



### In This Guide

This guide contains language arts and science lessons for articles in this issue of EXPLORER PIONEER.

### Explorer Magazine

EXPLORER classroom magazines are specifically written for each grade, 2-5. Through great storytelling and stunning photographs, the EXPLORER magazines develop literacy skills and teach standards-based science content.

The EXPLORER magazines strive to offer a variety of reading experiences for students with different ability levels in the same class. Thus, all articles have been measured using the Lexile® Framework for Reading. Some articles will be easier to read than others, but all articles in EXPLORER PIONEER will be within the 250-550L range.

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## Your Subscription Includes:

- Magazines
- Classroom Posters
- Projectable Magazine
- Interactive Whiteboard Lesson
- Teacher's Guide
- App (additional subscription required)

### Objectives

- Students will recognize connections between vocabulary words.
- Students will identify the main topic of a text and of specific paragraphs within a text

### Resources

- Vocabulary Assessment Master (page 6)
- Language Arts Assessment Master (page 7)

### Summary

- The article “Your Bones” introduces students to the various bones in the human body, focusing on how bones help a body stand and move.

## BUILD VOCABULARY AND CONCEPTS

- **joint**
- **muscle**
- **skeleton**

Display the Wordwise section on page 8 of the projectable magazine. Invite volunteers to read aloud the words and their definitions. Encourage students to share what they know about each word.

Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to record each word and its definition. Then have them think about how the vocabulary words are related. Tell them to record three connections they see. For example: Joints are located between bones in your skeleton.

After reading the article, divide the class into small groups. Have students share the connections they predicted before reading the article. Instruct them to reevaluate each connection based upon what they have learned. If necessary, have students rewrite their ideas to more accurately reflect connections between different vocabulary words.

### READ

Give students a few minutes to scan the article in their magazines. **Ask:** *What you think this article is about? Why?* Invite students to share their ideas.

Inform students that what they just tried to identify was the main idea of the article. **Say:** *The main idea is the main topic, or what the article is about. Every article has a main idea. Every paragraph in the article has a main idea, too.* Inform students that important details in the text help readers identify the main idea of each paragraph. The main idea of each paragraph helps them identify the main idea of the text.

Display pages 2-3 of the projectable edition. Read aloud the headline. **Say:** *To figure out the main idea on these pages, I have to search for clues. The first clue is the headline. This headline makes the topic pretty clear. The article is about your bones. But what exactly will it tell you about bones? To figure that out, we'll have to search for more clues.*

Read aloud the text. **Say:** *According to the text, bones come in many shapes and sizes. And each bone has a job to do. Maybe the article will describe different bones.*

Point out the comprehension strategy in the upper right corner of the screen. Read it aloud. **Say:** *I didn't notice this clue at first. But it's important because it helps me put all of the pieces together. The main idea of this article must be that the shape of bones is related to how they are used. To know for sure, I'll have to search for more clues as I read the article.*

Give each student a copy of the **Language Arts Assessment Master**. Have students record what they think is the main idea of the article. (Possible response: The shape of bones is related to how they are used.) Then have students read the article with a partner. As they read, encourage students to record important details from the article. After reading, instruct students to review their notes and rewrite the main idea of the article in their own words.

# Your Bones

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about bones. **Ask:** *What do your bones fit together to make?* (a skeleton) *How many bones are in a skeleton* (206) *What do the flat bones in your head make up?* (your skull) *What do those bones do?* (protect your skull)

- **Finding Connections** Explain to students that reading definitions tells people what words mean. But readers can get a more thorough understanding if they recognize how important words are connected. Point out that this is exactly what they did when they wrote sentences about the vocabulary words in the article. Instruct students to turn and share the sentences they wrote on their **Vocabulary Assessment Masters** with a partner. Encourage them to discuss similarities and differences in their sentences to get an even deeper understanding of the vocabulary words.

- **Identify Main Ideas** Remind students that the article has a main idea. But each paragraph has a main idea, too. Explain that they can find the main idea of a paragraph the same way they found the main idea of the article. They must search for important clues. As a class, review each paragraph individually. Challenge students to identify the main idea of each. Discuss how the main idea of each paragraph supports the main idea of the article.

### WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *How do bones give your body shape?*
- *How do bones protect your body?*
- *What surprised you about what you read?*

## SCIENCE

### Objectives

- Students will recognize that bones come in many shapes and sizes.
- Students will understand how the shapes of bones are related to how they are used.
- Students will identify other body parts and understand how they help your body move.

### Resources

- Content Assessment Master (page 8)
- Comprehension Check (page 9)
- "Your Bones" Interactive Whiteboard (optional)

### Science Background

Bone is a living, growing tissue found in human and animal bodies. As organisms grow, their bones grow and change with them.

A human baby, for example, has about 300 bones when it is born. Over time, those bones grow bigger and stronger and fuse together. The adult human has only 206 bones in its body. These bones form a frame called a skeleton.

Bones serve several important functions. Some bones, like the spine, provide structural support for the body. Others, like the skull and ribs, protect vital organs including the brain, heart, and lungs.

Most bones are hard. They cannot move on their own. However, bones work with other body parts to make your body move. Muscles push and pull your bones. Joints, or the place where two bones meet, allow your body to bend and twist.

Different types of joints move in different ways. Hinge joints, such as those found in the elbows and knees, let you bend and straighten your arms and legs. Ball and socket joints, which are found in the shoulders and hips, make it possible to move in every direction. Working as a team, bones, muscles, and joints allow people to move in many different ways.

## ENGAGE

### Tap Prior Knowledge

Instruct students to look at their hands. Now tell them to imagine that they have X-ray vision and can see the bones inside. Invite volunteers to describe the bones they might see. Tell students to look at their arms. As a class, discuss how arm bones are like hand bones. Challenge students to explain how they are different.

## EXPLORE

### Preview the Lesson

Display pages 2-3 of the projectable magazine. Give students a moment to examine the photos in the red and yellow circles show. Invite volunteers to describe some of the different bones they see. Inform students that as they read the article, they will learn about bones and why they come in different shapes and sizes.

### Set a Purpose and Read

Have students read the article in order to recognize that bones come in many different shapes and sizes and to understand how the shapes of bones are related to how they are used.

## EXPLAIN

### Recognizing Shapes and Sizes of Bones

Display pages 4-5 of the projectable magazine. As a class, review the diagram to identify different types of bones in the human body. Invite volunteers to describe the shape and size of each bone. Encourage students to find and feel these bones on their own bodies. Then divide the class into small groups. Assign half of the groups the image of the skeleton on pages 6-7. Assign the other groups the image on pages 8-9. Challenge groups to identify and label the various bones in their skeletons. When students are finished, combine groups who examined different images. Encourage them to compare their results.

## SCIENCE

### EXPLAIN

(continued)

#### Linking Structure and Function of Bones

Remind the class that bones come in different shapes and sizes. **Say:** *This is no accident. Each bone has a specific job to do. The shape and size of a bone is directly related to how it is used.* Display pages 2-3 of the projectable magazine. As you read aloud the text, highlight the words *support*, *protect*, and *move* in the second paragraph. If necessary, discuss what each word means. Then inform students that these are three key functions of bones. Give each student a copy of the **Content Assessment Master**. Instruct students to review the article with a partner. As they do, have them identify examples of bones that perform each function. Challenge them to describe the bones and tell how they help the body do each job. When students are finished, rejoin as a class. Invite volunteers to share their answers. Clear up any misconceptions students may have about the structure and function of bones in their bodies.

#### Understanding How the Body Moves

Display pages 6-7 of the projectable magazine. As students examine the image of the skeleton, invite volunteers to point out each location where the body bends. Guide the class to recognize that none of these points is located on a bone. **Say:** *Most bones are hard. They do not bend back and forth. When you move, it's because other body parts are helping you get around.* Challenge students to identify what those body parts are. (joints and muscles) **Say:** *Muscles push and pull your bones. Joints, which are located where bones come together, help you bend and twist.* Encourage students to share what they know about the joints and muscles in their bodies. Discuss further how these parts help the body move.

### ELABORATE

#### Find Out More

Display the diagram on page 5 of the projectable magazine. Have students add up the number of bones in an adult person's hands, feet, and skull. (128: Be sure to multiply the hand and foot numbers by two.) Point out that there are many more bones in a skeleton. As a class, conduct research to find out how many bones are found in the other body parts labeled on the diagram. (legs: 6; arms: 6; ribs: 24; shoulders: 4; spine: 26; pelvis: 4) Note: There are also 6 bones in the ear, 1 bone in the throat, and 1 bone called the sternum to which first seven pairs of ribs attach in the front of the chest.

#### Extend Your Thinking About Bones

Remind students that protecting the body is one important function of bones. However, bones sometimes need protection, too. Bones can break if they are hit just right. And the body parts they protect can be hurt if they are hit hard enough. As a class, brainstorm a list of things people do to protect their bones. If necessary, prompt students to think about the safety equipment they use when they play different types of sports.

### EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *What is a skeleton?* (the structure of bones that supports the body of a person or animal)
- *Which bones protect your hear and lungs?* (ribs)
- *What body parts do bones work with to help you move?* (joints and muscles.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article. You may also wish to examine the optional **Interactive Whiteboard** lesson that accompanies this article.

**VOCABULARY ASSESSMENT: Your Bones**

Record each vocabulary word and its definition.

Word	Definition

Write three sentences to tell how different words are connected.

1. \_\_\_\_\_  
\_\_\_\_\_
2. \_\_\_\_\_  
\_\_\_\_\_
3. \_\_\_\_\_  
\_\_\_\_\_



Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Your Bones**

Use this organizer to record information about bones that help your body do different things.

	Support	Protect	Move
Give an example.			
Tell what it looks like.			
Tell how it works.			

**COMPREHENSION CHECK: Your Bones**

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. How many bones are in an adult person's skeleton?  
 A 106  
 B 206  
 C 602
  
2. What do the bones in your spine do?  
 A protect your body  
 B support your body  
 C make the body move
  
3. Which bones protect your brain?  
 A ribs  
 B pelvis  
 C skull
  
4. What body part is found where bones meet in the body?  
 A joint  
 B muscle  
 C skeleton

5. Pick one bone. Tell how its shape helps it do a specific job.

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# Running the River

## LANGUAGE ARTS 490L

### Objectives

- Students will record, define, and sketch vocabulary words and draw a picture to show how the words are related.
- Students will explore how using the pronoun *I* impacts the telling of a story.
- Students will write a first-person letter to a friend about events described in the article.

### Resources

- Vocabulary Assessment Master (page 14)
- Language Arts Assessment Master (page 15)

### Summary

- In the article “Running the River,” students read a first-person account of the first ever source-to-mouth decent of the Chitina River in Alaska.

## BUILD VOCABULARY AND CONCEPTS

- **climate change**
- **glacier**
- **silt**

Display the vocabulary words on a word wall or on the whiteboard. Say the words aloud and invite students to share what they know about each.

Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to write each word and its definition on their papers. Then have students draw a picture to remind themselves of what each word means.

When students are finished drawing their interpretations of individual words, discuss with the class how the words could be related to a river in Alaska. Then challenge students to sketch a larger picture showing how the three items are related in that context. Instruct students to label each item in their drawings.

## READ

Let students know that in this article they will read about the first ever trip down the entire length of the Chitina River in Alaska.

Display page 12 of the projectable magazine. Instruct students to examine the page closely. **Ask:** *Who wrote this article?* (Todd Wells) *How do you know?* (The caption identifies the author.) Then zoom in on the first paragraph of text. Highlight the word *I* each time it appears. Inform students that this word is another clue that tells them who wrote the article.

**Say:** *When writers write, they often tell about their own experiences. This type of writing is easy to spot. Sentences contain the words I and we. Text like this is a direct link into the writer's thoughts. It's written this way so readers see, hear, and feel just what the writer did at this particular moment in time.*

Instruct students to read the article on their own. As they do, challenge them to identify additional sentences that contain the words *I* or *we*. Tell students to highlight each sentence in their student magazines.

# Running the River

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about the team's trip down the Chitina River.

**Ask:** *Where is the Chitina River? (Alaska) Why hasn't anyone gone the entire length of the river before? (Part of the river was covered in ice.) Why is it now possible to take a boat down the entire length of the river?*

(Warmer temperatures have melted the ice that once blocked the river.) Encourage students to share other interesting facts they learned about the first trip down the entire length of the Chitina River.

- **Exploring the Pronouns "I" and "We"** Remind students that when writers use the pronouns *I* and *we* they are telling a story about themselves. If necessary, spend more time discussing what this means. Then invite volunteers to read aloud sentences they highlighted as they read the article. As a class, revise the sentences so that rather than the pronouns *I* and *we*, they contain the words *he*, *she*, or *they*. Discuss how this changes the focus of the sentence.

- **Writing a First-Person Narrative** Inform students that one time writers almost always use the words *I* and *we* is when they write a letter to a friend. **Say:** *Letters are a great way to tell friends what you've been up to. When you write a letter, you have time to think about what you want to say. This means you can pick just the right words to describe things. And, you can review what you wrote to make sure you didn't leave out any important details.*

Give each student a copy of the **Language Arts Assessment Master**. Tell students to imagine that they were one of the team members who went down the Chitina River with Todd Wells. Instruct each student to write a letter to a friend describing their own experience as they completed the trip.

### WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *Why was this such a daring trip?*
- *What did Todd Wells do to keep the team safe?*
- *What surprised you about what you read?*

# Running the River

## SCIENCE

### Objectives

- Students will understand how climate change changed the Chitina River.
- Students will explain how Todd Wells and his team found a safe way to descend the entire river .

### Resources

- Content Assessment Master (page 16)
- Comprehension Check (page 17)

### Science Background

A glacier is a large mass of ice that moves very slowly. The ice within a glacier can be extremely aged, ranging from several hundred to several hundreds of thousands years old.

Logan Glacier, located in the heart of Alaska's Wrangell—St. Elias National Park, is the source of the 210-kilometer-long Chitina River. Until recently, the first stretch of the river was frozen. But like other glaciers, Logan Glacier has been melting, or retreating, due to warmer temperatures around the globe. That stretch of river is now open, revealing a canyon that features a Class V+ gorge.

Based on the International Scale of River Difficulty—Standard Rated Rapids, the gorge presented one of the most difficult, unpredictable, and dangerous river runs that exist. Class V+ rapids are rarely attempted because mistakes can be fatal. It may be impossible to rescue anyone who finds themselves in trouble along the way.

Despite the danger, National Geographic Young Explorer Todd Wells saw the gorge as a unique opportunity to explore. Wells compiled a team of expert kayakers. After careful scouting and preparation, the team took to the water, becoming the first people to run the entire length of the Chitina River.

## ENGAGE

### Tap Prior Knowledge

Instruct students to close their eyes and form a mental picture as you state the following words out loud: *glacier, melting, fast-moving water, brown waves, icy water, swept downriver, dangerous section, rocks and strong currents*. Now tell students to imagine themselves sitting in the middle of this picture in a kayak. Invite volunteers to share how they would feel and why.

## EXPLORE

### Preview the Lesson

Display pages 10-11 of the projectable magazine. Invite a volunteer to read aloud the headline and deck. As a class, brainstorm a list of challenges the team might face as they try to run the entire length of the Chitina River.

### Set a Purpose and Read

Have students read the article in order to understand how climate change changed the Chitina River and to explain how Todd Wells and his team found a safe way to descend the entire river.

## EXPLAIN

### Understanding Climate Change

Prior to conducting this activity, download several images of glaciers. Display those images for the class. Then have students scan the images in the article. **Ask:** *Do you see any glaciers in these photos?* (no) Challenge students to find the paragraph in the article that explains why not. (Page 13, first paragraph) Guide students to understand that the rising temperatures caused by climate change have caused the glacier that feeds this river to melt.

**Say:** *Before the temperatures rose, one section of the river was always covered in ice. Now it's not. Now, the river is open and the water flows very fast.* Give each student a copy of the **Content Assessment Master**. Instruct students to draw pictures that show what this part of the river looked like before and after the ice melted. Challenge them to write detailed captions that explain what happened.

# Running the River

## SCIENCE

### EXPLAIN

(continued)

#### Putting Safety First

Display page 19 of the projectable magazine. Zoom in on the bottom photo. **Say:** *This article is about a team of explorers who took kayaks down a river. But this photo is taken from an airplane.* **Ask:** *Why do you think that is?* Invite volunteers to share their ideas. Then guide the class to understand that viewing the river from above is a good way to find places that might be dangerous when they go down the river. Review the article as a class. Challenge students to identify other things Wells did to keep his team as safe as possible during their trip. (Possible responses: studied the river for a year, looked at maps and photos, made plans, delayed the trip when it was too dangerous, and lifted their boats up a cliff to avoid a dangerous section)

### ELABORATE

#### Find Out More

Inform students that the Logan Glacier isn't the only glacier melting because of climate change. As a class, conduct research to learn how rising temperatures have affected other glaciers around the world.

#### Extend Your Thinking About Climate Change

Remind the class that Wells was able to go down the entire length of the Chitina River because ice covering part of the river had melted. According to the article, the ice melted because climate change has brought warmer weather to Alaska. Point out that warmer temperatures affect more than just ice. Discuss how the rising temperatures could affect the plants and animals that live here.

### EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *What is climate change?* (changes in the patterns of weather over a long period of time)
- *Why was the river filled with silt?* (The silt had been trapped in the glacier. When the glacier melted, it released the silt into the river.)
- *Why did Wells hope that temperatures would cool down?* (Lower temperatures would cause the glacier to melt less. That might lower the river levels, making it safer to go down the river.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

Name \_\_\_\_\_

Date \_\_\_\_\_

**VOCABULARY ASSESSMENT : Running the River**

Write each word and its definition. Draw a small picture to show what each word means. Draw a larger picture to show how the words are connected. Label each word in your drawing.

Word	Definition	Picture	Larger Picture



Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Running the River**

Draw pictures that show what the river looked like before and after the ice melted.  
Write captions that explain what happened.

Before	After
<p>Pictures</p>	
<p>Captions</p>	

**COMPREHENSION CHECK: Running the River**

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. Where does the water in the Chitina River come from?

- Ⓐ a glacier
- Ⓑ a mountain
- Ⓒ an ocean

2. What is the water in the Chitina River like?

- Ⓐ warm and calm
- Ⓑ cold and fast-moving
- Ⓒ hot and bubbly

3. What made the water feel heavy?

- Ⓐ rocks
- Ⓑ silt
- Ⓒ icebergs

4. What kind of boats did Wells and his team take down the river?

- Ⓐ canoes
- Ⓑ yachts
- Ⓒ kayaks

5. Explain how melting ice changed the Chitina River.

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# Peek in a Pool

## LANGUAGE ARTS 510L

### Objectives

- Students will create sketches to understand the scientific meaning of vocabulary words.
- Students will describe how the writer uses reasons to support specific points in the text.

### Resources

- Vocabulary Assessment Master (page 22)
- Language Arts Assessment Master (page 23)

### Summary

- The article “Peek in a Pool” introduces students to tide pools, examines how and why tide pools change, and identifies many of the different living things that live there.

## BUILD VOCABULARY AND CONCEPTS

- **habitat**
- **shallow**
- **tide**
- **tide pool**

Display the vocabulary words on a word wall or the whiteboard. Point out to students that when they read it's sometimes necessary to understand the technical meaning of words in order to fully understand the text. This is particularly true when reading articles about science. Inform the class that using clues such as the sentences before and after words and photos on the page can help them figure out what a word means in this type of context.

Invite a volunteer to read the definition of *habitat* in the Wordwise feature on page 23 of the article. Examine this word in context. Then give each student a copy of the **Vocabulary Assessment Master**. Instruct students to write the word's definition and create a detailed sketch showing what it means. Inform students that their drawings won't all be the same. The point is for students to draw the word in a way that will help them remember its definition. Examine the other words in this way, too.

### READ

Let students know that in this article they will learn what tide pools are, how and why they change, and what lives there.

Display pages 18-19 of the projectable magazine. Read aloud the headline and invite volunteers to describe what they see in the photo.

Then highlight the first sentence of the text. **Say:** *This is a photo of a tide pool. But according to this sentence, what you see here will change. In fact, it will change twice a day. There must be a reason for this.* **Ask:** *Do you know what it is?* Invite volunteers to share their opinions. If necessary, point out the bold word *tide* in the sentence and discuss what it means.

Explain to the class that a text contains a statement like this, the writer must always support the fact with a reason. **Say:** *Reasons tell why things happen. People can write anything they want to. But if writers don't include logical reasons, the text won't make sense. Good writers always include reasons that support important points they want to make.*

Give each student a copy of the **Language Arts Assessment Master**. Have students read the article on their own. As they do, instruct them to identify three points the writer makes. Encourage them to search for reasons that support each point.

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about tide pools. **Ask:** *Where are tide pools located?* (near rocky shores) *What is a good time to peek in a tide pool?* (low tide) *Why?* (The water level is low and you can see the living things that live there.) Encourage students to share other interesting facts they learned about tide pools.

- **Interpret Visual Information** Inform students that reading definitions tells people what words mean. But sometimes readers have to "see" words to really understand them. Point out that this is exactly what they did when they drew sketches of the vocabulary words in the article. They drew the words in a way that had meaning to them. Instruct students to turn and share the sketches they created on their **Vocabulary Assessment Masters** with a partner. Encourage them to explain how their drawings reflect the scientific meaning of each word.

- **Identifying Reasons** After reading the article, remind students that reasons tell why something happened. Invite students to share their **Language Arts Assessment Masters** in small groups. Challenge them to examine one another's results to determine that all reasons are valid and support the identified key points in the text.

### WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

- *How do tides change the habitat in a tide pool?*
- *Why do seagulls fly over tide pools at low tide?*
- *What surprised you about what you read?*

# Peek in a Pool

## SCIENCE

### Objectives

- Students will note how many living things live in a tide pool.
- Students will understand how changing tides affect organisms that live in tide pools.

### Resources

- Content Assessment Master (page 24)
- Comprehension Check (page 25)

### Science Background

A tide is the flow of the ocean's water as it rises or falls each day. The point at which the water reaches its highest level is called "high tide." The lowest water level is, likewise, referred to as "low tide."

As the water along a coastline moves in and out, it changes the coastline in different ways. One result is the formation of tide pools.

Tide pools form twice a day as the tide moves in and out along rocky shores. During high tide, the pools are large and deep. When the tide moves back out, they become small and shallow.

This habitat may be ever-changing, but it is home to a great variety of plant and animal life. Seaweeds and seagrasses thrive in tide pools. So do snails, crabs, barnacles, and sea stars. Sea urchins, anemones, fish, lobsters, sponges, and octopuses live here.

Not all animals that depend on tide pools live in the water. For example, seagulls get many meals here. They are frequent visitors during low tide when shallow waters make it easy to find and catch prey.

### ENGAGE

#### Tap Prior Knowledge

Write the word *tide* on the board. Invite a volunteer to explain what a tide is. Write the word *pool*. Invite another volunteer to describe what a pool looks like. If the student describes a swimming pool, guide the class to recognize that a pool can be any small body of still water. Now, instruct students to put the two words together. Discuss what a tide pool would look like. Brainstorm a list of animals that you might see in or near a tide pool.

### EXPLORE

#### Preview the Lesson

Display pages 18-19 of the projectable magazine. Instruct students to examine the sea stars shown in the photo. Then tell them to imagine that the tide came and the sea stars were covered by water. Invite volunteers to share their ideas about how the sea stars would react.

#### Set a Purpose and Read

Have students read the article in order to note how many living things live in a tide pool and to understand how changing tides affect organisms that live in tide pools.

### EXPLAIN

#### Identifying Living Things in a Tide Pool

Display pages 18-19 of the projectable magazine. Invite students to describe the habitat they see and identify the animals shown in the photo. (sea stars) Divide the class into small groups. Assign each group one section of the article. Instruct groups to read their sections and write the names of any living things that are found in tide pools. Rejoin as a class. Compile a master list of all the living things identified in the article that live in a tide pool. (sea stars, seaweed, seagrasses, crabs, seagulls, sea urchins)

# Peek in a Pool

## SCIENCE

### EXPLAIN

(continued)

#### Understanding How Tide Pools Change

Display page 20 of the projectable magazine. Highlight the subhead. Point out to students that in each section, the article describes how plants and animals are affected by the changing tides. Create a T-chart on the board. Label one side "Low Tide" and the other side "High Tide." Review the article as a class to note how living things are affected by each type of tide. (Low Tide: Seaweed and seagrasses lay on rocks; Crabs go under rocks or in holes; Seagulls fly over tide pools; Sea stars stop moving; Sea urchins settle at the bottom of the pool.) (High Tide: Seaweed and seagrasses are underwater. Some stay rooted to rocks and some float away; Crabs crawl on rocks looking for food; Seagulls fly over the ocean; Sea stars walk and take in water; Sea urchins move.) Then give each student a copy of the **Content Assessment Master**. Instruct students to draw a picture of a tide pool at either high or low tide. Instruct them to identify the type of tide shown. Challenge them to explain how they know their picture shows this type of tide.

### ELABORATE

#### Find Out More

Inform students that tide pools are a very diverse habitat. As a class, conduct research to identify more living things that live in tide pools. Challenge students to discover how each organism reacts to the change in tide.

#### Extend Your Thinking About Tide Pools

Have students examine the images of tide pool water in their student magazines. Guide the class to understand that during low tide, a tide pool is shallow and calm. During high tide, the water is deep. And as the tide is changing, waves can be very rough. Challenge students to identify adaptations that could help the plants and animals that live in tide pools survive these ever-changing conditions.

### EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *What is a tide?* (the flow of the ocean's water as it rises and falls each day)
- *When is the water in a tide pool shallow?* (during low tide)
- *Why do seagulls fly over the tide pools during low tide?* (It's easier for them to find food in the shallow water.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

**VOCABULARY ASSESSMENT: Peek in a Pool**

Record the definition of each vocabulary word. Draw a picture to help you remember what each word means.

Word	Definition	Sketch
habitat		
shallow		
tide		
tide pool		

Name \_\_\_\_\_

Date \_\_\_\_\_

**LANGUAGE ARTS ASSESSMENT: Peek in a Pool**

Identify three points the writer makes in the text. Record reasons that support each point.

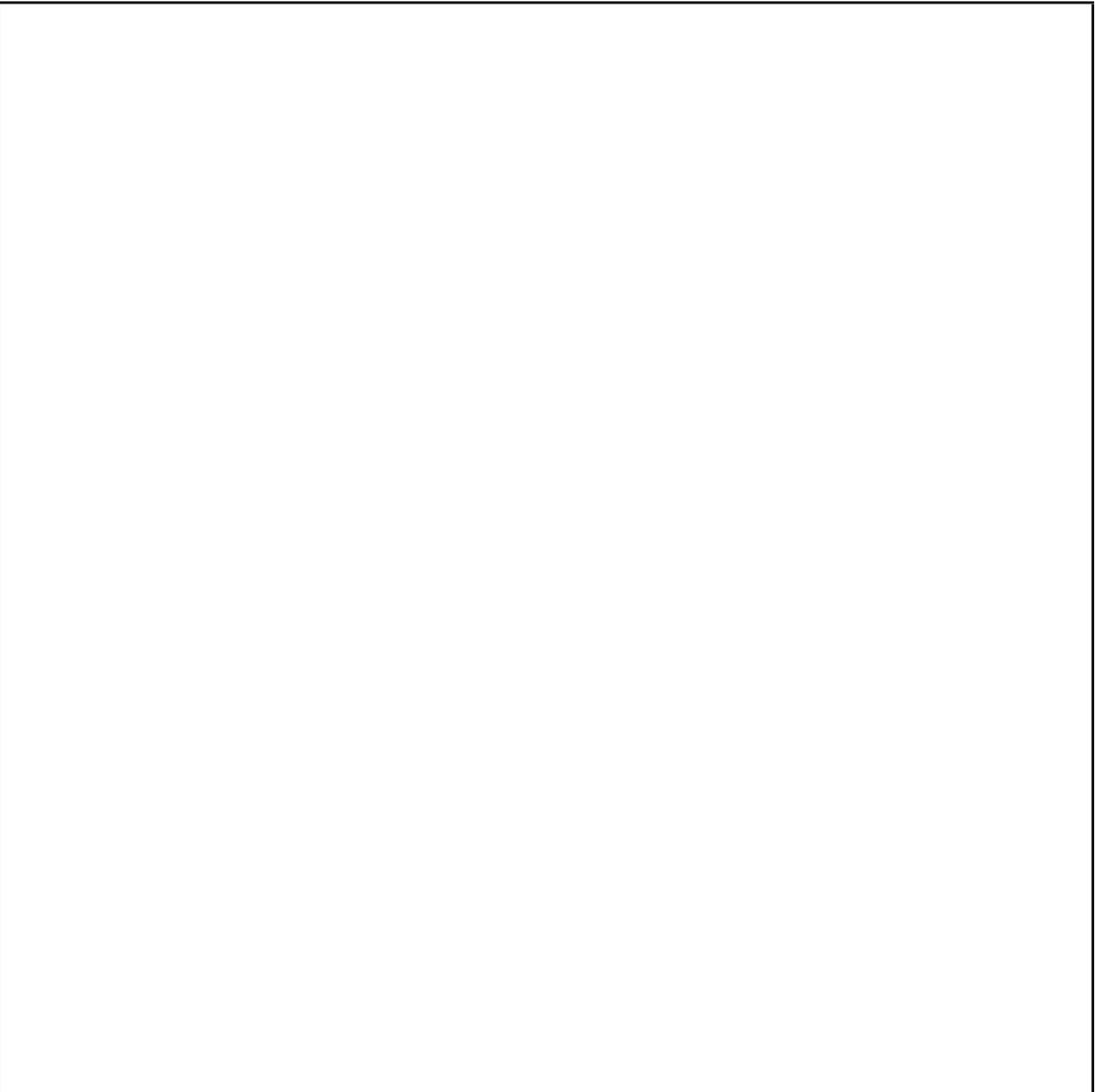
Point	Reasons

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Peek in a Pool**

Draw a picture of animals living in a tide pool. Then answer the questions.



Does your picture show high or low tide?

\_\_\_\_\_  
\_\_\_\_\_

How do you know?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**COMPREHENSION CHECK: Peek in a Pool**

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. Where does the water in a tide pool come from?  
 A a river  
 B an ocean  
 C a stream
  
2. What do seaweed and seagrasses do during low tide?  
 A lay on rocks  
 B root to rocks  
 C float out to sea
  
3. Which animal crawls on rocks during high tide?  
 A sea stars  
 B sea urchins  
 C crabs
  
4. When is it easier for seagulls to find food in a tide pool?  
 A during high tide  
 B during low tide  
 C when the tide is changing

5. Pick one animal from the article. Tell how it is affected by high and low tides.

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## POSTERS

### Objectives

- Students will recognize that many of the organisms on Earth are endangered species.
- Students will identify actions people can take to protect disappearing species.

### Resources

- "Joel Sartore's Photo Ark" poster (Teacher's Edition)
- "All in a Day's Work" poster (Teacher's Edition)

## ENGAGE

### Tap Prior Knowledge

Instruct students to think of a time they saw a frog. What did it look like? What did it sound like? Encourage students who felt the frog to describe what it felt like. Then tell students to imagine that there were no more frogs. Brainstorm ideas about how the world would be different.

## EXPLORE

### Preview the Lesson

As a class, discuss what it means to be in danger. Then introduce students to the terms endangered and extinct. Tell the class that when a species is endangered, it is in danger of no longer existing. When a species is extinct, it is gone. Encourage students to share what they know about endangered and extinct species.

### Set a Purpose and Read

Have students read the article in order to recognize that many of the organisms on Earth are endangered species and to identify actions people can take to protect disappearing species..

## EXPLAIN

### Saving Endangered Species

Display the **"All in a Day's Work" poster**. Introduce students to photographer Joel Sartore. Discuss what he is doing and why. (Sartore is taking photos of captured endangered species to inspire people to care about these animals before they are gone. Review the poster and talk about what Sartore goes through to capture his photos. Then display the **"Joel Sartore's Photo Ark" poster**. Instruct volunteers to read aloud the information about each animal. Have students visit Sartore's Photo Ark at: <http://www.joelsartore.com/galleries/the-photo-ark/>. Divide the class into small groups. Instruct each group to pick four different animals from the Photo Ark. Challenge them to recreate the **"Joel Sartore's Photo Ark" poster** with images, captions, and a map related to the four animals they selected.

## ELABORATE

### Find Out More

Inform students that only one of the animals shown on the **"Joel Sartore's Photo Ark" poster**, the South Georgia king penguin, is increasing in population. As a class, conduct research to learn how people's actions are helping save these penguins. List actions people could take to save other endangered species.

### Extend Your Thinking About Saving Species

Point out to the class that Joel Sartore takes photos to save endangered species. But there are many ways to help. As a class, brainstorm a list of things students could do to help save endangered species living in your area.

## EVALUATE

Have students write a brief summary explaining why it is important to save endangered species in their science notebooks or on a separate sheet of paper.

# Pioneer

## ANSWER KEY

### Your Bones

#### Assess Vocabulary, page 6

Students should record the words and definitions from the Wordwise feature on page 8.

**joint:** a point where bones meet in the body

**muscle:** a body tissue that can shorten to produce movement

**skeleton:** the structure of bones that supports the body of a person or animal

Sentences will vary depending on the connections students identify.

#### Assess Language Arts, page 7

Students should write a main idea. (The shape of bones is related to how they are used.) Details will vary. Students should rewrite the main idea.

#### Assess Content, page 8

Possible responses include:

Support: spine; small bones that run down the back; holdup top half of the body

Protect: skull or ribs; skull/ flat bones in the head and ribs/curved bones in the chest; Both types of bones cover the area that they protect.

Move: arm and leg bones; long, straight bones; They work with joints and muscles. Muscles push and pull bones. Joints help the body bend and twist.

#### Comprehension Check, page 9

1. B; 2. B; 3. C; 4. A; 5: Answers will vary depending on which bone students select.

### Running the River

#### Assess Vocabulary, page 14

Students should record the words and definitions from the Wordwise feature on page 17.

**climate change:** changes in the patterns of weather over a long period of time

**glacier:** a large mass of ice that moves very slowly

**silt:** fine sand, clay, or other material carried by moving water

Sketches should accurately reflect definitions and connections. Students should label all terms in the larger drawing. Evaluate responses for accuracy.

#### Assess Language Arts, page 15

Students' letters should be written from the first-person perspective, utilizing the pronouns *I* and *we*. Content should reflect information from the text.

#### Assess Content, page 16

Students should draw pictures of the river before and after warmer temperatures caused the frozen section to melt. They should write a caption for each picture based on information in the text.

#### Comprehension Check, page 17

1. A; 2. B; 3. B; 4: C; 5: Possible response: Warmer temperatures caused part of the river that was frozen to melt. Now people can boat down the entire length of the river.

### Peek in a Pool

#### Assess Vocabulary, page 22

Students should record the words and definitions from the Wordwise feature on page 23.

**habitat:** a place where a plant or animal lives and grows

**shallow:** not deep

**tide:** the flow of the ocean's water as it rises or falls each day

**tide pool:** a pool of water near a rocky shore

Sketches will vary depending on students' interpretations of each word. Evaluate each response for accuracy.

#### Assess Language Arts, page 23

Responses may vary. All points and reasons should be stated directly in the article.

#### Assess Content, page 24

Students should draw a picture showing living things in a tide pool at high or low tide. Images should be labeled accurately. Explanations should reference the location or actions of organisms during the particular type of tide.

#### Comprehension Check, page 25

1. B; 2. A; 3. C; 4: B; 5: Answers will vary depending on which animal students select.