباتات الصبار أن تعيش في الصحراء.



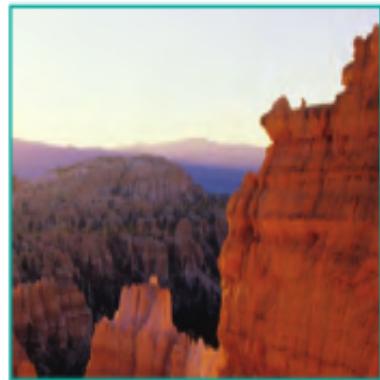
**design** to draw, plan, build, and test an idea. This drawing was made during the design process for a hamster carrier.

**تصميم** رسم فكرة والتخطيط لها وتنفيذها واختبارها. تم عمل هذه الرسمة أثناء عملية تصميم حقيقة لحمل حيوان الهاستر.

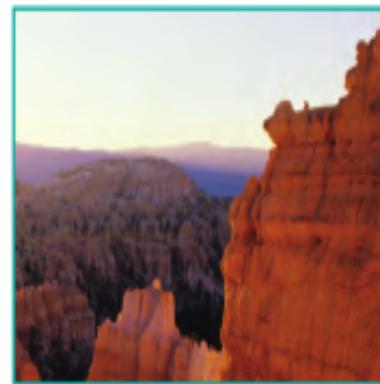


**deposition** the dropping off of weathered rock.

There is much deposition in rocky areas.



**ترسيب** تراكم قنات صخري على شكل طبقات بفعل الرياح و الماء.  
يكثر الترسيب في المناطق الصخرية.



**dissolve** to mix evenly with a liquid and form a solution.

Sugar will dissolve when it is mixed with water.



**ذوبان** امتصاص المادة كلباً بالسائل لعمل محلول.  
سوف يذوب السكر عند خلطه مع الماء.



**draw conclusions** to use what you observe to explain what happens

You can draw conclusions about why the stick will make a shadow.

**استنتاج خلاصات** استخدام النتائج لتفسير ما يحدث.

يمكنك استنتاج السبب الذي سوف يجعل العصا تصنع ظلاماً.

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**erosion** when rock and soil are moved by wind or water to a new place.  
Erosion slowly changes the shape of land.



**تعرية** تحريك التربة والصخور بفعل الرياح أو المياه إلى مكان جديد.  
تغيير التعرية شكل الأرض ببطء.



**extinct** when a living thing dies out and no more of its kind live on Earth.  
Dinosaurs are extinct.



**انقراض** عندما يموت كافن حي ولا يعيش أي فرد من نوعه على الأرض.  
الдинاصور حيوان منقرض.



**flower** a part of a plant that makes seeds.  
Flowers come in many shapes and colors.



**زهرة** جزء من النبات ينتج البذور.  
تتميز الزهور بأشكالها وألوانها المختلفة.



**force** a push or pull on an object.

When you kick a ball, you are using a kind of force.

**قوة** عملية دفع أو شد تمارس على جسم ما. عندما تركل الكرة فإنك تستخدم أحد أنواع القوة.



**fossil** what is left of a living thing from the past.

This fish fossil was found in the desert.



**أحفورة** آثار أو بقايا مخلوقات حية عاشت في الماضي البعيد. عُثر على أحفورة السمكة هذه في الصحراء.



**friction** a force that slows down moving things.

A skate makes friction when the stopper rubs against the ground.

**احتكاك** قوة تعمل على إبطاء الأشياء المتحركة. يحدث الاحتكاك حينما يحتك المكعب المطاطي لحذاء التزلج بالأرض.

**fruit** the plant part that holds the seeds.  
The peach fruit has a seed inside.



**ثمرة** جزء من النبات يحمل البذور.  
تحتوي ثمرة الخوخ على بذرة بداخلها.



**fulcrum** the point that a lever moves against.  
This piece of wood can act as a fulcrum.



**نقطة ارتكاز** هي النقطة التي تتحرك منها الرافة.  
يمكن أن تكون هذه القطعة الخشبية نقطة ارتكاز.



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**gravity** a kind of force that pulls down on everything on Earth.  
Gravity is the force that pulls a ball to the ground.



**الجاذبية الأرضية** هي نوع من القوة التي تجذب كل شيء على الأرض إلى أسفل.  
**الجاذبية** هي القوة التي تجذب الكواكب نحو الأرض.

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# H

**human-made things** are things made by people.

Glue and beach balls are examples of human-made things.



**أشياء مصنعة** أشياء من صنع الإنسان. من أمثلة الأشياء المصنعة الفراء وكرات الشاطئ.



# I

**infer** to use what you know to figure something out.

From these tracks, you can infer what animal was here.



**استنتاج** استخدام المعرفة السابقة للوصول إلى معرفة جديدة.

من هذه الآثار يمكنك استنتاج أي الحيوانات كان هنا.



**investigate** to make a plan and try it out.  
You can investigate how long it takes the car to stop rolling.

**تحقق** وضع خطة وتجربتها.  
يمكنك التحقق من طول المسافة.



## L

**leaves** the plant parts that use sunlight and air to make food.

Leaves come in different shapes and sizes.

**أوراق** أجزاء النبات التي تستخدم ضوء الشمس والهواء لصنع الغذاء.  
للأوراق أشكال وأحجام مختلفة.



**lever** a simple machine made of a bar that turns around a point.

A lever can help you move or lift objects.



**رافعة** آلة بسيطة مصنوعة من قضيب يدور حول نقطة محددة.

يمكن الرافعة أن تساعدك على رفع الأجسام.

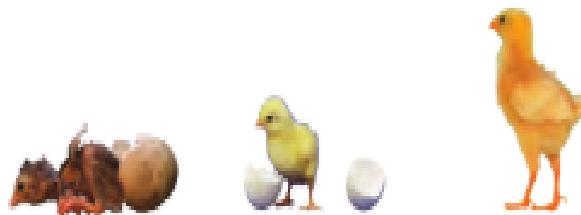


**life cycle** how a living thing grows, lives, and dies.

The life cycle of a bean plant starts with a seed.

**دورة الحياة** مراحل نمو الكائن الحي وحياته وموته.

تبدأ دورة حياة نبات الفول بالبذرة.



**living** a thing that grows, changes, and needs food, air, and water to survive.  
This man is a living thing.



**كائن حي** الكائن الذي ينمو ويتغير ويحتاج إلى  
الغذاء والهواء والماء ليحيا.  
الإنسان كائن حي.



## M

**make a model** to make something to show how something looks.

You can make a model of a mountain in the ocean.



**عمل نموذج** صنع شيء لتوضيح ما يبدو عليه شيء محدد.  
يمكنك صنع نموذج لجبل في المحيط.



**measure** to find out how far something moves, or how long, how much, or how warm something is.

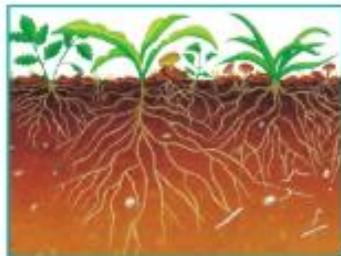
You can measure temperature with a thermometer.



**قياس** إجراء نقوم به لإيجاد مدى بعد شيء ما أو طوله أو كميته أو درجة حرارته.  
يمكنك قياس درجة الحرارة باستخدام ميزان الحرارة.



**minerals (nutrients)** bits of rock and soil that help plants and animals grow.  
Plants use minerals in the ground to grow.



**model** a sample of a product or idea used for testing.  
You can make a model to show how an idea should look.



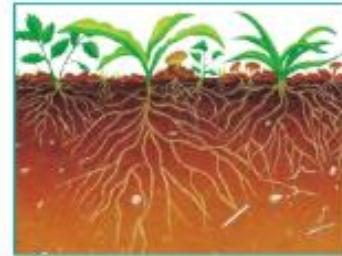
**motion** a change in the position of an object.  
This horse is in motion.



**mountain** land that is very high.  
A mountain is the highest type of land.



**معادن (العناصر الغذائية)** أجزاء من مكونات الصخور والتربة تساعد النباتات والحيوانات على النمو.  
تستخدم النباتات المعادن الموجودة في الأرض لتنمو.



**نموذج** عينة لمنتج أو فكرة تُستخدم من أجل الاختبار.  
يمكنك تصميم نموذج لتوضيح كيف تبدو الفكرة.



**حركة** تغيير في موضع أحد الأجسام (تغير مكان الجسم).  
هذا الحصان في حالة حركة.



**جبل** أرض مرتفعة للغاية.  
الجبل هو المكان الأكثر ارتفاعاً على اليابسة.



**natural resource** a material from Earth that people use in daily life.  
Rocks are a natural resource.



**nonliving things** a thing that does not grow and change, or need food, air, or water to exist.  
Rocks and books are examples of nonliving things.

**nutrients** things in the soil that help plants grow and stay healthy.  
There are lots of nutrients in some soils.



**مصدر طبيعي** مادة من الطبيعة يستخدمها الإنسان في حياته اليومية.  
وتعتبر الصخور مصدراً طبيعياً.



**جماد** شيء لا ينمو ولا يتغير ولا يحتاج إلى الغذاء أو الماء أو الهواء ليظل موجوداً.  
من أمثلة الجماد الصخور والكتب.

**عناصر غذائية** مواد في التربة تساعد النباتات على النمو تحتوي بعض أنواع التربة على الكثير من العناصر الغذائية.



## 0

**observe** to see, hear, taste, touch, or smell  
You can observe how the flower looks, smells, and feels.



**ملاحظة** استخدام الحواس الخمسة للمعرفة (الرؤية-السمع-التذوق-اللمس-الشم).  
يمكنك ملاحظة شكل الزهور ورائحتها وملمسها.



**oxygen** a gas found in the air we breathe.  
Living things need oxygen.



**أكسجين** غاز موجود في الهواء الذي نتنفسه.  
تحتاج الكائنات الحية إلى الأكسجين.



**plains** flat land that spreads out a long way.  
Plains are wide and flat.



**سهول** أرض متبسطة تمتد لمدى واسع.  
السهول واسعة ومتسطة.



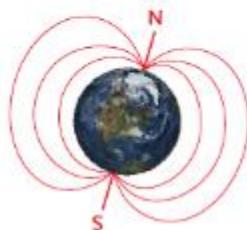
**pollution** anything that makes air, land, or water dirty.  
Garbage is one kind of pollution.



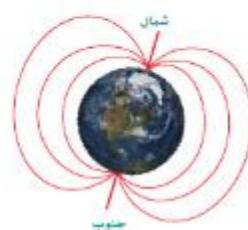
**تلويث** أي شيء يجعل الهواء أو الأرض أو الماء غير نظيف.  
النفايات أحد أشكال التلوث.



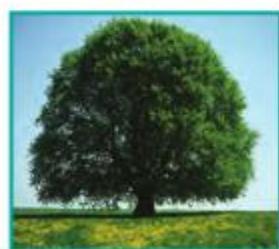
**poles** the two ends of a magnet, or either end of Earth's axis.  
Earth has two poles, a north pole and a south pole.



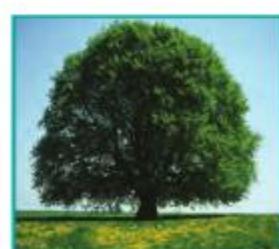
**قطبان** طرفا المغناطيس أو طرفي محور الأرض.  
الأرض لها قطبان؛ القطب الشمالي والقطب الجنوبي.



**pollen** sticky powder inside the flower that helps make seeds.  
Pollen sticks to bees when they land on flowers.



**حبوب اللقاح** حبيبات دقيقة داخل الزهرة يساعد في إنتاج البذور.  
تلتصق حبوب اللقاح بالنحل عندما يقف على الزهور.



**position** the place where something is.  
The position of the rabbit is **above** the cat.



**موقع** مكان وجود الشيء.  
موقع الأرنب فوق المقعد وموقع القط تحته.



**predict** to use what you know to tell what you think will happen  
You can predict what the weather will be like today.



**توقع** استخدام ما تعرفه من معلومات لتحديد ما تعتقد أنه سيحدث.  
يمكنك توقع حالة الطقس اليوم.



**put things in order** to tell or show what happens first, next, or last  
You can put things in order to show the life cycle of a plant.



**ترتيب الأشياء** هو تحديد أو بيان ما سيحدث أولاً، أو ثانياً أو أخيراً.  
يمكنك ترتيب الأشياء للإشارة إلى دورة حياة أحد النباتات.



**rain forest** a hot, wet place.  
A rain forest has many green plants.



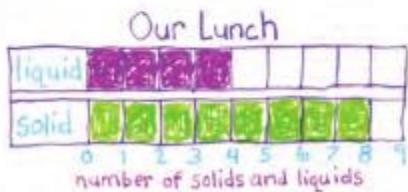
**غابة مطيرة** مكان حار ورطب تساقط فيه الأمطار بشكل يومي تقريباً.  
تحتوي الغابة المطيرة على الكثير من النباتات.



**ramp** A simple machine with a flat, slanted surface.  
A ramp can be used to move an object from one level to another.



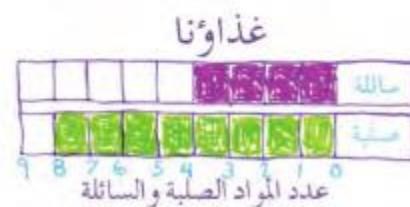
**record data** to write down what you observe  
You can record data about what your class had for lunch.



**أداة التحميل** آلة بسيطة لها سطح مستوٍ ومائٍ، تصنع من الخشب أو المعدن.  
يمكن استخدام أداة التحميل لتحريك جسم من مستوى إلى آخر.



**تسجيل البيانات** تدوين الملاحظات والمشاهدات.  
يمكنك تسجيل البيانات حول ما تناوله طلاب صفك على الفداء في جدول.



**recycle** To make new items out of old items.  
You can recycle paper.



**إعادة التدوير** تصنيع أشياء جديدة باستخدام أشياء قديمة.  
ويمكنك إعادة تدوير الورق.



**reduce** to cut back on how much you use something.  
We should reduce the amount of water we use.



**ترشيد** تقليل الكمية التي تستخدمها من شيء ما.  
ينبغي علينا ترشيد كمية المياه التي نستخدمها.



**repel** to push away or apart.  
The two south poles of a magnet repel each other.



**تنافر** الدفع بعيداً.  
يتناول القطبان الجنوبيان لمغناطيس مع بعضهما البعض.



**reuse** to use something again.  
We can reuse items to cut down on waste.



**river** a body of fresh water that moves.  
A river may flow into a lake.



**rock** a hard, nonliving part of Earth.  
A rock like this can be used as a tool.



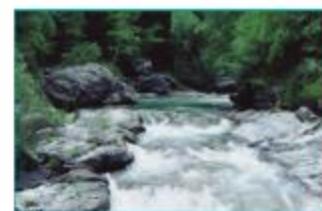
**root** a plant part that keeps the plant in the ground.  
Roots hold a plant in the ground.



**إعادة الاستخدام** استخدام الشيء مرة أخرى.  
يمكننا إعادة استخدام العناصر لتقليل المخلفات.



**نهر** مياه عذبة تسير في مجرى واسع.  
قد يتدفق النهر إلى إحدى البحيرات.



**صخرة** جزء صلب وجامد.  
تم استخدام هذه الصخرة كفأس قديماً.



**جذر** جزء من النبات يعمل على تثبيته في الأرض.  
الجذور تثبت النباتات في التربة.



## S

**seed** a part of a plant that can grow into a new plant.

A seed inside a peach can grow into a peach tree.

**seedling** a young plant.

A young bean plant is a seedling.

**simple machine** a tool that can change the size or direction of a force.

This simple machine is called a ramp.



**soil** a mix of tiny rocks and bits of dead plants and animals.

Most plants need soil to grow.



**solution** a kind of mixture with parts that do not easily come apart.



**بذرة** جزء من النبات يتمو ويصبح نباتاً جديداً. يمكن أن تنمو البذرة الموجودة داخل ثمرة الخوخ لتصبح شجرة خوخ.

**بادرة** نبتة صغيرة في بداية ظهورها. برعم الفول هو الباذرة.

**آلة بسيطة** أداة يمكن أن تغير من حجم القوة أو اتجاهها.

تعرف هذه الآلة البسيطة باسم أداة التحميل.



**تربيه** مزيج من الصخور الصغيرة وبقايا النباتات والحيوانات الميتة.

تحتاج معظم النباتات إلى التربة لكي تنمو.



**محلول** نوع من المخلوط يصعب فصل مكوناته.



**speed** is how far something moves in a certain amount of time.  
Cheetahs can run at very high speed.



سرعة هي مقدار حركة الجسم في فترة زمنية معينة.  
تجري الفهود بسرعة كبيرة جداً.



**stem** the part of a plant that holds up the plant.  
The stem holds up the flower.



**ساق** جزء من النبات يحمله ويدعمه.  
يدعم الساق الزهرة.



**technology** all the tools and ideas we use.  
Technology helps make our lives easier.



**تكنولوجيا** جميع الأدوات والأفكار التي نستخدمها.  
تساعد التكنولوجيا في تسهيل حياتنا.



**tool** an object or body part that helps do work.  
Our hands and teeth are tools.



**عضو** جزء من الجسم يساعد على أداء العمل.  
أيدينا وأسناننا عبارة عن أعضاء تساعنا في أداء الأعمال.



**trait** the way a living thing looks or acts.  
The color of a flower is a trait.



**صفة وراثية** الأسلوب الذي يظهر به الكائن الحي أو يتصرف وفقاً له.  
يُعد لون الزهرة صفة وراثية.



## V

**valley** the low land between mountains.  
The valley is flat.

**وادي** أرض منخفضة بين جبلين.  
يكون الوادي منبسطاً.



## W

**weathering** when water changes the shape and size of rocks.

**Weathering can make rocks crack.**

**تجوية** تحدث عندما تغير المياه من شكل الصخور وحجمها.

يمكن أن تؤدي التجوية إلى تشقق الصخور.

