In This Guide
This guide contains language arts and science or social studies lessons for articles in this issue of Explorer Trailblazer.

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 Trailblazer will be within the 350-750L range.

For additional resources to extend your students’ learning, visit Explorer’s website, natgeo.org/explorermag-resources.

Your Subscription Includes:
• Magazines • Classroom Posters • Projectable Magazine
• Teacher’s Guide • App (additional subscription required)
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 “In Search of Pristine Seas.”

MINDSET OF AN EXPLORER

KEY FOCUS AREAS

A —— Attitudes

National Geographic kids are:
CURIOS 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.

S —— 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.

K —— 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.
Tall Tales

LANGUAGE ARTS

Standard Supported
• Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently. (CCSS.RI.3.5)

Resources
• Vocabulary Assessment Master (page 7)
• Language Arts Assessment Master (page 8)

Summary
• The article “Tall Tales” explores how new discoveries have changed people’s ideas about giraffes and how this might impact conservation efforts in the future.

BUILD VOCABULARY AND CONCEPTS
• conservation
• habitat
• species

Display the vocabulary words on a word wall or on a 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, encourage them to share their ideas about how the words could be related to giraffes in small groups. Then challenge each student to sketch a larger picture showing how the three words are related in that context. Instruct students to label their representations of each term in their drawings.

READ
Display pages 2-3 of the projectable magazine. Ask: What animal are you going to read about in this article? [giraffe] Say: Raise your hand if you used the photo to answer my question. Guide the class to recognize that photos are a text feature that helps readers locate key facts quickly.

Point out that this article contains other text features that help in this way, too. Model how to identify and use text features to learn about a topic. Say: I’ve seen lots of pictures of giraffes. As this photo shows, they are tall animals with long necks and brown spots. But then I noticed the deck. It tells me something I didn’t know. Not all giraffes are the same. There’s more than one species of giraffe! That’s an important fact, and it was easy to find because it’s in large type in the deck.

Have students review the article to identify the headline, subheads, diagram, map, bold print, photos, and captions. Discuss how each text feature can help readers get information quickly.

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 record one key fact they learned from each type of text feature in the article.
TALL TALES

TALL TALE

Have students turn and talk to discuss what they learned about giraffes. **Ask:** What is a giraffe? (Possible response: a very tall animal with long legs, a long neck, and brown spots) Why didn’t people know there was more than one species of giraffe? (Nobody had studied giraffes closely because they’re so common.) Why are people worried about giraffes now? (With the population of giraffes now divided into four groups, giraffes need to be protected from extinction.)

- **Interpreting Definitions** Have students turn and talk to share what they learned about the article’s three vocabulary words. Encourage them to describe to classmates how their drawings tie the words together while accurately reflecting the definition of each word.

- **Using Text Features** After reading the article, divide the class into small groups. Instruct students to ask each other questions about giraffes. Encourage them to use the information they recorded on their **Language Arts Assessment Masters** to find the answers. Rejoin as a class. Discuss how using various text elements helped them quickly locate key information about giraffes in 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.

- What does conservation mean?
- How is subhead “Spot the Difference” connected to the new information about giraffes?
- What surprised you about what you read?
Science Background

Giraffes are giant animals. As newborns, they are about 1.9 meters (6 feet) tall and weigh around 68 kilograms (150 pounds). By the time they become adults, they can reach up to 5.8 meters (19 feet) tall and weigh up to 1,270 kilograms (2,800 pounds). They are the tallest land animals on Earth.

Other than humans, the giraffe’s only predators are lions and crocodiles. Although giraffes can deliver deadly blows with their long, strong legs, they gain additional protection by living together in groups called towers. One giraffe can stand guard while others catch the five to 30 minutes of sleep they need each day.

Until recently, it was believed that all giraffes belonged to the same species. However, a study of giraffe DNA released in 2016 revealed that there are actually four different species of giraffe—the Masai giraffe, reticulated giraffe, southern giraffe, and northern giraffe. The different varieties can be distinguished by examining the animals’ spots.

While interesting, these findings are also cause for alarm. Fewer than 100,000 giraffes remain living in the wild. Now we know that number is actually divided into four distinct groups. It is more important than ever to protect giraffes, which are now one of the most endangered large mammals in the world.
EXPLAIN

Identify Body Parts that Help Giraffes Survive
Display pages 4-5 of the projectable magazine. Read aloud the information in the brown blurb. Point out that each caption in the diagram tells about a different part of a giraffe. Have students review the diagram in small groups. Rejoin as a class. Invite students to share what they learned. Then challenge them to explain how different parts of a giraffe’s body parts help it survive in the environment where it lives. (Possible responses: Brown spots help a giraffe blend in with a brown landscape. Long legs and a long neck help it reach the leaves it likes to eat. Long legs also help it run fast to escape from predators.)

Distinguish Between Giraffe Species
Display pages 6-7 of the projectable magazine. As a class, study the photos. Invite volunteers to identify similarities between the four giraffe species. (Possible responses: All have long legs, long necks, small heads, horns, and brown spots. All live in Africa.) Point out the map. Have students note differences in where the four species of giraffes live. Then review the section “Spot the Difference.” Combined with what they see in the photos, challenge students to identify key differences in the spots on the four species of giraffes. Give each student a copy of the Content Assessment Master. Instruct each student to select one species of giraffe and color the outline of the giraffe in a way that accurately reflects the color, size, shape, and location of its spots. Have students identify the giraffe and describe its spots. Challenge them to explain how the spots prove the giraffe they drew belongs to this species.

ELABORATE

Find Out More
Point out to students that the article describes the physical traits of giraffes in detail. But it doesn’t tell much about their behaviors. Divide the class into small groups. Have groups conduct research to learn about the habits and behaviors of giraffes. Invite groups to present their findings to the class.

Extend Your Thinking About Giraffes
Remind students that until recently, scientists had not studied giraffes in detail. As a class, discuss reasons why scientists might not have wanted to study giraffes. Challenge students to identify reasons why giraffes should be the subject of further research.

EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.
- What are the four species of giraffes? [Masai giraffe, reticulated giraffe, northern giraffe, and southern giraffe]
- How is a giraffe’s neck similar to a human’s neck? How is it different? [Both humans and giraffes have seven neck bones, or vertebrae. But a giraffe’s vertebrae are much bigger.]
- How do a giraffe’s spots help it survive? [The spots are camouflage. They help a giraffe blend in with the leaves and shadows made by sunlight.]

If you wish, have students complete the Comprehension Check to assess their knowledge of concepts mentioned in the article.
VOCABULARY ASSESSMENT: Tall Tales

Record each vocabulary word and its definition. Draw a small picture to show what each word means.

<table>
<thead>
<tr>
<th>Word</th>
<th>Definition</th>
<th>Picture</th>
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Draw a larger picture that shows how the words are related to giraffes. Add labels to show how you included each word in your drawing.
## LANGUAGE ARTS ASSESSMENT: Tall Tales

Record one key fact you learned from each type of text feature in the article.

<table>
<thead>
<tr>
<th>Text Feature</th>
<th>Fact</th>
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</thead>
<tbody>
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<td>bold print</td>
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<td>photo</td>
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<td>caption</td>
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</tbody>
</table>
Pick one giraffe species. Draw and color the giraffe’s species. Identify the giraffe. Describe its spots. Explain how the spots prove the giraffe belongs to this species.
COMPREHENSION CHECK: Tall Tales

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

1. On which continent do giraffes live?
   A Africa
   B Asia
   C Australia

2. How many giraffe species are there?
   A two
   B four
   C six

3. What does a giraffe use to snag leaves growing high on trees?
   A its horns
   B its nostrils
   C its tongue

4. Which sentence is true?
   A All giraffes have yellow spots.
   B All giraffes have spots on their legs.
   C All giraffes have spots.

5. Why is it more important than ever to protect and conserve giraffes?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Show Me the Money!

**LANGUAGE ARTS**  630L

**Standard Supported**
- Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (CCSS.RI.3.3)

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

**Summary**
- The article “Show Me the Money!” examines the history of trade and money.

**BUILD VOCABULARY AND CONCEPTS**
- barter
- commodity
- currency
- value

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 on the page 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.

In small groups, have students find and record text and visual clues in the article that are related to each vocabulary word. Then instruct each student to record his or her own idea about what each word means. Invite volunteers to read aloud the definitions from the Wordwise feature on page 15 of their student magazines. Have students record those definitions on their worksheets. Encourage students to compare the definitions they wrote with those in the text. Discuss how context clues helped them understand the meaning of each word.

**READ**

Inform students that the purpose of this article is to examine the history of trade and money. As they read, they’ll learn what people use to trade and how and why that has changed over time.

Explain to students that as they read, they will notice relationships between ideas in the text. For example, events happen in a specific order. This is known as sequence or chronology. **Say:** When writers use chronology, they often use words like “first,” “next,” “then,” and “finally.” This helps you track the order of events as they occur.

Tell students that another type of relationship is cause/effect. **Say:** Simply stated, one thing—the cause—makes something else happen. What happens is the effect. To find a cause/effect relationship look for the words “if/then” or “because” in a sentence. Explain to students that finding and interpreting these relationships is the key to fully understanding how topics are connected in a text.

Have students read the article on their own. After reading, give each student a copy of the Language Arts Assessment Master. Instruct students to explain how the process of trade evolved over time. Remind them to record events in the order they occurred. Then have students complete three cause/effect statements about money and trade. Instruct students to write a “C” above the cause in each sentence and an “E” above the effect.
TURN AND TALK

Show Me the Money!

LANGUAGE ARTS

Have students turn and talk to discuss what they learned about money. **Ask:** *What is a commodity?* (any good that is used in trade) *When does bartering work well?* (when the commodities being traded are of equal value) **When were some kinds of foods that have been used as currency in the past?** (salt, parmigiano cheese, and bricks of tea leaves) Invite students to share other things that they learned about money.

- **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.

- **Describe Relationships** As a class, review the concepts of chronology and cause/effect relationships. Then have students review their **Language Arts Assessment Masters** in small groups. Encourage students to share and compare the information they recorded. If group members note differences in the sequence of events, instruct them to review the article once again so they can record the proper chronology. If students identified different causes and effects, remind them that a cause is an event that happens and makes an effect occur. Advise students to reread the sentences and try again.

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.

- **What happens when people barter?**

- **If you could pick one everyday item to use as currency, what would it be? Why?**

- **What surprised you about what you read?**
In modern society, money is a fact of life. People use money to buy the things they want or need. But that wasn’t always the case. And the type of money we use today is quite different from the currencies people used thousands of years ago.

It all began with barter, or the exchange of one good or service for another. Bartering worked well when people wanted to trade objects of equal value. But it didn’t work when the trades became more complex.

Because of that, people created a new system. They assigned values to objects that were beautiful, interesting, or rare. They used those items as currency.

About 3,500 years ago, people in Africa and China used a small shell called a cowrie as currency. Native Americans and early North American colonists traded wampum, a white cylindrical shell that they used as beads to embroider or decorate belts and other ornamental objects.

Coins were first used in Turkey around 630 B.C. Paper money, which was much more convenient for larger purchases, first appeared in China about 910 A.D.

Today, only eight percent of transactions involve physical cash. The rest are digital trades conducted electronically through bits and bytes on computers.

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**ENGAGE**

**Tap Prior Knowledge**
Encourage students to think about the last time they or their parents bought something. Poll the class to see if they paid for the items with cash, credit cards, or some other means. As a class, compare and contrast the different types of payment.

**EXPLORE**

**Preview the Lesson**
Display pages 10-11 of the projectable magazine. Point out that each word in the subhead identifies a type of money used somewhere in the world.

**Ask:** How are all of these types of money the same? (Possible response: All can be used to buy things.) How are they different? (Possible response: They are all made by and used in different countries. They look different and they have different values.) Tell students that as they read the article they will learn more about money and how people use it to trade.

**Set a Purpose and Read**
Have students read the article in order to understand the history of trade and to recognize how using money makes it easier for people to trade goods and services.

**EXPLAIN**

**Understanding the History of Trade**
Instruct students to compare the illustration of fish and corn on page 12 of their student magazines to the illustration of cell phones on page 14. Guide the class to recognize that these two illustrations summarize how trade has evolved over time. Say: At one time, people only traded actual goods and services. Today, most of our transactions are completed using digital money on computers. Divide the class into small groups. Then give each student a copy of the **Content Assessment Master**. Instruct students to review the article in their groups. Challenge them to write one sentence that summarizes each section of the article. Then have students create an illustrated timeline that summarizes the history of trade.
**Show Me the Money!**

**SOCIAL STUDIES**

**EXPLAIN**

(continued)

**Recognizing The Role of Money**
Display the Wordwise feature on page 15 of the projectable magazine. As a class, discuss the difference between currency and a commodity. (Currency is money. A commodity is a good.) 

**Say:**

*Bartering was the first form of trade. It involved the exchange of commodities. Today, some people still barter. But usually people trade money for a good or service.* Review the article with students to note the different items that have been used as currency over the years. Discuss the advantages and disadvantages of using each. Challenge students to explain how using money makes the exchange of goods and services easier in today’s society.

**ELABORATE**

**Find Out More**
Display pages 10-11 of the projectable magazine. Point out to the class that each word in the subhead identifies a type of currency used today. As a class, conduct research to identify at least one country where each one is used. (Possible responses: ruble/Russia; rupee/India; shekel/Israel; dinar/Serbia; rand/South Africa; yen/Japan; peso/Mexico)
Challenge students to find five more types of currency and tell where they are used.

**Extend Your Thinking About Money**
Point out to the class that it costs 2.4 cents to make one penny, which is worth one cent. As a class, debate whether or not pennies should still be used as a form of U.S. currency.

**EVALUATE**

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

- **What is currency?** (money in any form that is actively used in trade)
- **How did Native Americans barter with colonists?** (They traded valuable shells called wampum for goods and services.)
- **Why did people start to use paper money?** (People wanted something lighter than coins to carry.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.
<table>
<thead>
<tr>
<th>Word</th>
<th>Text Clues</th>
<th>Visual Clues</th>
<th>What I Think</th>
<th>Definition</th>
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Record information from the article about each vocabulary word.

VOCABULARY ASSESSMENT: Show Me the Money!
LANGUAGE ARTS ASSESSMENT: Show Me the Money!

Describe how the process of trade evolved over time.

First, ____________________________________________

________________________________________________

Next, ____________________________________________

________________________________________________

Then, ____________________________________________

________________________________________________

Finally, __________________________________________

________________________________________________

Complete each sentence. Write a “C” above each cause. Write an “E” above each effect.

If two items are of equal value, then ________________________________

________________________________________________

Native Americans used shells to barter with early colonists because ____________

________________________________________________

Today, most money isn’t backed by something valuable because ________________

________________________________________________
### CONTENT ASSESSMENT: Show Me the Money!

Write a sentence that summarizes the content of each section.

<table>
<thead>
<tr>
<th>Section</th>
<th>Summary Sentence</th>
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<tbody>
<tr>
<td>The Price of Doing Business</td>
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<tr>
<td>Is It Better to Barter?</td>
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<tr>
<td>Changing Currency</td>
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<td>Its Worth in Weight</td>
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<tr>
<td>Paper in Your Pocket</td>
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<tr>
<td>Backed by a Promise</td>
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</table>

Draw a timeline that summarizes the history of trade.
COMPREHENSION CHECK: Show Me the Money!

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

1. What happens when people barter?
   (a) One person buys something.
   (b) Two people trade things.
   (c) Many people find shells.

2. What is any good that is used in trade called?
   (a) currency
   (b) wampum
   (c) commodity

3. Where was paper money invented?
   (a) the United States
   (b) China
   (c) Turkey

4. What do most people use to make trades today?
   (a) paper money
   (b) stamped coins
   (c) digital money

5. Explain how money makes the exchange of goods easier.

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
In Search of Pristine Seas

Standard Supported
• Determine the main idea of a text; recount the key details and explain how they support the main idea. (CCSS.RI.3.2)

Resources
• Vocabulary Assessment Master (page 23)
• Language Arts Assessment Master (page 24)

Summary
• The article "In Search of Pristine Seas" is a first-person account of Dr. Enric Sala’s expedition to the Pitcairn Islands and his efforts to establish this area as a protected marine ecosystem.

BUILD VOCABULARY AND CONCEPTS
• atoll
• ecosystem
• mutineer
• lagoon
• pristine

Give each student a copy of the Vocabulary Assessment Master. Instruct students to record each vocabulary word as you read it aloud from the Wordwise feature on page 23.

Divide the class into pairs. Point out to students that they may have heard some or all of these words before. Using that background knowledge as a base, instruct partners to predict and write a definition for each word. Then have them write a sentence for each word, based on the definitions they wrote.

Display the Wordwise feature on page 23 of the projectable magazine. First, instruct students to make sure they spelled each word correctly. Then review the definitions as a class. Have students add these definitions to their worksheets. With their partners, have students write a new sentence for each word that accurately reflects how it was defined in the article.

READ
Give students a few minutes to scan the article in their student 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 of the article. Tell the class that the main idea is the main topic. Everything in the article is connected to the main idea. Point out that paragraphs have a main idea, too. Everything in a paragraph is connected to its main idea.

Display pages 16-17 of the projectable magazine. Model how to identify the main idea of the article.
Say: When I look at these pages, the first thing I notice is the photo. It’s hard not to notice a picture of a man swimming with sharks. But then I see the headline, "In Search of Pristine Seas." I wonder what that means?

Explain to students that the headline and photo are often great clues that can help readers figure out what an article is about. Say: But sometimes clues that aren’t so obvious are even more helpful, particularly if you aren’t sure what a word in the headline—such as pristine—means. Zoom in on the comprehension strategy in the lower left corner of the photo and read it aloud. Say: Now I know what this article is about. It is going to tell how people can affect ocean habitats.

Have students read the article in small groups. As they read, encourage student to search for details that support the main idea of the article.
In Search of Pristine Seas

LANGUAGE ARTS

TURN AND TALK
Have students turn an talk to discuss what they learned about pristine seas. Ask: What does the word pristine mean? (unspoiled) What do pristine seas look like? (Possible response: There are lots of corals, fish, and sharks. The water is clear.) Why aren’t more of the world’s oceans pristine? (Possible response: People have done things to damage the ecosystems.) Encourage students to share other interesting facts they learned about pristine seas.

• Predicting Definitions Have students turn and talk to discuss what they learned about the article’s vocabulary words in small groups. Encourage them to compare the before and after sentences they wrote for each word. As a class, examine how new knowledge contributes to students’ understanding of each word.

• Identify Main Ideas Remind students that the article has a main idea. (People can affect ocean habitats.) But paragraphs have main ideas, 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. Give each student a copy of the Language Arts Assessment Master. Instruct students to write the main idea of the article in the middle circle. Then have them select four paragraphs in the article. Challenge them to write the main idea of each. Encourage students to turn and talk to analyze and compare results. Challenge them to recognize how the main idea of each paragraph ultimately supports the main idea of 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 can people cause an ocean ecosystem to become broken?
• What is the ecosystem like in a pristine sea?
• What surprised you about what you read?
In Search of Pristine Seas

SCIENCE

Standard Supported
• Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (secondary to NGSS.3-LS4-4)

Resources
• Content Assessment Master (page 25)
• Comprehension Check (page 26)

Science Background

As a boy, growing up on the Mediterranean coast of Spain, Dr. Enric Sala loved the sea. His fascination with the ocean led him to become a marine ecologist. But after years of working in academia, Sala came to a realization. The ocean is dying. And he wanted to find a cure.

To do that, Sala took his career in a different direction. In 2008, he became a National Geographic Explorer-in-Residence. His project, Pristine Seas, combines science, exploration, and media. His goal is to collect essential data that will convince governments to create new policies to protect the last pristine marine ecosystems in the world.

This is no small task. The ocean covers 70 percent of the planet. It is home to an incredible diversity of life. It provides food, jobs, and even half of the oxygen we breathe. But people are taking too many fish out of the ocean. They are polluting the oceans and making them warmer and more acidic.

Despite this, only three percent of the ocean’s waters are currently protected. Through Pristine Seas, Sala is working to increase that number. So far, Sala has gone on 23 expeditions. His work has helped protect 4.4 million square kilometers (1.7 million square miles) of ocean territory. It has also led to the creation of 13 marine reserves.

ENGAGE

Tap Prior Knowledge
Display a globe. Point out all of the blue areas on the globe that represent the ocean. As a class, identify plants and animals that live in the ocean. Then ask students to imagine that the ocean somehow changed. Discuss what could happen to the plants and animals that lived there.

EXPLORE

Preview the Lesson
Display pages 16-17 of the projectable magazine. Read aloud the headline. Ask: What is this article about? [the search for pristine seas] Remind students that the word pristine means “unspoiled.” As a class, discuss reasons why the ocean shown in this photo could be described as pristine. Brainstorm a list of ways the ocean here could change if it became damaged or polluted by people.

Set a Purpose and Read
Have students read the article in order to understand how Dr. Enric Sala and his team are looking for ways to protect the oceans from mostly man-made changes.
**In Search of Pristine Seas**

**SCIENCE**

**EXPLAIN**

**Protecting the Oceans**
Display page 18 of the projectable magazine. Zoom in on the illustration of the globe and point out the Pitcairn Islands. **Ask:** Why do you think Dr. Enric Sala chose this location when he was searching for pristine seas? (Possible response: The Pitcairn Islands are very remote, which makes them less likely to be spoiled by human activities.) Instruct students to examine the article’s photos in their student magazines. **Say:** Sometimes when you want to solve a problem, it helps to see the results you could potentially achieve. That’s what Sala hoped to find here. Divide the class into small groups. Have groups review the article to examine conditions on each island Sala visited. Then give each student a copy of the Content Assessment Master. Using information from the article as a guide, instruct students to draw pictures of a sea that is pristine and one that is not. Then have them describe how humans harm the ocean and explain how Sala hopes to protect it.

**ELABORATE**

**Find Out More**
Divide the class into small groups. Instruct groups to visit the “Pristine Seas” site at: [http://www.nationalgeographic.org/projects/pristine-seas/](http://www.nationalgeographic.org/projects/pristine-seas/). Inform students that the Pitcairn Islands are just one of 23 ocean ecosystems that Dr. Enric Sala and his team have explored. Each location they’ve visited is marked with a clickable dot on this globe. Have groups select three locations on the globe. Instruct them to write a short report describing the impact Sala’s research has had on each area.

**Extend Your Thinking About Problem Solving**
Point out to students that they don’t have to travel to remote locations like the Pitcairn Islands to solve problems. There are plenty of problems to solve here at home. Display the back cover of this month’s magazine. Review the information about “Problem Solving” with the class. Identify a list of ways that people commonly waste resources. Brainstorm potential solutions. Encourage each student to pick one idea and draw a picture of his or her solution.

**EVALUATE**

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

- **What is a lagoon?** (a shallow body of water separated from the sea by a reef)
- **Why are pristine seas rare?** (People have polluted most ocean ecosystems.)
- **What did Sala’s research help create?** (the world’s largest marine protected area)

If you wish, have students complete the Comprehension Check to assess their knowledge of concepts mentioned in the article.
**VOCABULARY ASSESSMENT: In Search of Pristine Seas**

Use this organizer to study each vocabulary word in the article.

<table>
<thead>
<tr>
<th>Word</th>
<th>Predicted Definition</th>
<th>Sentence</th>
<th>Definition from the Article</th>
<th>Sentence</th>
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Write the main idea of the article in the middle circle. Pick four paragraphs. Write the main idea of each.
### In Search of Pristine Seas

<table>
<thead>
<tr>
<th>Pristine</th>
<th>Not Pristine</th>
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**Describe how human activities harm the ocean.**

**Explain how Dr. Enric Sala and his team try to protect the oceans.**

**Draw a picture of a pristine sea and one that is not pristine.**
COMPREHENSION CHECK: In Search of Pristine Seas

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

1. In which ocean are the Pitcairn Islands located?
   ☐ Atlantic Ocean
   ☐ Pacific Ocean
   ☐ Indian Ocean

2. What can you find in a pristine ocean ecosystem?
   ☐ lots of trash
   ☐ lots of ships
   ☐ lots of sharks

3. What is an atoll made of?
   ☐ rocks
   ☐ coral
   ☐ soil

4. Which human activity is harming the Pitcairn Islands?
   ☐ fishing
   ☐ surfing
   ☐ sunbathing

5. Describe how creating protected marine areas can help ocean ecosystems.

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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.

EXPLAIN

Explore the Physical Map
Display the Africa Physical Map poster. Invite a volunteer to read aloud the text in the “Landforms” box at the top of the poster. Challenge the student to locate the Sahara on the map. Review the other boxes in this same way. Then read aloud the captions for each photo. Invite students to share what the map taught them about the physical characteristics of Africa.

Explore the Political Map
Display the World Political Map poster. Invite volunteers to read aloud the captions and the text in the boxes at the top of the poster. Have them find each location mentioned on the map. Then point out that the map key identifies country capitals and cities. As a class, locate a few capitals on the map. Then name a capital and challenge students to find the country where it is located.

ELABORATE

Find Out More
Point out to students that color is an important part of both physical and political maps. Say: On these maps, Africa is very colorful. But the two other continents shown, Europe and Asia, are gray. Ask: Why would the mapmaker want to include Europe and Asia on these maps? (to help readers understand how Africa fits in on a global context)

Extend Your Thinking About Africa
Give each student a copy of the Africa Map Content Assessment Master. In small groups, have students identify 10 countries in Africa. Then have groups conduct research to find three more facts about the physical or political traits of Africa. Have students summarize and illustrate each fact on their maps.

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 African geography.
CONTENT ASSESSMENT: Africa Map

Identify 10 countries in Africa. Write three new facts about Africa’s physical or political characteristics. Draw a picture to illustrate each fact.
Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. What is the largest country in Africa?
   - Algeria
   - Seychelles
   - Libya

2. What is the Sahara?
   - a grassland
   - a desert
   - a mountain range

3. What type of landform covers most of Central Africa?
   - desert
   - mountains
   - rain forest

4. What is the highest point in Africa?
   - Victoria Falls
   - the Sahara
   - Mount Kilimanjaro

5. Write one political fact and one physical fact you learned about Africa.

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Tall Tales

Assess Vocabulary, page 7
Students should record the words and definitions from the Wordwise feature on page 9.

- **conservation**: the protection of animals and plants and the promotion of careful use of natural resources
- **habitat**: the place where a plant or animal lives
- **species**: a group of animals or plants that are similar and can produce young animals or plants

Sketches should accurately reflect the meaning of each word. The larger picture should show how the words are connected. Students should label their representation of each word in the larger picture.

Assess Language Arts, page 8
Students should record one fact from the article directly related to each text feature.

Assess Content, page 9
Students should identify and color one giraffe as described below:

- **Masai giraffe**: dark brown, jagged, leaf-shaped spots that don’t cover all of the legs
- **northern giraffe**: chestnut brown spots; no spots on its legs
- **reticulated giraffe**: big orangey-brown spots; the photo shows the spots cover its legs
- **southern giraffe**: chestnut brown spots with jagged edges; the photo shows the spots go down the legs

Students should use the information about each species to describe the spots on the giraffe they selected. They should use information about other species to explain why their drawing doesn’t belong to one of these species.

Comprehension Check, page 10
1. A; 2. B; 3. C; 4. C; 5: Possible response: Now that we know there are four species of giraffes, we know that each species of giraffes is in trouble. We have to protect them or they will become extinct.

Show Me the Money!

Assess Vocabulary, page 15
Students should record the words and definitions from the Wordwise feature on page 15.

- **barter**: to exchange goods and services for other goods and services
- **commodity**: any good that is used in trade
- **currency**: money in any form that is actively used in trade
- **value**: the worth of an object

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

Assess Language Arts, page 16
Possible response: First, people bartered, or traded, goods and service. Next, they used beautiful, interesting, or rare objects like shells to trade for the things they needed. Then, people created metal coins and paper bills, which they used as currency. Finally, people started trading with digital money. It only exists on computers.

If two items are of equal value (C), it is easy to barter for goods and services. (E) Native Americans used shells to barter with early colonists (E) because they considered the beautiful shells to be valuable. (C) Today, most money isn’t backed by something valuable (E) because it is digital money that only exists on computers (C).

Assess Content, page 17
Answers will vary, but students should write one sentence that accurately summarizes the content of each section. Timelines should include text and illustrations related to each section of the article.

Comprehension Check, page 18
1. B; 2. C; 3. B; 4. C; 5: Answers will vary, but students may note people can exchange money instead of trading actual goods and services.
In Search of Pristine Seas

Assess Vocabulary, page 23
Students’ predictions and the sentences they write will vary. They should record the words and definitions from the Wordwise feature on page 23.

atoll: a ring-shaped reef, island, or chain of islands made of corals
ecosystem: a community of plants and animals that depend on the same environment
mutineer: a person, especially a soldier or sailor, who rebels or refuses to obey the orders of a person in authority
lagoon: a shallow body of water separated from the sea by a reef
pristine: unspoiled

Assess Language Arts, page 24
Students should record the main idea of the article. (People do things that can affect ocean habitats.) Additional responses will vary, depending on which paragraphs students choose to investigate.

Assess Content, page 25
Drawings will vary, but students should include several sharks in their drawing of a pristine sea. There should be no sharks in the other drawing. They may also want to show a fishing boat.

Describe: People pollute the water and remove important species like sharks that keep the ecosystem healthy.

Explain: Sala and his team study areas and report on their condition. They convince government leaders to protect the ocean waters around them.

Comprehension Check, page 26
1. B; 2. C; 3. B; 4: A; 5: Possible response: It is illegal for people to fish in protected marine areas. This will keep the ecosystems balanced and healthy.

Africa Map

Assess Content, page 28
Students should correctly label 10 countries in Africa. Facts will vary, but each should be accurate and include a relevant illustration.

Comprehension Check, page 29