



TEACHER'S GUIDE
Pathfinder and Adventurer
Vol. 18 No. 5

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Educational consultant **Stephanie Harvey** has helped shape the instructional vision for this Teacher's Guide. Her goal is to ensure you have the tools you need to enhance student understanding and engagement with nonfiction text.

Lexile® Framework Levels

Pathfinder

Lions on the Loose..... 790
 Round and Round..... 700
 Saving History 780

Adventurer

Lions on the Loose..... 860
 Round and Round..... 710
 Saving History ` 890

Standards Supported

- Common Core State Standards (CCSS)
- Next Generation Science Standards (NGSS)
- C3 Framework for Social Studies State Standards (C3)



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

For additional resources to extend your students' learning, visit EXPLORER's website:
NATGEO.ORG/EXPLORERMAG-RESOURCES

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.

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.

Fourth Grade Standard Supported

• **CCSS Reading Informational Text:** Read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Fifth Grade Standard Supported

• **CCSS Reading Informational Text:** Read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. (5–10)

What You'll Need

- “Round and Round with Wheels and Axels” (*Explorer*, pages 10–17)
- Think Sheet (Teacher’s Guide, page 5)
- Clipboards and pencils

CONNECT & ENGAGE (5 minutes)

Kids are in a group on the floor in front of you. Sit on a low chair and hold up pages 10–11 in the magazine.

Say: *Reading is thinking. And thinking is our inner voice. When we read, listen to, or view something our inner voice is kind of how we talk to ourselves about what we are reading, hearing, or seeing. We start connecting what we already know about the subject to the new things we are learning. That’s pretty fascinating, isn’t it?*

Say: *Let’s explore this inner voice a little more. For instance, when I look at the beginning of the article “Round and Round with Wheels and Axels,” my inner voice says, “Take a look at all the pictures, words, and graphics on these pages. I bet I can find lots of information here. These pages have so much they want to tell me.”*

Say: *Go ahead and look at these pages. What do you see here? What are the words and pictures saying to you? Turn and talk about what your inner voice is telling you about these pages.*

Kids turn and talk and then share out their thinking.

MODEL (10 minutes)

Kids sit in a group on the floor with you in a low chair in front of them.

Say: *When we are reading and taking in the other information on the pages, such as the pictures and graphics or diagrams, it’s helpful to engage that inner voice by thinking about the connections we can make to our own life. We call these text-to-self connections.*

Say: *I’ll show you what I mean by that. When I look at pages 10–11, I see a connection to myself. I see the picture of the bikes and the wheels on the bikes.*

Say: *I know what it is like to ride a bike, and I start making that connection. That is a text-to-self connection. I’m going to write this connection on my chart in the “My Connections” column. When I read the information on page 11, I can understand the “ease of motion” that the text mentions, because I have ridden a bike. I know how a bike can make going places easier and faster. I’m going to write that in my chart in the “How They Help Me Understand” column.*

My Connection	How It Helps Me Understand
riding a bike (text to self)	I know how a bike makes getting places easier and faster.

Say: *Another type of personal experience that we can use to make connections is to connect what we are reading now to things we have read in the past. We call these text-to-text connections. For example, when I look at the Simple Machines feature on page 10, it reminds me of information we’ve read and learned about in our science textbook. Some of these types of simple machines are familiar to me because I have read about them. I’m going to write this on my chart, too.*

My Connection	How It Helps Me Understand
reading about simple machines in our science textbook (text to text)	Some of the information is familiar to me.

Say: *Remember that making connections as we read and listening to our inner voice is a way to better understand what we are reading. Also, we can make connections as we read to all sorts of things, not just to ourselves and other texts. Some other things are movies, television, and other media we’ve heard and seen. We can even make connections to the world at large. Turn and talk about how all of these different connections can help us better understand what we are reading.*

Kids turn and talk and then share out their thinking.

GUIDE (10 minutes)

Hand out Think Sheets and have kids attach them to their clipboards. Kids remain in a group in front of you on the floor.

Say: *Now it's your turn to try this. As I read pages 12–13, listen to your inner voice and think about any text-to-self, text-to-text, or any other connection you might have to the text. Remember to look at the pictures, too. When you have a connection, be sure to draw it or write it down on your Think Sheet chart in the "My Connections" column.*

Read pages 12–13 aloud. You might want to read each section and stop at the end of each one to have kids turn and talk and record their connections.

Say: *Did you have some interesting connections? Who can share a connection with us?*

Let a few kids share their connections with the class.

Say: *The reason we use our inner voice to make these connections is to help us better understand what we are reading. Now take some time to record on your Think Sheets how the connections you made help you understand. Then turn and talk again about your connections and how they help you understand what we are reading about in the article.*

Kids record on their Think Sheets and turn and talk.

COLLABORATE (25 Minutes)

Say: *Now you are ready to work with a partner. You can take turns reading the rest of the article. Write or draw your connections in the first column of your chart. You and your partner will have different connections. You can discuss your different connections. Be sure to also take time to write on your Think Sheet chart how these connections help you understand.*

Say: *I'm going to move around the classroom, so let me know if you need help.*

Partners work together. Move around the room, conferring with partners.

SHARE THE LEARNING (10 minutes)

Kids join a sharing circle with you and share out, using respectful language.

TEACHER TIP: The sharing phase is done in a circle, so that the focus is on one another rather than the teacher.

Say: *Okay, flip through the article and consult your Think Sheet to choose a connection you would like to share. I am going to invite _____ to share a connection. We are going to share using respectful language. So when I ask: "_____, would you like to share a connection?" You need to say: "Yes thank you." Then you can share your connection. After you share, ask if anyone has any comments or questions. Then you can invite someone else to share. To do that, you need to call on the person by name and use the same language we just practiced. When we use polite, respectful sharing language, everyone pays closer attention to the important information being shared. Also, everyone likes to be listened to when they share out, so remember to pay attention to the person who is sharing.*

Kids share out and invite others to share, always using the respectful sharing language that was modeled. There should be time for about 3 or 4 kids to share out with the whole group. Once they are finished, have everyone turn and share with the person next to them, so that all have a chance to be heard.

Say: *You've learned that reading is thinking and that we use our inner voice to make connections that help us understand what we are reading. Turn and talk about some of the important connections you made.*

Several kids share out.

Say: *Everyone, you did a great job using your inner voice to make connections today!*

Name _____

Date _____

THINK SHEET

Use this chart to write your connections and how they help you understand.

My Connections

How They Help Me Understand

LESSON FRAME Make Connections to Better Understand

This frame is a kind of template of the lesson we just worked on. It has the instructional moves and language of the lesson, but the specific content has been removed. This way you can use the Lesson Frame for the other articles in the issue or for any nonfiction text you might be teaching.

CONNECT & ENGAGE (5 minutes)

Kids are in a group on the floor in front of you. Sit on a low chair and hold up pages _____.

Say: *Reading is thinking. And thinking is our inner voice. When we read, listen to, or view something our inner voice is kind of how we talk to ourselves about what we are reading, hearing, or seeing. We start connecting what we already know about the subject to the new things we are learning. That's pretty fascinating, isn't it?*

Say: *Let's explore this inner voice a little more. For instance, when I look at these pages my inner voice says, "Take a look at all the pictures, words, and graphics on these pages. I bet I can find lots of information here. These pages have so much they want to tell me."*

Say: *Go ahead and look at these pages. What do you see here? What are the words and pictures saying to you? Turn and talk about what your inner voice is telling you about these pages. (Kids turn and talk and then share out their thinking.)*

MODEL (10 minutes)

Kids sit in a group on the floor with you in a low chair in front of them.

Say: *When we are reading and taking in the other information on the pages, such as the pictures and graphics or diagrams, it's helpful to engage that inner voice by thinking about the connections we can make to our own life. We call these text-to-self connections.*

What You'll Need

- Nonfiction text
- Think Sheet template
- Clipboards and pencils

Say: *I'll show you what I mean by that. When I look at pages _____, I see a connection to myself. I see _____ and I start making that connection. That is a text-to-self connection. I'm going to write this connection on my chart in the "My Connections" column. When I read the information on page _____, I can understand _____ because _____. I'm going to write that in my chart in the "How They Help Me Understand" column.*

Say: *Another type of personal experience that we can use to make connections is to connect what we are reading now to things we have read in the past. We call these text-to-text connections. For example, when I look at _____ on page _____, it reminds me of _____ because I read about this before. I'm going to write this on my chart, too.*

Say: *Remember that making connections as we read and listening to our inner voice is a way to better understand what we are reading. Also, we can make connections as we read to all sorts of things, not just to ourselves and other texts. Some other things are movies, television, and other media we've heard and seen. We can even make connections to the world at large. Turn and talk about how all of these different connections can help us better understand what we are reading. (Kids turn and talk and then share out their thinking.)*

GUIDE (10 minutes)

Hand out Think Sheets and have kids attach them to their clipboards. Kids remain in a group in front of you on the floor.

Say: *Now it's your turn to try this. As I read pages _____, listen to your inner voice and think about any text-to-self, text-to-text, or any other connection you might have to the text.*

LESSON FRAME Make Connections to Better Understand

Say: Remember to look at the pictures, too. When you have a connection, be sure to draw it or write it down on your Think Sheet chart in the “My Connections” column. (Read pages _____ aloud. Have kids turn and talk and record their connections.)

Say: Did you have some interesting connections? Who can share a connection with us? (Let a few kids share their connections with the class.)

Say: The reason we use our inner voice to make these connections is to help us better understand what we are reading. Now take some time to record on your Think Sheets how the connections you made help you understand. Then turn and talk again about your connections and how they help you understand what we are reading about. (Kids record on their Think Sheets and turn and talk.)

COLLABORATE (25 Minutes)

Say: Now you are ready to work with a partner. Continue reading pages _____. You can take turns reading. Write or draw your connections in the first column of your chart. You and your partner will have different connections. You can discuss your different connections. Be sure to also take time to write on your Think Sheet chart how these connections help you understand. I’m going to move around the classroom, so let me know if you need help. (Partners work together. Move around the room, conferring with partners.)

SHARE THE LEARNING (10 minutes)

Kids join a sharing circle with you and share out, using respectful language.

Say: Okay, flip through the article and consult your Think Sheet to choose a connection you would like to share. I am going to invite _____ to share a connection. We are going to share using respectful language. So when I ask: “_____, would you like to share a connection?” You need to say: “Yes thank you.” Then you can share your connection. After you share, ask if anyone has any comments or questions. Then you can invite someone else to share. To do that, you need to call on the person by name and use the same language we just practiced. When we use

polite, respectful sharing language, everyone pays closer attention to the important information being shared. Also, everyone likes to be listened to when they share out, so remember to pay attention to the person who is sharing. (Kids share out and invite others to share, always using the respectful sharing language that was modeled. There should be time for about 3 or 4 kids to share out with the whole group. Once they are finished, have everyone turn and share with the person next to them, so that all have a chance to be heard.)

Say: You’ve learned that reading is thinking and that we use our inner voice to make connections that help us understand what we are reading. Turn and talk about some of the important connections you made. (Several kids share out.)

Say: Everyone, you did a great job using your inner voice to make connections today!

Lions on the Loose

SCIENCE

Standards Supported

- **NGSS ETS1.C: Optimizing the Design Solution:** Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)
- **NGSS ESS3.C: Human Impacts on Earth Systems:** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

Resources

- Content Assessment Master (page 9)
- Article Test (page 16)

Science Background

The lionfish is a native predator in the Indian and South Pacific Oceans. This fish sports reddish-brown and white zebra-like stripes and has up to 18 needle-like dorsal fins filled with venom on its body.

A lionfish sting can cause a lot of pain, but this fish is causing a lot more harm just by existing where it shouldn't be. In the early the 1980s, lionfish were introduced into the Atlantic Ocean. Since then, their population has exploded.

Unlike in their native habitat, lionfish have no natural predators in the Atlantic. As a result, they are free to eat as many fish and crustaceans as they want. Fish populations are struggling to rebuild and groups of crustaceans are disappearing. Even coral reefs, which rely on plant-eating fish to survive, are suffering as those fish disappear.

People are testing several different ideas to solve this problem. But so far, the lionfish appears to have the upper hand.

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about lionfish.

EXPLORE

Display pages 2-3 of the projectable magazine. Invite students to examine the photo, headline, and text. Encourage students to brainstorm ideas about how a lionfish could wreak havoc on a new habitat.

EXPLAIN

After reading, remind students that lionfish are ocean animals. But they are not native to the Atlantic Ocean. **Ask:** *Why are lionfish a threat to the Atlantic Ocean?* (Lionfish have no natural predators in the Atlantic Ocean so there is nothing to keep their population in check.) *How are they harming Atlantic Ocean habitats?* (They are hurting local fish populations and threatening the coral reefs.) Have students turn and talk as they discuss how this problem might have started and different ideas people are trying to solve it. Encourage students to identify the solutions they think could be the most effective. Challenge them to explain why.

ELABORATE

Display the diagram "Deadly Predator" on pages 6-7 of the projectable magazine. As students review the diagram, encourage them to summarize how the lionfish has already changed the Atlantic Ocean. Challenge them to explain why the lionfish invasion will be hard to stop.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.



Click here for the Kahoot! quiz:

[https://play.kahoot.it/#/k/](https://play.kahoot.it/#/k/a0166e51-96f0-4371-afd2-068b9e9fda50)

[a0166e51-96f0-4371-afd2-068b9e9fda50](https://play.kahoot.it/#/k/a0166e51-96f0-4371-afd2-068b9e9fda50)

CONTENT ASSESSMENT: Lions on the Loose

Summarize how lionfish may have gotten in the Atlantic Ocean. Tell why they are a problem.

How	Why

Describe four ideas people have tried to solve the lionfish problem.

Which idea do you think best solves the problem? Why?

Standards Supported

- **NGSS ETS1.A: Defining and Delimiting Engineering Problems:** Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)
- **NGSS Crosscutting Concepts: Cause and Effect:** Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)

Resources

- Content Assessment Master (page 11)
- Article Test (page 17)

Science Background

Machines can be complicated gadgets with lots of moving parts. Or, they can be quite simple. In fact, simple machines are machines that only have a few parts.

In this article, the fifth of a six-part series about simple machines, students will learn about wheels and axles. A wheel and axle is basically a disc that turns around a rod. Some roll. Others turn. All make it easier to do work.

The wheel, invented about 3500 B.C., is considered to be one of the most important inventions of all time. The first wheels may have been used to raise weights or haul water buckets up from wells. Adding the axle later on led to the creation of carts and wagons, which made it easier to transport people and goods. Today, wheels and axles are found in a multitude of objects you use every day.



Click here for the Kahoot! quiz:
<https://play.kahoot.it/#/k/f73aef1b-d38e-4cc8-b83c-f87529c22292>

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about wheels and axles.

EXPLORE

Display pages 10-11 of the projectable magazine. Invite students to read aloud the headline and text. Challenge students to identify the wheels and axles in the photo. Brainstorm ideas about how "ease of motion is what this simple machine is all about."

EXPLAIN

After reading, point out to students that a wheel and axle is a type of simple machine. **Ask:** *Why do you need both a wheel and an axle to make this simple machine work?* (The wheel goes around. The axle connects the wheel to something else. When the axle moves, so does the wheel, and so does whatever the axle is connected to.) Have students turn and talk as they discuss how using wheels, whether or not they roll, makes it easier for people to do work. Encourage them to use examples in the article to explain each concept. Then have students identify the trade-offs of using wheels. (The larger the wheel, the less force you have to apply. But you have to apply that force over a greater distance.) As a class, make a list of wheels students use each day.

ELABORATE

Divide the class into pairs. Have partners preview the activity on pages 16-17 of their student magazines and brainstorm ideas about how they could record the results. Have partners compete the activity. Challenge them to adapt and test the procedure and record how their changes affected the results.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.

CONTENT ASSESSMENT: Round and Round

Draw a picture of a wheel and axle that rolls. Label the wheel and axle.
Explain how this simple machine works.

Draw and Label	Explain

Draw a picture of a wheel and axle that doesn't roll. Label the wheel and axle.
Explain how this simple machine works.

Draw and Label	Explain

Standards Supported

- **C3: History: Historical Sources and Evidence:**
Summarize how different kinds of historical sources are used to explain events in the past. (D2.His.9.3-5)

Resources

- Content Assessment Master (page 13)
- Article Test (page 18)

Social Studies Background

On April 14, 1865, President Abraham Lincoln and his wife, Mary, attended the nighttime performance at Ford's Theatre in Washington, D.C. Today, artifacts left behind help us remember what happened that fateful evening.

An artifact is an object of cultural or historical significance. Some artifacts set the stage for Lincoln's last evening. The playbill, for example, tells us the president was watching *Our American Cousin*, starring Laura Keene. Some artifacts tell us about Lincoln himself. As usual, the president was wearing a white shirt and black pants, hat, and coat. But this coat, made for his second inauguration, had the words "One Country, One Destiny," stitched into the lining. And his top hat was rimmed with a black mourning band in honor of his son Willie, who had died three years earlier.

Other artifacts reveal the tragic fate the president met as he sat above the stage and watched the play below: locks of Lincoln's hair; pieces of Laura Keene's bloodstained costume; the bullet; the gun; the reward poster; and the diary that traces the assassin's thoughts as he plotted to kill the president.

Artifacts are a link to the past. Protecting and preserving them helps us learn, remember and maybe prevent similar actions in the future.

ENGAGE

Encourage students to flip through the article and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about President Abraham Lincoln's assassination.

EXPLORE

Display pages 18-19 of the projectable magazine. Invite students to examine the photos, headline, and deck. Then have students brainstorm ideas about how these text elements all connect to a crime.

EXPLAIN

After reading, remind students that an artifact is an object of cultural or historical interest. Have students turn and talk as they identify reasons why the items mentioned in the article's deck are considered to be important artifacts. (They help us solve and understand the assassination of President Abraham Lincoln.) Encourage students to share what they learned about each object and what it reveals about Lincoln's assassination. Then have them identify practices curators use to protect and preserve artifacts so people can see and connect with them today.

ELABORATE

Remind students that the National Park Service's Museum Resources Center in Maryland stores and cares for more than six million artifacts connected to the history of Washington, D.C. As a class, debate reasons why it is important for curators to continue to collect, protect, and preserve these artifacts when so many are too large or fragile to be displayed.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.



Click here for the Kahoot! quiz:

<https://play.kahoot.it/#/k/>

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CONTENT ASSESSMENT: Saving History

Summarize why each of these objects is an important artifact related to Abraham Lincoln's assassination.

A flag	A toothbrush
A diary	A letter

Describe how curators protect and preserve artifacts like these.

SOCIAL STUDIES

Standard Supported

- **C3: History: Change, Continuity, and Context:** Generate questions about individuals and groups who have shaped significant historical changes and continuities. (D2.His.3.3-5)

Resources

- Ancient China poster (Teacher's edition)
- Life in Ancient China poster (Teacher's edition)
- Content Assessment Master (page 15)
- Poster Test (page 19)

Social Studies Background

Asking questions is the first step in acquiring historical knowledge. But to fully understand history, students must know which questions to ask, how to evaluate the answers, and how to use those answers to create accurate arguments about the past. Historical thinking is a process that takes time to develop. Recognizing that, each month *Explorer* magazine will introduce students to a different ancient culture. Use the accompanying lessons to guide students as they develop these skills.

ENGAGE

Encourage students to examine the maps and turn and talk with a partner to discuss what they see. Invite students to ask questions or share what they already know about ancient China.

EXPLORE

Display the **Ancient China poster**. Instruct students to examine the timeline. **Ask:** *Which entry on this timeline is missing a small map below?* (Han Dynasty) *Why is that one missing?* (It's shown in the big map.) Challenge students to find the text block that explains why the Han Empire may have been singled out for the large map. (It was considered a golden age in Chinese History.)

EXPLAIN

Invite students to examine the **Ancient China poster**. **Ask:** *What natural barriers protected the borders of ancient China?* (Gobi, Taklimakan Desert, Himalayas) *What artificial barrier did they build for extra security?* (the Great Wall of China) *Which natural and man-made objects helped the culture spread?* (natural: rivers; man-made: the Silk Road) Discuss how. Then display and review the **Life in Ancient China poster**. Have students discuss what the poster's content reveals about life in ancient China.

ELABORATE

Point out to the timeline of Chinese rule at the bottom of the **Ancient China poster**. Explain that this timeline identifies the succession of dynasties that have ruled China up to modern times. Encourage students to select one era and conduct research to learn more about the ruling dynasty and its contributions to Chinese civilization.

EVALUATE

Have students complete the **Content Assessment** for this lesson. Encourage them to share and compare their results in small groups.

CONTENT ASSESSMENT: Ancient China Posters

Make a checkmark to show if you think each sentence is true or false.

Use information from the posters to explain your answers.

Sentence	True	False	Explanation
1. The Yellow River created a boundary between northern and southern China.			
2. Genghis Kan invaded ancient China through the Himalayas.			
3. Art was an important part of ancient Chinese culture.			
4. Buddhism teaches the ideas of Yin and Yang.			
5. The Silk Road helped spread Chinese ideas, culture, and inventions all the way to Europe.			
6. The Great Wall of China was one long wall.			

ARTICLE TEST: Lions on the Loose

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

- 1. Why are lionfish considered to be an invasive species in the Atlantic Ocean?
 - Ⓐ They add to its biodiversity.
 - Ⓑ They are not native and harm the environment.
 - Ⓒ They have venomous spines.

- 2. Why are lionfish a problem in the Atlantic Ocean?
 - Ⓐ They have no natural predators.
 - Ⓑ Many other fish eat their eggs.
 - Ⓒ They only eat a few kinds of fish.

- 3. How are lionfish disrupting coral reef behavior?
 - Ⓐ They eat the coral.
 - Ⓑ They eat algae.
 - Ⓒ They eat cleaner fish.

- 4. Which lionfish behavior disrupts life in coral reefs?
 - Ⓐ They hunt in brackish water.
 - Ⓑ They gather in groups.
 - Ⓒ They eat cleaner fish.

5. Why are lionfish causing coral reefs to die in the Atlantic Ocean?

ARTICLE TEST: Round and Round

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

1. Why is a wheel and axle a simple machine?
Ⓐ It is easy to use.
Ⓑ It is small.
Ⓒ It only has a few parts.

2. What happens when you use wheels to pull a heavy load?
Ⓐ Your effort increases.
Ⓑ The force of friction decreases.
Ⓒ The load scrapes on the ground.

3. Which of these objects has a wheel and axle that rolls?
Ⓐ bicycle
Ⓑ doorknob
Ⓒ Ferris wheel

4. What is a trade-off of using a larger wheel?
Ⓐ You have to apply more force.
Ⓑ You have to apply force over a greater distance.
Ⓒ You can't pull heavy loads.

5. How do a wheel and axle make a doorknob work?

ARTICLE TEST: Saving History

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

1. What is an artifact?
Ⓐ an object of cultural or historical interest
Ⓑ a keeper or custodian of a museum or other collection
Ⓒ an idea about Abraham Lincoln

2. Why do curators preserve artifacts from Abraham Lincoln's assassination?
Ⓐ They are old.
Ⓑ They are fragile.
Ⓒ They are a link to the past.

3. Why did curators save Thomas Powell's toothbrush?
Ⓐ Powell dropped the toothbrush at the crime scene.
Ⓑ Powell gave the toothbrush to Lincoln's assassin.
Ⓒ Powell had the toothbrush with him when he was arrested.

4. Why is Willie Clark's letter a primary source about Lincoln's assassination?
Ⓐ The letter is about Abraham Lincoln.
Ⓑ Clark wrote the letter at the time of Lincoln's assassination.
Ⓒ Clark was a friend of Lincoln's.

5. What are three things curators do to protect and preserve historic flags?

POSTER TEST: Ancient China Posters

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

- Where did the earliest Chinese settlers live?
Ⓐ near the Great Wall of China
Ⓑ on the coast
Ⓒ along the Yellow and Yangtze rivers
- Who was the first emperor of China?
Ⓐ Genghis Khan
Ⓑ Qin Shi Huang
Ⓒ Confucius
- What are the three major philosophies of ancient China?
Ⓐ Taoism, Buddhism, and Confucianism
Ⓑ poetry, painting, and calligraphy
Ⓒ Shang, Qin, and Sui
- Which of these statements about the Great Wall of China is true?
Ⓐ It took 100 years to build the Great Wall.
Ⓑ The Great Wall is on China's northern border.
Ⓒ Soldiers built the Great Wall of China.
- Why was the Silk Road an important part of ancient Chinese civilization?

Pathfinder and Adventurer

ANSWER KEY

Lions on the Loose

Assess Content, page 10

How: People may have brought them there on cargo ships or the fish may have escaped from or been dumped from aquariums.

Why: Lionfish have no natural predators in the Atlantic Ocean so there is nothing to stop them from eating everything.

Idea 1: Divers spear lionfish and try to teach predators to eat them.

Idea 2: People hold lionfish derbies and offer prizes to the teams that catch the most lionfish.

Idea 3: Chefs have written cookbooks to teach people how to cook lionfish.

Idea 4: A scientist built a trap that catches lionfish as they gather in a group.

Students' responses to the final question will vary depending on which option they select.

Article Test, page 17

1. B; 2. A; 3. C; 4. C; 5: Possible response: Lionfish eat plant-eating fish around coral reefs. The algae grows out of control and covers the corals. This chokes off the light and the corals die.

Round and Round

Assess Content, page 12

Answers will vary depending on which wheel and axle students draw. But students should draw a wheel and axle that rolls and one that doesn't roll, label the wheel and axle in each picture, and explain how each simple machine works.

Article Test, page 18

1. C; 2. B; 3. A; 4. B; 5: A knob is a wheel connected to a rod—the axle. When you turn the doorknob, the rod pulls on a latch that moves out of the doorframe. The door opens.

Saving History

Assess Content, page 14

A flag: The dark blue silk flag with the hand-painted eagle, attached to the booth where Lincoln was sitting, has a tear in it where John Wilkes Booth's spur caught when he jumped down from the booth.

A toothbrush: The toothbrush belonged to Thomas Powell, a Confederate soldier who conspired with Booth to harm the president.

A diary: The diary belonged to Booth, and it is a record of Booth's thoughts.

A letter: Willie Clark, who rented the room where Lincoln died, wrote the letter to his sister. In it, he described what happened right after the assassination.

Students may describe how curators put artifacts under special glass that blocks ultraviolet rays, frame or roll flags so they don't become permanently creased, wear gloves, control pests, or put objects in climate-controlled rooms.

Article Test, page 19

1. A; 2. C; 3. C; 4. B; 5: Possible response: Curators place historic flags under glass that blocks ultraviolet rays, handle them with white gloves, and roll or frame flags rather than folding them to prevent creases.

Ancient China Posters

Assess Content, page 16

1. False: The Yangtze River created a boundary between northern and southern China.
2. False: Genghis Khan invaded China from the north, through the Gobi.
3. True: Calligraphy, poetry, and painting were all forms of artistic expression in ancient China.
4. False: Taoism teaches the idea of Yin and Yang. Buddhism teaches a "rebirth" of self.
5. True: The Silk Road was a route from China to Europe. It helped generate trade and spread ideas.
6. False: The Great Wall was many walls linked together, along with watchtowers, beacon towers, and blockhouses.

Poster Test, page 20

1. C; 2. B; 3. A; 4. B; 5: The Silk Road was a trade route from China to Europe. It helped generate trade between different kingdoms and empires and spread ideas, culture, and inventions.