

# TEACHER'S GUIDE

Adventurer

Vol. 17 No. 5



## In This Guide

This guide contains language arts and science or social studies lessons for articles in this issue of EXPLORER ADVENTURER.

## Explorer Magazine

EXPLORER classroom magazines are written for each grade, 2-5. Through great storytelling and stunning photographs, the magazines develop literacy skills and teach standards-based content aligned with the Common Core State Standards (CCSS), Next Generation Science Standards (NGSS), or National Council for the Social Studies (NCSS). The activity on the magazine's back cover is tailored to the NG Learning Framework. (see page 2)

EXPLORER magazines offer engaging reading opportunities for students with different ability levels in the same class. All articles have been measured using the Lexile® Framework for Reading. Articles in EXPLORER ADVENTURER will be within the 520-950L range.

For additional resources to extend your students' learning, visit EXPLORER's website, [NatGeo.org/ExplorerMagazine](http://NatGeo.org/ExplorerMagazine).

## Your Subscription Includes:

- Magazines • Classroom Posters • Projectables
- Teacher's Guides • Digital Magazines (additional subscription required)



Looking for a fun way to test your student's recall? Each story in this issue of Adventurer has an accompanying Kahoot! quiz.

## INTRODUCTION

### BACKGROUND

Since 1888, the National Geographic Society has funded scientists and explorers and shared their findings with the world. To support educators who use our resources, we have created a Learning Framework, which lays out what we believe students should learn from their experiences with the Society.

### PURPOSE

The Learning Framework was designed to convey the Society's core beliefs and values. It is built around a set of attitudes, skills, and knowledge that embody the explorer mindset.

To determine the learning outcomes within the Learning Framework, we dug deep into national standards in key subject areas. We also sought advice from subject matter and child development experts, along with the combined expertise of NG instructional designers, researchers, and content developers. To learn more, go to: <https://www.nationalgeographic.org/education/learningframework/>.

### IMPLEMENTATION

Each article in this magazine has a knowledge-based link to the Learning Framework. Students will use the skills and attitudes as they do the activity on the back cover. The activity relates to the article "River of Elk."

## MINDSET OF AN EXPLORER

### KEY FOCUS AREAS



#### Attitudes

*National Geographic kids are:*

**CURIIOUS** about how the world works, seeking out new and challenging experiences throughout their lives.

**RESPONSIBLE**, with concern for the welfare of other people, cultural resources, and the natural world. NG kids are respectful, considering multiple perspectives, and honoring others regardless of differences.

**EMPOWERED** to make a difference. NG kids act on curiosity, respect, and responsibility. They are adventurous and persist in the face of challenges.



#### Skills

*National Geographic kids can:*

**OBSERVE** and document the world around them and make sense of those observations.

**COMMUNICATE** experiences and ideas effectively through language and media. They are storytellers!

**COLLABORATE** with others to achieve goals.

**SOLVE PROBLEMS** by generating, evaluating, and implementing solutions after identifying alternatives, weighing trade-offs, and making well-reasoned decisions.



#### Knowledge

*National Geographic kids understand:*

**THE HUMAN JOURNEY** is all about where we have been, where we live now (and why), and where we are going.

**OUR CHANGING PLANET** encompasses all that coexists on our planet—interconnected through systems that generate and nurture each other.

**WILDLIFE AND WILD PLACES** inhabit our planet—from the butterflies in our backyards to the lions in Africa.

### Standard Supported

- Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (CCSS.RI.5.8)

### Resources

- Vocabulary Assessment Master (page 7)
- Language Arts Assessment Master (page 8)

### Summary

- The article "Lord of the Wings" reveals how an albatross can travel up to 966 kilometers (600 miles) a day without flapping its wings.

## BUILD VOCABULARY AND CONCEPTS

- drag
- dynamic soaring
- force
- friction
- gravity
- kinetic energy
- lift
- thrust

Display the vocabulary words on page 9 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 words might be related. For example, gravity and lift are opposing forces. Instruct students to write four sentences, using two different vocabulary words in each sentence.

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

Write the words *reasons* and *evidence* on the board.

**Then ask:** *What's the difference between these two words?* Invite students to share their ideas. Guide the class to understand that a reason tells why something happened. Evidence shows how.

Inform students that valid reasons and solid evidence are crucial elements of any text. Writers use them to support key points on a topic.

Display pages 2-3 of the projectable magazine. Instruct students to then examine the illustration while a volunteer reads aloud the headline and deck.

**Say:** *Sometimes when you read an article, you have to get a paragraph or two into the text before you can identify key points the writer is trying to make. In this article, the writer hints at a key point in the headline. She calls the wandering albatross "Lord of the Wings." In the deck, she points out that the wandering albatross can fly for months without touching land. The deck gives a supporting reason that makes the key point made in the headline clear: The wandering albatross is a superior flier.*

Give each student a copy of the **Language Arts Assessment Master**. Then have students read the article on their own. As they read, encourage them to search for reasons and evidence that support the identified key point. Then challenge them to record two more key points the writer makes in the text. Encourage students to record reasons and evidence that support each key point.



Click here for the Kahoot! quiz:

[https://play.kahoot.it/#/k/](https://play.kahoot.it/#/k/c034560d-53f5-4b7b-beb5-5739aa0c5d0b)

[c034560d-53f5-4b7b-beb5-5739aa0c5d0b](https://play.kahoot.it/#/k/c034560d-53f5-4b7b-beb5-5739aa0c5d0b)

# Lord of the Wings

## LANGUAGE ARTS

### TURN AND TALK

Have students turn and talk to discuss what they learned about the wandering albatross. **Ask:** *What is a wandering albatross?* (a type of seabird) *What is unusual about the wandering albatross?* (It spends most of its life in flight.) *What makes it possible for the albatross to stay in flight for so long?* (It uses the wind to travel as far as possible and its body is built for flight.) Invite students to share what else they learned about the albatross.

- **Finding Connections** Explain to students that a word's definition tells you what the word means. 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 connecting the article's vocabulary words. Instruct students to turn and share the sentences they wrote on their **Vocabulary Assessment Masters** with a partner. Encourage them to identify and discuss similarities and differences in their sentences to get an even deeper understanding of the vocabulary words.

- **Identifying Reasons and Evidence** After reading the article, remind students that reasons tell why something happened. Evidence explains how. Invite students to share their **Language Arts Assessment Masters** with a partner. Challenge them to examine one another's results to determine whether or not all reasons are valid, all evidence is solid, and both support the key points made 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 does the shape of a bird's wing help it fly?*
- *When and why do albatross make their way to land?*
- *What surprised you about what you read?*

### Standard Supported

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (NGSS.5-PS2-1)

### Resources

- Content Assessment Master (page 9)
- Comprehension Check (page 10)

### Science Background

The wandering albatross is a feathered giant. Adults can weigh up to 10 kilograms (22 pounds) and have a wingspan that stretches up to 3.5 meters (11.5 feet). That's the longest wingspan of any living bird.

These seabirds put their wings to good use. They spend most of their lives in flight. Unlike most birds, they don't constantly flap their wings to stay aloft. Instead, they stretch out their wings and lock them into place. Then they can glide for hours without rest. This flying technique is known as dynamic soaring.

Dynamic soaring is possible because wind speeds vary with altitude. The albatross flies a constant looping pattern. It gains altitude as it glides up on fast-moving updrafts. It gains speed as it dives back down toward slower moving air at the surface. This allows the bird to take advantage of differences in wind speed and capture energy from wind.

Throughout most of its 60-year lifetime, the wandering albatross flies above or rests on the sea. But adults do return to land to breed. Pairs, which mate for life, build nests on islands just north of the Antarctic Circle.

The female lays a single egg in their mud and grass nest. Both parents care for the egg, and they take turns caring for their offspring after it hatches. After about eight months, the young albatross is ready to fly off. Over the next five to seven years it grows and matures until it, too, is ready to return to land to mate.

### ENGAGE

#### Tap Prior Knowledge

Make a paper airplane. Fly it across the room. Ask students why they think the airplane flew. What kept it in the air? What made it eventually move to the ground? Do students think the airplane would have flown differently if it had larger wings? Encourage them to share their opinions.

### EXPLORE

#### Preview the Lesson

Display pages 2-3 of the projectable magazine. Instruct students to examine the photo. Then read aloud the deck. Point out to students that most birds cannot fly this long without touching land. As a class, brainstorm ideas about how the albatross is able to do this.

#### Set a Purpose and Read

Have students read the article in order to analyze how the albatross's body is built for flight, recognize the forces of flight, and understand how dynamic soaring allows the seabird to use opposing forces to counteract gravity and stay in flight.

### EXPLAIN

#### Analyzing the Albatross's Body

Display pages 6-7 of the projectable magazine. Zoom in on the sidebar "Built For Life at Sea." Review the diagram as a class. **Say:** *An albatross can fly for months at a time.* **Ask:** *Why doesn't it get tired?* (The albatross's wings lock in place so it doesn't have to flap its wings. This keeps the bird's muscles from getting tired.) Discuss how other parts of the albatross's body help the bird fly and live at sea.

#### Recognizing the Forces and Flight

Display page 5 of the projectable magazine. Review the section "Forces of Flight" as a class. **Say:** *Gravity is a force that pulls objects toward Earth's center.* Have students identify the other forces of flight (lift, drag, thrust). Discuss how each force affects a bird in flight. (Gravity pulls the bird down, lift pushes it up, drag slows it down, and thrust propels it forward.)

# Lord of the Wings

## SCIENCE

### EXPLAIN

(continued)

#### Understanding Dynamic Soaring

Inform students that most birds can fly because the shape of their wings splits air into two directions. Faster-moving air travels over the wings. Slower-moving air goes under. This gives birds the lift they need to overcome gravity. Flapping their wings creates thrust. As long as their thrust is more than the drag of head winds, they can move forward. **Say:** *The albatross is different. It doesn't flap its wings. It locks them in place and angles them. Then it turns directly into the wind. Instead of slowing the bird down, this allows the albatross to capture the kinetic energy of wind and soar upward.* Inform students that this technique is called "dynamic soaring." Assign each student a partner. Have pairs examine the information about dynamic soaring on page 6 of their student magazines. Then give each student a copy of the **Content Assessment Master**. Instruct students to show and tell how dynamic soaring works. Then challenge them to explain, in their own words, why dynamic soaring allows the albatross to stay in the air for such a long time.

### ELABORATE

#### Find Out More

Remind students that the wandering albatross is just one of the 22 different albatross species. Divide the class into small groups. Instruct groups to select one albatross species and conduct research to learn more about it. Invite groups to share and compare what they learned with the class.

#### Extend Your Thinking About the Albatross

Remind the class that each of the 22 albatross species is categorized as vulnerable, threatened, near threatened, or endangered by conservationists. Point out to students that there are natural threats, such as predatory fish. But the biggest danger for the albatross comes from longline fishing. As a class, identify solutions fishing companies have tried. Discuss reasons why the solutions could work. Brainstorm other ideas the companies could try.

### EVALUATE

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

- *What is a force?* (a push or a pull)
- *How does kinetic energy help an albatross fly?* (The bird uses the kinetic energy of wind to soar upward.)
- *What is dynamic soaring?* (a flying technique used to gain energy from the wind)

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

**VOCABULARY ASSESSMENT: Lord of the Wings**

Record each vocabulary word and its definition.

Word	Definition

Write four sentences showing how the vocabulary words above are connected.  
Use two different vocabulary words in each sentence.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**LANGUAGE ARTS ASSESSMENT: Lord of the Wings**

Record reasons and evidence that support this key point the writer makes.

<b>Key Point: The wandering albatross is a superior flier.</b>	
<b>Reasons</b>	<b>Evidence</b>

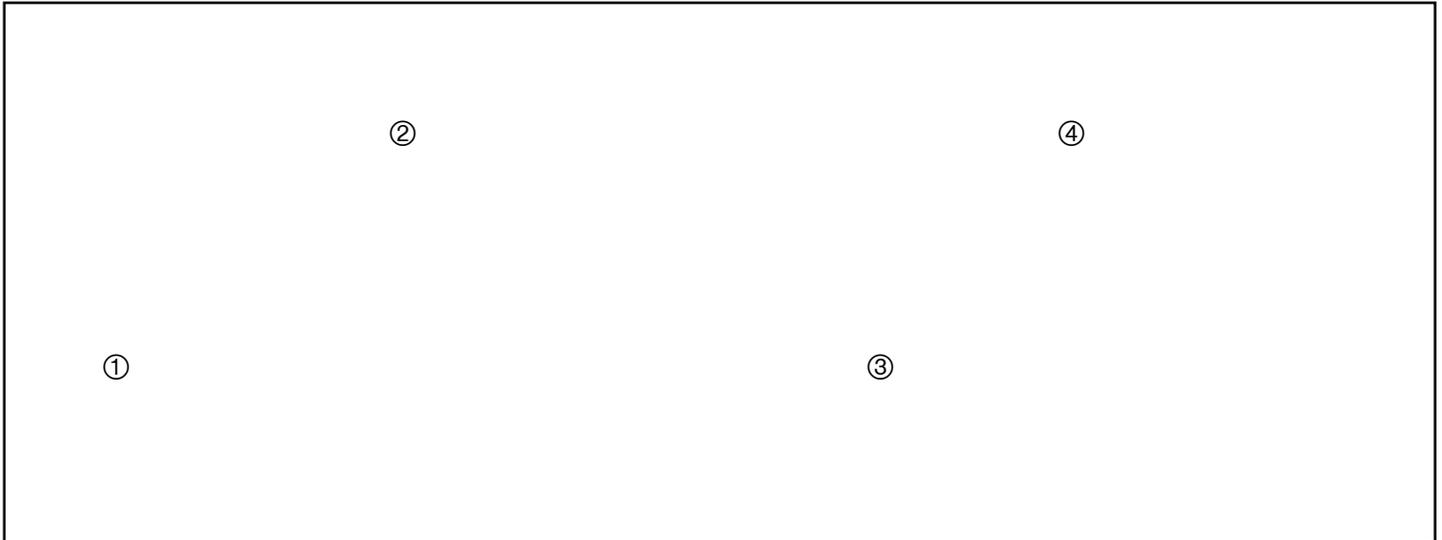
Identify two more key points in the article. Record reasons and evidence that support each.

<b>Key Point:</b>	
<b>Reasons</b>	<b>Evidence</b>

<b>Key Point:</b>	
<b>Reasons</b>	<b>Evidence</b>

**CONTENT ASSESSMENT: Lord of the Wings**

Draw a diagram to show dynamic soaring works.



Put these sentences in the correct order to tell how dynamic soaring works.

- \_\_\_\_\_ The albatross glides back down to the sea to gain speed.
- \_\_\_\_\_ The cycle repeats.
- \_\_\_\_\_ The wind lifts the bird.
- \_\_\_\_\_ An albatross flies low over the waves. Then the bird turns into the direction of the wind.

In your own words, explain why dynamic soaring allows the albatross to stay in the air for such a long time.

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**COMPREHENSION CHECK: Lord of the Wings**

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

- 1. What are the four forces of flight?
  - Ⓐ drag, friction, gravity, and kinetic energy
  - Ⓑ lift, thrust, drag, and gravity
  - Ⓒ thrust, drag, lift, and friction
  
- 2. Which force does the albatross overcome with dynamic soaring?
  - Ⓐ friction
  - Ⓑ drag
  - Ⓒ gravity
  
- 3. How far can an albatross fly without flapping its wings?
  - Ⓐ hundreds of kilometers
  - Ⓑ thousands of kilometers
  - Ⓒ millions of kilometers
  
- 4. Why does an albatross go to land?
  - Ⓐ to find a mate
  - Ⓑ to find food
  - Ⓒ to find a place to rest

5. How does dynamic soaring work?

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### Standard Supported

- Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. (CCSS.RI.5.2)

### Resources

- Vocabulary Assessment Master (page 15)
- Language Arts Assessment Master (page 16)

### Summary

- The article "Orchids: Flowers of the Forest" introduces readers to the unique world of orchids, the world's largest family of flowering plants.

## BUILD VOCABULARY AND CONCEPTS

- **column**
- **lip**
- **nutrient**
- **petal**
- **sepal**

Display the Wordwise feature on page 17 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. Discuss how the vocabulary words are related. Then challenge students to create a diagram that illustrates how the words are connected. Have students label each term in their drawings. Then invite students to share their ideas with the class.

## READ

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

Explain to students that what they just attempted to identify was the main idea or overall topic of the article. Tell students that everything in the article is connected to the main idea. The main idea is supported with key details in the text.

Display pages 10-11 of the projectable magazine. Model how to identify the main idea of the article. **Say:** *To figure out what this article is about, I need to look for clues. The first clues are the photos. Each photo shows a different flower. The headline tells me that these flowers are all orchids and that they grow in the forest. Does that mean the article will talk about how and where orchids grow? To know for sure, I need to look for more clues.* Invite a volunteer to read aloud the deck. **Say:** *This is extremely useful information. This article will tell me about all types of orchids. It will explain why orchids are such special flowers. As I read the article, I'm sure I'll find many interesting details that support this idea.*

Have students read the article on their own. As students read, encourage them to search for details that support the main idea of the article.



Click here for the Kahoot! quiz:

[https://play.kahoot.it/#/k/](https://play.kahoot.it/#/k/800cfd6b-4137-46dc-a3bf-158e9c0c8b72)

[800cfd6b-4137-46dc-a3bf-158e9c0c8b72](https://play.kahoot.it/#/k/800cfd6b-4137-46dc-a3bf-158e9c0c8b72)

### TURN AND TALK

Have students turn and talk to discuss what they learned about orchids. **Ask:** *What is an orchid?* (a type of flower) *Why were orchids so valuable in the past?* (They grow in the tropics and subtropics. It was dangerous and expensive to find them.) *Why are they easier to find now?* (People grow them in greenhouses.) Have students share other facts they learned about orchids.

- **Identify Main Ideas** Remind students that the article has a main idea. Then point out that each section has a main idea, too. Explain that readers can find the main idea of a section the same way they found the main idea of the article. They search for important clues. Give each student a copy of the **Language Arts Assessment Master**. Assign each student a partner. Have pairs review the article and record key details in each section. Based on those details, instruct them to identify the main idea of each section. Then, using that information as a base, challenge them to write the main idea of the article along with a brief summary of the text. Once partners are finished, have them share what they learned with another pair.

### 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 are people so fascinated with orchids?*
- *How are most orchids alike? In what ways are orchid species different from one another?*
- *What surprised you about what you read?*

### Standard Supported

- Plants acquire their material for growth chiefly from air and water. (NGSS.5-LS1-1)

### Resources

- Content Assessment Master (page 17)
- Comprehension Check (page 18)

### Science Background

Recognized for their variety and beauty, orchids are one of the most ancient flowering plants found on Earth. They are also the largest family of plants, with more than 25,000 species. They mostly grow in moist tropical areas.

There are two main types of orchids. Terrestrial orchids grow in loose soils on the forest floor. They get nutrients from decomposing leaves and twigs. Epiphytic orchids grow on trees. They have a spongy covering around their roots. It absorbs the nutrients, moisture, and air they need to survive.

Orchids are nothing if not diverse. Blooms can be as big as your hand or small enough to fit on a pinhead. Flowers may look like a running man or a flying duck. Orchids blossoms often mimic the shape of pollinators they want to attract. And the blooms come in every color except for blue and black.

Despite this variety, most orchid flowers have the same basic parts. The three outermost flower parts are sepals. Inside the sepals lie two petals and a lip. The lip is a specialized petal designed to attract specific pollinators. The column, which combines the flower's male and female parts, is in the middle.

### ENGAGE

#### Tap Prior Knowledge

Give each student a piece of plain white paper and access to crayons or colored pencils. Then ask each student to draw a picture of a flower. Compare and contrast the results. Point out the variety of colors, sizes, and shapes. Then point out that, more likely than not, students' drawings represent different species of flowers. **Ask:** *Do you think it's possible for one species of flower to have this much variety?* Encourage students to share their opinions.

### EXPLORE

#### Preview the Lesson

Display pages 10-11 of the projectable magazine. Read aloud the headline and deck. **Say:** *Each flower you see here is an orchid. According to the deck, orchids come in nearly every shape, size, and color.* **Ask:** *How would you describe the orchids you see in these photos?* Invite students to share their descriptions.

#### Set a Purpose and Read

Have students read the article in order to identify the common parts of most orchids, compare and contrast different orchid traits, and understand how orchids get the nutrients they need to survive.

### EXPLAIN

#### Identifying the Anatomy of an Orchid

Inform students that most orchids have common characteristics. One example is the flowers' parts. Display page 13 of the projectable magazine. Review the diagram to identify those parts (sepal, petal, column, lip). Then have students examine the section "Anatomy of an Orchid" on page 12 of their student magazines for more information about each flower part. Divide the class into pairs. Instruct partners to review the article's photos. Challenge them to identify the sepal, petal, column, and lip on as many orchids as they can. Rejoin as a class to compare results. Give each student a copy of the **Content Assessment Master**. Instruct students to draw a picture of an orchid and label its parts.

### EXPLAIN

(continued)

#### Compare and Contrast Orchid Traits

Point out to the class that while most orchids have common characteristics, orchid species vary in many ways. **Say:** *Orchids come in nearly every shape, size, and color. That's what makes these flowers so special.* Display pages 16-17 of the projectable magazine. As a class, compare and contrast the shapes, sizes, and colors of the orchids shown here. Then have students take out their **Content Assessment Masters**. Based on what they've seen and read in the article, instruct students to compare and contrast the shape, size, and color of different orchid species.

#### Understand How Orchids Get Nutrients

Remind students that a nutrient is a substance that is needed for healthy growth, development, and functioning. **Say:** *You get the nutrients you need from the food you eat. Most plants grow in soil. They absorb nutrients from the soil through their roots. Some orchids grow this way. Others don't.* Display page 14 of the projectable magazine. Inform students that this orchid is an epiphytic, which is a type of plant that grows in or on trees. **Say:** *Growing on a tree lets this orchid reach more sunlight.* **Ask:** *But how can the flower's roots, which are nowhere near the ground, help the orchid get what it needs to survive?* (The roots are surrounded by a spongy covering that absorbs nutrients, moisture, and air, while preventing the true roots inside from drying out.) As a class, discuss how other orchids have adapted to live in places where they can get what they need to survive. (Orchids that need constant water grow in wet bogs. Those that need constant shade grow near tall trees.)

### ELABORATE

#### Find Out More

Inform students that orchids are the largest family of flowering plants. There are more than 25,000 different species, and each one is unique. Assign each student a partner. Instruct pairs to conduct research to identify several orchid species that share a common trait, such as those featured in the "Look-Alikes" diagram on pages 16-17 of the article. Encourage partners to create a poster with pictures and captions comparing the different orchids in this way. Have pairs share their posters with the class.

#### Extend Your Thinking About Orchids

Remind students that people grow millions of orchids in greenhouses each year. But orchids are still rare and hard to find in the wild. Many species are close to extinction because their habitats are disappearing and people are collecting them illegally. As a class, discuss reasons why it is important to protect wild orchids. Challenge students to identify ways this could be done.

### EVALUATE

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

- *How are orchids different from most other flowers?* (The male and female parts are combined into the column.)
- *How does the lip on an orchid help attract pollinators?* (It is usually very colorful or has a special shape.)
- *People admire orchids for their beauty. What practical ways have people found to use the flowers?* (Vanilla, one of the most popular flavors, comes from an orchid. People have also used orchids to make glue and medicines.)

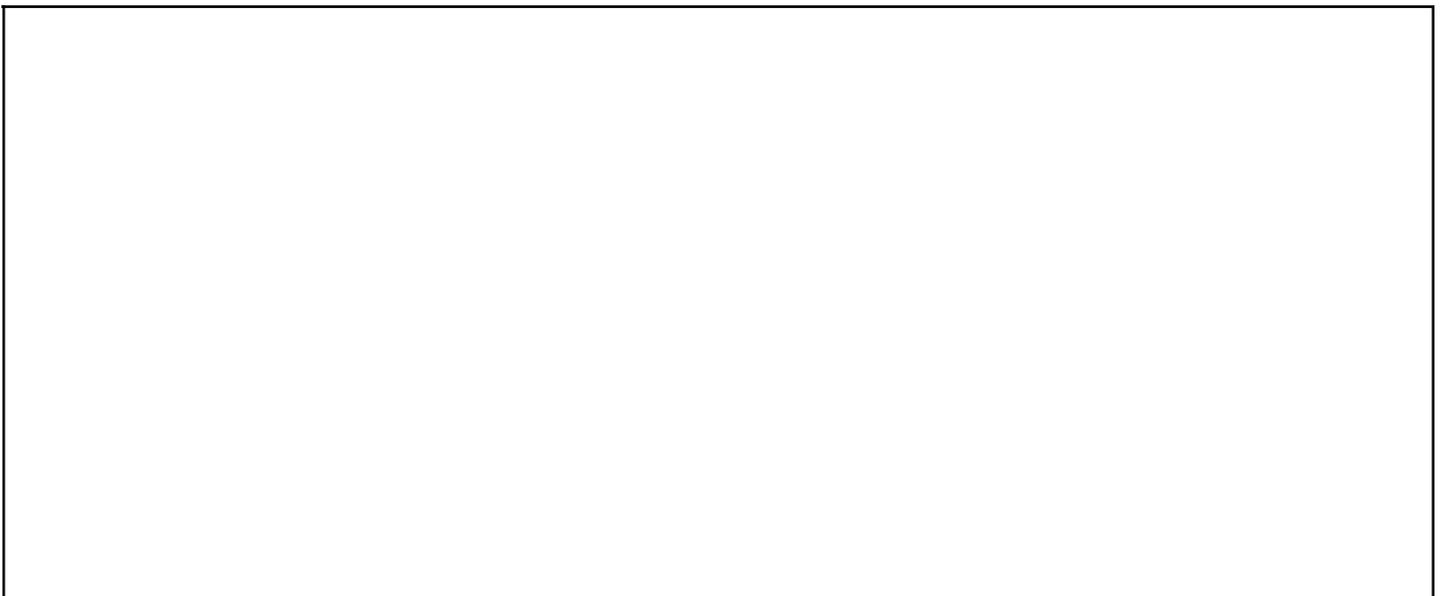
If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

**VOCABULARY ASSESSMENT: Orchids**

Record each vocabulary word and its definition.

Word	Definition

Create a diagram that shows how each vocabulary word is connected to an orchid.  
Label each part of your drawing.



**LANGUAGE ARTS ASSESSMENT: Orchids**

Use this organizer to record information about each section in the article.

Subhead	Key Details	Main Idea
Introduction		
Good to Grow		
From Big to Small		
Anatomy of an Orchid		
How Does the Garden Grow?		
Not Just for Show		
Big Business		
Look-Alikes		

What is the main idea of the article? \_\_\_\_\_

\_\_\_\_\_

Summarize the article. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Orchids**

Draw an orchid and label its parts. Describe similarities and differences in the shape, size, and color of orchids.

Draw and Label	Describe		
	Shape		
	Size		
	Color		

**COMPREHENSION CHECK: Orchids**

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

- 1. Where do orchids grow?
  - Ⓐ tundra or taiga
  - Ⓑ deserts or savannas
  - Ⓒ tropics or subtropics
  
- 2. Which type of orchid grows in the ground?
  - Ⓐ terrestrial
  - Ⓑ epiphytic
  - Ⓒ characteristic
  
- 3. Which do you call the fused male and female parts of an orchid?
  - Ⓐ the lip
  - Ⓑ the column
  - Ⓒ the sepal
  
- 4. Which of these statements is true?
  - Ⓐ The largest orchid has blooms as big as a pinhead.
  - Ⓑ Orchids have parts shaped to attract insects.
  - Ⓒ Most orchid blooms are black or blue.

5. How does an orchid that grows on a tree get the nutrients it needs to survive?

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### Standard Supported

- Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (CCSS.RI.5.1)

### Resources

- Vocabulary Assessment Master (page 23)
- Language Arts Assessment Master (page 24)

### Summary

- The article "River of Elk," introduces readers to a researcher and a photographer and explains how and why they are tracking the mass migration of elk in Yellowstone National Park.

## BUILD VOCABULARY AND CONCEPTS

- camera trap
- data
- ecosystem
- GPS collar
- migration

Display the vocabulary words on a word wall or on a whiteboard. Inform students that when they read they will encounter words they don't know. Remind them that using context clues such as the sentences before or after an unknown word and visuals such as photographs or illustrations can help them figure out what an unfamiliar word means.

Give each student a copy of the **Vocabulary Assessment Master**. Instruct students to record each vocabulary word from the article. Have them scan the article to locate each bold word in the text.

Instruct students to find and record text and visual clues in the article related to each vocabulary word. Then have each student record his or her own idea about what each word means. Invite volunteers to read aloud the definitions from the Wordwise feature on page 23 of their student magazines. Have students record the definitions on their worksheets. Encourage them to compare the definitions they wrote with the definitions from the text.

## READ

Tell students that as they read, they will come across many facts that are stated clearly in the text. These facts are explicit statements. But they will also encounter clues that require them to make an inference, or educated guess. To do this, they must combine what the text says with what they already know to reach a logical conclusion.

Display pages 18-19 of the projectable magazine. Read aloud the headline. Then model how to identify an explicit statement and make inferences. **Say:** *According to the headline, the animals you are going to read about in this article are elk. That is an explicit statement, or a stated fact. But the headline is "River of Elk." What does that mean? To figure it out, I'll have to search for clues.*

**Say:** *A river is a long, flowing body of water. The top photo shows a line of elk. Rivers are long. So based on the reference to a river, I can infer—or make a logical guess—that the line of elk is a lot longer than what we see here. I can also guess that the line is constantly moving, just like a river. To find out if my inferences are correct, I'll need to read the article.*

Give each student a copy of the **Language Arts Assessment Master**. Instruct students to read the article on their own. As they do, have them write five explicit statements and make five inferences about elk. As students record their ideas, remind them to quote accurately from the text.



Click here for the Kahoot! quiz:

[https://play.kahoot.it/#/k/](https://play.kahoot.it/#/k/a6b55e86-9280-4251-be2a-be9014e2df95)

[a6b55e86-9280-4251-be2a-be9014e2df95](https://play.kahoot.it/#/k/a6b55e86-9280-4251-be2a-be9014e2df95)

### TURN AND TALK

Have students turn and talk to discuss what they learned about elk. **Ask:** *Where are the elk featured in the article going? (Yellowstone National Park) Why are the researchers studying them? (They want to track the elk's migration pattern.) What is migration? (the regular passage of groups of animals from one region to another for feeding or breeding)* Encourage students to share other interesting facts they learned about elk.

- **Strengthen Understanding** Inform students that combining what you already know with what you learn can help readers understand new words. **Say:** *Once you understand what a word means, it's easier to use it correctly in a sentence.* Challenge students to make accurate statements using each of the vocabulary words. Encourage them to use their **Vocabulary Assessment Masters** as a resource. Remind students to be original. They shouldn't restate sentences from the article. They should create new sentences of their own.

- **Making Inferences** Remind students that making inferences is a strategy that can help them understand what they read. **Say:** *Understanding what you just read is important. But interpreting information from a writer's clues takes practice. If you can't follow the clues, you might need to reread the text.* Have students compare their **Language Arts Assessment Masters** with a partner. Did students identify the same explicit statements? Did they find the same clues? If so and they developed different inferences, encourage students to review the text once again. Challenge students to show their partners where in the article they found each explicit statement and where they found the information they used to make each inference.

### 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 does migration help animals survive?*
- *Why is it important for people to recognize the elk's annual migration route in Yellowstone?*
- *What surprised you about what you read?*

# River of Elk

## SCIENCE

### Standard Supported

- Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. (NGSS.5-LS2-1)

### Resources

- Content Assessment Master (page 25)
- Comprehension Check (page 26)

### Science Background

At one time, elk were found across much of North America. But over the years, they were killed off and driven to live in more remote areas. Today, most elk live in western North America, including the mountainous regions of Yellowstone National Park.

Each year, tens of thousands of elk migrate between Yellowstone and the lower altitude areas that surround it. Their route follows the path of freshly sprouted grass. It also takes them across private lands where fences block their way and roads present crossing hazards.

To protect the elk and hopefully prevent more obstructions from being built, wildlife biologist Arthur Middleton and photographer Joe Riis set out to track the elk's annual migration route.

To do this, the researchers had to capture elk and put GPS collars around their necks so they could track the elk's movement. That was the easy part. Then they had to follow the elk along a route that went up and down mountains, through deep snow, and across raging rivers. At times, it was impossible to keep up.

That's where the locals came in. Area residents told the researchers where the elk were going. Middleton and Riis got ahead of the herd and set up camera traps in their path. The data and images they collected, helped them track the elk's route and showed them how elk get what they need to survive along the way.

## ENGAGE

### Tap Prior Knowledge

Instruct students to think about a wild animal they commonly see, such as a squirrel. Tell students to imagine that they must follow that animal and document its actions for one day. Challenge students to identify problems they might encounter. For example, how would they keep track of the animal when it went places they couldn't go? Brainstorm potential solutions for each problem students mention.

## EXPLORE

### Preview the Lesson

Display pages 18-19 of the projectable magazine. Invite a volunteer to read aloud the headline and deck. As a class, discuss reasons why people might want to follow elk as they migrate to Yellowstone. Brainstorm ideas about what they could learn from the experience.

### Set a Purpose and Read

Have students read the article in order to understand how migration helps elk survive in their environment and how technology helps people track and record animal movements.

### EXPLAIN

#### Understanding Elk Migration

Display page 23 of the projectable magazine. Zoom in on the Wordwise feature and review the definition of migration. **Say:** *Many different animals migrate. And they always do it for a reason. Animals migrate to get the resources they need to survive.* Remind the class that researchers call the Yellowstone elk migration "surfing the green wave." Challenge students to explain why. (Elk are following the freshly sprouted grass.) Zoom in on the map showing the elk's migration route. Use the map key to help students interpret the map. If necessary, point out that the elk travel to Yellowstone in the summer but away from the park during winter. Challenge students to explain how this pattern of movement helps the elk survive. (Yellowstone is in the highlands. Grass stays greener for longer there, so it's a good place to find food in the summer. But in the winter, there is too much snow. The elk move back to lower lands where they can find shelter from the snow.)

#### Using Technology to Learn About Migration

Instruct students to examine the article's photos in their student magazines. Invite volunteers to describe what they see. **Say:** *These photos show elk running across highlands, going up and down mountains, and even crossing raging rivers. And the researchers were right there with them.* **Ask:** *How was this possible?* (The researchers put GPS collars on the elk so they could track their movements. Local people told them where the elk would travel next, which gave them time to set up camera traps before the elk got there.) Give each student a copy of the **Content Assessment Master**. Instruct students to draw a picture of elk as they would appear from a distance. Then have them draw that same scene close up, or like a picture taken with a camera trap. Instruct students to explain how camera traps help people learn more about elk.

### ELABORATE

#### Find Out More

Inform students that photos provided valuable information about elk migration to Yellowstone and the return trip. They showed researchers how and where elk go and how elk parents teach younger animals to survive along the way. Remind students that elk are just one of many animals with an annual migration. Divide the class into small groups. Tell groups to select another animal that migrates each year. Instruct them to conduct research to track the animal's migration route. Challenge them to explain how and why the animals migrate and what parents teach their young along the way.

#### Extend Your Thinking About Communication

Display the National Geographic Learning Framework feature on the back cover of the magazine. Discuss what communication is and how the researchers in the article "River of Elk" used pictures and words to communicate their findings with others. Then have students go outside. Tell them to take or draw pictures of something they find interesting. Give students time to write about what they saw. Encourage students to share their picture stories with others.

### EVALUATE

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

- *What is a GPS collar?* (a collar used as a radio beacon to track animal migration for research)
- *What did data from GPS collars reveal about the Yellowstone elk?* (which routes they follow and where they spend their summers and winters)
- *What is a camera trap?* (a remotely activated camera)

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

Name \_\_\_\_\_

Date \_\_\_\_\_

**VOCABULARY ASSESSMENT: River of Elk**

Record information from the article about each vocabulary word.

Word					
Text Clues					
Visual Clues					
What I Think the Word Means					
Definition					

**LANGUAGE ARTS ASSESSMENT: River of Elk**

Record five explicit statements and make five inferences about elk.

Explicit Statements	
1.	
2.	
3.	
4.	
5.	

**Inferences**

What the Text Says	What I Already Know	Inferences I Can Make

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: River of Elk**

Draw a picture of elk from a distance. Draw that same scene close up, or like a picture taken with a camera trap.

Distance	Camera Trap

Explain how camera traps help people learn more about elk.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**COMPREHENSION CHECK: River of Elk**

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

1. Why do elk go to Yellowstone National Park?

- Ⓐ to get water
- Ⓑ to be in snow
- Ⓒ to eat grass

2. When do the elk arrive in Yellowstone?

- Ⓐ summer
- Ⓑ fall
- Ⓒ winter

3. How often do elk migrate to Yellowstone?

- Ⓐ once a week
- Ⓑ once a month
- Ⓒ once a year

4. What triggers a camera trap to take a photo?

- Ⓐ light
- Ⓑ motion
- Ⓒ sound

5. How does migration help elk survive in their environment?

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# Understanding Maps

## EUROPE

### Standard Supported

- Use maps of different scales to describe the locations of cultural and environmental characteristics. (NCSS.D2.Geo.3.3-5)

### Resources

- Content Assessment Master (page 28)
- Comprehension Check (page 29)
- Europe Physical Map poster (teacher's edition)
- Europe Political Map poster (teacher's edition)

### Social Studies Background

Spatial thinking is an essential skill for students to develop as they learn about geography and Earth and environmental sciences. Developing spatial concepts takes time and practice. Recognizing that, each month Explorer magazine will introduce students to a new set of physical and political maps. Use the accompanying lessons to guide students as they learn to recognize spaces and places in the natural world.

## ENGAGE

### Tap Prior Knowledge

Give students three minutes to list facts about Europe. Review the lists. Which items were recorded most often? Which countries could students name? Note questionable items that show students could benefit by learning more about Europe.

## EXPLORE

### Preview the Lesson

Display the **Europe Physical Map poster** and the **Europe Political Map poster**. Cover the captions. Have students examine the photos. As a class, discuss what each photo tells about Europe.

### Set a Purpose and Read

Have students examine the posters in order to understand that physical and political maps can be used to describe the cultural and environmental characteristics of a location.

## EXPLAIN

### Explore the Physical Map

Display the **Europe Physical Map poster**. Read aloud the text in the "Landforms" box. Have students find the Alps and Balkans on the map. Challenge students to identify and locate other mountain ranges in Europe. Review the other boxes in this same way. Then read aloud the caption for each photo. Invite students to share what the map taught them about the physical characteristics of Europe.

### Explore the Political Map

Display the **Europe Political Map poster**. Invite volunteers to read aloud the captions and text. As a class, find each location mentioned on the map. Challenge students to add another fact they know about each place. As a class, make a list of fun facts students know about European locations.

## ELABORATE

### Find Out More

Ask students to examine the **Europe Physical** and **Political Map** posters. **Ask:** *Why does Europe look larger on the political map?* (More area is colored (non-gray).) *Why is this accurate?* (The entire political area of each country is colored on the political map. But physically, only portions of some countries are in Europe. Only those portions are colored on the physical map.) Point out the white line on the political map that divides Europe and Asia.

### Extend Your Thinking About Europe

Give each student a copy of the **Europe Map Content Assessment Master**. Have students create a physical or political map of Europe. Then have them conduct research to find and record five more physical or political facts about Europe.

## EVALUATE

Have students ask and answer questions about the physical and political maps. If you wish, have them complete the **Comprehension Check** to assess their knowledge of European geography.

Name \_\_\_\_\_

Date \_\_\_\_\_

**CONTENT ASSESSMENT: Europe Maps**

Create a physical or political map of Europe. Record five new facts about Europe.



1.

2.

3.

4.

5.

**COMPREHENSION CHECK: Europe Maps**

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

1. What is the climate like in western Europe?  
Ⓐ arctic  
Ⓑ subtropical  
Ⓒ temperate
  
2. What portion of all Europeans live in urban areas?  
Ⓐ one-quarter  
Ⓑ one-half  
Ⓒ three-quarters
  
3. What is the smallest country in Europe?  
Ⓐ Russia  
Ⓑ Vatican City  
Ⓒ Albania
  
4. What is the highest mountain peak in Europe?  
Ⓐ Mount Elbrus  
Ⓑ Stonehenge  
Ⓒ Mount Etna

5. Write three facts about Europe.

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### Lord of the Wings

#### Assess Vocabulary, page 7

Students should record the words and definitions from the Wordwise feature on page 9.

**drag:** the force that slows down an object's movement

**dynamic soaring:** a flying technique used to gain energy from the wind

**force:** a push or a pull

**friction:** the force that slows down objects when they rub against each other

**gravity:** the force that causes objects to fall toward the center of Earth

**kinetic energy:** the energy an object has due to its motion, such as wind or moving water

**lift:** the force that pushes something upward

**thrust:** the force that propels something forward

Sentences will vary depending on the connections students identify.

#### Assess Language Arts, page 8

Students should identify reasons and evidence that support the writer's point that the wandering albatross is a superior flier. Answers may vary, but they should all come directly from the text. Other answers will vary depending on which key points students identify.

#### Assess Content, page 9

**Draw:** Students should create a diagram like the one on page 6 of the article.

**Sequence:** The order of events is: 3, 4, 2, 1.

**Explain:** With dynamic soaring, the albatross can fly without flapping its wings. This method of flying is so efficient, the bird uses up only a little more energy than it would sitting on its nest. Because of that, it can fly for a long time without stopping.

#### Comprehension Check, page 10

1. B; 2. C; 3. B; 4. A; 5: Possible response: An albatross flies low over the waves. Then the bird turns into the direction of the wind. The wind lifts the bird. The albatross glides back down to the sea to gain speed. The cycle repeats.

### Orchids

#### Assess Vocabulary, page 15

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

**column:** the fused male and female parts of an orchid

**lip:** a type of petal designed to attract pollinators

**nutrient:** a substance that is needed for healthy growth, development, and functioning

**petal:** one of the brightly colored leaf-like parts of a flower

**sepal:** one of the parts forming the outer covering of a flower

Diagrams should show an accurate connection between the words. All terms should be labeled in the diagram.

#### Assess Language Arts, page 16

Key details and for each section may vary. Main ideas should be directly related to the content of each section. The main idea and summary of the article should reflect that orchids are diverse and special flowers.

#### Assess Content, page 17

Students should draw an image of an orchid like the one on page 13 of the article and label the sepal, petal, column, and lip. Descriptions will vary, but students should note similarities and differences in the shape, size, and color of different orchids.

#### Comprehension Check, page 18

1. C; 2. A; 3. B; 4. B; 5: The roots of orchids that grow on trees have a spongy covering that absorbs nutrients, moisture, and air.

(continued)

### River of Elk

#### Assess Vocabulary, page 23

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

**camera trap:** a remotely activated camera

**data:** information about something that can be used in calculating, reasoning, or planning

**ecosystem:** includes all of the living things in a given area interacting with each other and also interacting with the non-living parts of that environment

**GPS collar:** a collar used as a radio beacon to track animal migration for research

**migration:** the regular passage of groups of animals from one region to another for feeding or breeding

Text clues, visual clues, and what students think each word means may vary. Evaluate answers for accuracy.

#### Assess Language Arts, page 24

Students should record five explicit statements and five inferences. Inferences may vary but should be logical and directly relate to information in the text.

#### Assess Content, page 25

Students should draw the same scene of elk along the migration route close up and from a distance. They should explain that camera traps allow people to capture images of the animals without getting too close or disturbing them. The close-up images would show exactly what elk were doing while distant shots would just show a long line of elk on the move.

#### Comprehension Check, page 26

1. C; 2. A; 3. C; 4. B; 5: Migration allows elk to find plenty of food in the summer and shelter from snow in the winter.

### Europe Maps

#### Assess Content, page 28

Students should create an accurate physical or political map of Europe. Facts will vary, but they should relate to the type of map (physical or political) that the student chose to create.

#### Comprehension Check, page 29

1. C; 2. C; 3. B; 4: A; 5: Facts will vary but should come from the Europe Physical or Political Map posters.