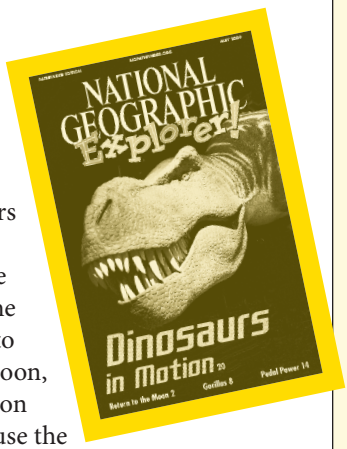
Teacher's Guide May 2009

NATIONAL GEOGRAPHIC Explorer!

Pathfinder Edition

nationalgeographic.com/ngexplorer/teachers

Dear Educator:



From a space base on the moon to the primeval forest of the dinosaurs, our May issue keeps students on the go.

In "Return to the Moon," readers rocket to the moon as they learn about NASA's plans to build a space base on Earth's closest neighbor. The story explains how NASA intends to get people and equipment to the moon, build a moon base, and use the moon as a launch pad for Mars. You can use the blackline master on p. T3 to check students' comprehension of the story's main ideas.

Next, students follow scientists into the African rain forest for "A Glimpse of Gorillas." Readers will meet a family of western lowland gorillas, learning how the family lives, eats, and interacts. The blackline master on p. T5 supports students in summarizing the story.

Readers then pedal back in time to learn the history of one of the world's easiest and least expensive forms of transportation—the bicycle. "Pedal Power" traces the evolution of the bike from the wooden hobbyhorses of the early 1800s to BMX stunt bikes. Readers will find out how changes in design and materials have led to safer, more comfortable rides for bicycle lovers everywhere. The blackline master on p. T7 helps readers use a time line to track and sequence key events.

Finally, students head to the movies to see "Dinosaurs in Motion." This story explains how dinosaur model builders use fossil records, experts' advice, and imagination to construct robotic dinos and computer-generated images that show how the prehistoric giants might have looked, moved, and acted.

It's been great exploring with you and your students this year. We wish you a wonderful, restful summer. Please be sure to renew your subscription so that we can take new journeys together in September!

Sincerely yours,

Jacalyn Mahler
Editor in Chief

In This Issue

Answer Key

Return to the Moon • Teacher's Guide, p. T3
1. Phase 1: get people to the moon and back. Phase 2: build a base on the moon. Phase 3: go from the moon to Mars. **2.** Learn more about Earth; may find useful minerals or gases. **3.** Getting materials to the moon; getting power; working in a place without oxygen. **4.** Answers will vary.

A Glimpse of Gorillas • Teacher's Guide, p. T5
1. a family of lowland gorillas. **2.** Answers will vary. Make sure that students focus on the most important information. **3.** Answers will vary.

Pedal Power • Teacher's Guide, p. T7
1860s. Pedals are added to bikes. **1890s.** Biking becomes a popular pastime. **1930s.** Cruisers and Classics become popular. **1960s.** Dirt bikes become a trend. **1970s.** Adults get back into biking. The ten-speed is invented.

Review • Teacher's Guide, p. T8
1. b **2.** c **3.** c **4.** d **5.** a **6.** a **7.** b **8.** c **9.** d **10.** b

Next Issue

This is our last issue for 2008-2009.
EXPLORER will return in September.
To renew your subscription, call 1-888-915-3276 or visit *NGSP.com*.

PAGES 2–7

Return to the Moon

About the Story

Astronauts first walked on the moon 40 years ago. In this story, students will learn about NASA's plans to return to the moon and the technical challenges NASA faces. The ambitious Constellation Program has three phases: 1) getting astronauts to the moon and back safely, 2) building a lunar space base, and 3) using the moon as a launch pad to Mars.

Fast Facts

Why return to the moon? NASA has identified six Lunar Exploration Themes that it believes "define the value of going to the moon":

- **Human Civilization:** Enable future settlements;
- **Scientific Knowledge:** Gather information about the solar system and universe;
- **Exploration Preparation:** Develop techniques that will allow future planetary exploration;
- **Global Partnerships:** Provide a peaceful, challenging activity that can unite nations;
- **Economic Expansion:** Expand Earth's economic sphere and conduct lunar activities that may benefit life on Earth; and
- **Public Engagement:** Engage the public, encourage students, and develop a high-tech workforce that can meet future challenges.

Vocabulary

Acronyms: Display and read aloud the acronym *NASA*. Then ask: *Does anyone know what* NASA *means?* (National Aeronautics and Space Administration) Explain that this is a special kind of abbreviation called an acronym. Instead of pronouncing each letter individually, people read the acronym as a word.

Explain that some acronyms become new words in our language. At that point, people spell them with lowercase letters. Challenge students to look up the meanings of the following acronyms: *laser* (light amplification by stimulated emission of radiation), *radar* (radio detecting and ranging), and *scuba* (self-contained underwater breathing apparatus).

Before Reading

Preview and Set a Purpose: Tell students that good readers preview nonfiction stories to get an idea of what they will be learning and set their purpose for reading. Lead students in previewing the story, focusing on the headline, pictures, subheads, and bold words. Ask, *What will you be learning about in this story?* Help students understand that their purpose for reading is to find out why and how NASA will return to the moon.

Reading Strategy

Ask and Answer Questions: Explain to students that some texts we read give us a lot of new information. One way to make sure we "get it" is to ask ourselves questions as we read. Encourage students to ask themselves two questions as they read each section: "What are the key words in this section?" and "What should I remember from this section?" Suggest that they reread any section if they have trouble answering the two questions.

After Reading

- **Content Literacy:** Remind students of their purpose for reading, and ask them if it was met. Distribute the blackline master on p. T3 for students to complete. Invite volunteers to share their responses. Note differences and similarities in the responses, especially for item 4.
- **Acronyms:** Using newspapers or magazines, have students search for acronyms. (Remind them that abbreviations are not acronyms.) Create a classroom list of acronyms in alphabetical order. Each entry should include the acronym, the spelled out words, and the source where it was found.
- **Creative Writing:** Invite students to pretend they are the first astronauts on Mars. Have them write a five-day journal about their experiences and discoveries on the red planet.
- **Critical Thinking:** Tell students to imagine a human colony on the moon. Ask them to brainstorm a list of 15 or more "must have" items the colonists would need.

CONTENT LITERACY

Name: _____

Return to the Moon

Read "Return to the Moon" in National Geographic Explorer. Then complete the items below.

1. Explain what NASA plans to do in its Constellation Program.

_____

_____

_____

_____

2. How could exploring the moon benefit people on Earth?

_____

_____

_____

3. Give two examples of challenges astronauts will face when building a space base on the moon.

_____

_____

_____

_____

4. What was the most surprising thing you learned from reading the story?

_____

_____

_____

_____

PAGES 8–13

A Glimpse of Gorillas

About the Story

Researcher Diane Doran-Sheehy's work in equatorial Africa provides readers with a close-up look at lowland gorillas. Students learn about the gorillas' family relationships, including the dominant role played by the male silverback gorilla. Students also learn how the number of gorillas has been reduced due to the destruction of their habitat, illegal hunting, and disease.

Fast Facts

- There are two species of gorillas: eastern gorillas and western gorillas. Each species has two subspecies. Eastern gorillas include lowland and mountain gorillas. Western gorillas include western lowland gorillas and Cross River gorillas.
- In August 2008, scientists announced the discovery of a population of about 125,000 western lowland gorillas in the forests of the Republic of the Congo. The new finding doubled the estimated population for this subspecies.

Vocabulary

Adjectives With *-ing*: Point out the phrase *clicking sounds* in the second paragraph on p. 10. Ask students to find the base word inside *clicking (click).* Then ask: *What does the action word* click *mean? What does this tell you about the sound?* (It's a sound that clicks.) Explain that there are many words that describe a person, place, or thing that end in *-ing.* Students can figure out the meaning of these describing words by looking for the base word and thinking about the meaning of the verb. Encourage them to use this strategy as they read the story. (Other examples: *hanging vines, rotting log, amazing animals, warning growl.)*

Before Reading

Build Background: Work with students to create a concept web, with the word *gorillas* in the middle. Invite them to come up with a word or fact about gorillas. Record their responses in the outer circles. Students can add to the concept web after they read the story.

Reading Strategy

Determine Importance/Summarize: Explain that when you read nonfiction, it helps to summarize, or tell the main points of a story in a short and direct way. Use the blackline master on p. T5 to support students in applying these steps:

1) Identify the topic. First, preview the story, including looking for repeated words. Then identify what the story is mostly about.
2) Pay attention as you read. Write down the facts that seem to be the most important.
3) Sum up the main points that the story makes about the topic.

After Reading

- **Determine Importance/Summarize:** After students have read the story, have them complete item 3 on the blackline master and then read their summaries aloud.
- **Revisit the Concept Web:** Ask students what additions or changes they would like to make to the concept web you created earlier.
- **Science:** Form small groups. Have each group research and report on one of the four subspecies of gorilla: eastern lowland, mountain, western lowland, Cross River.
- **Writing:** Tell students to write a descriptive paragraph about a gorilla moving through the rain forest in Africa. Encourage students to use what they learned about gorillas in the story, as well as phrases from the concept web they made earlier, to complete their descriptions.

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DETERMINE IMPORTANCE

Name: _____

A Glimpse of Gorillas

Before You Read

1. Preview "A Glimpse of Gorillas" in National Geographic Explorer. Then complete the sentence below.

This story is mostly about _____ .

While You Read

2. Write down important things you learn from the story.

_____

_____

_____

_____

_____

_____

_____

After You Read

3. Look at the notes you took. Then use the back of this page to write a summary of this story.

PAGES 14–19

PEDAL POWER

About the Story

A billion people worldwide ride bikes for fun or transportation. This story traces the evolution of this popular invention, from early "boneshakers" and high-wheelers to today's cutting-edge bikes used for racing and daredevil stunts.

Fast Facts

- Bike helmets have become a regular piece of cycling gear as children and adults have sustained many serious head injuries from falls.
- Most Americans ride bikes for pleasure. In China, riding bikes for transportation is as common as driving a car is in the United States.
- Bicycle sharing is catching on in Europe and in some U.S. cities. Older bicycles are left in designated areas for anyone to use to get to another location. Then the rider leaves it in a bicycle rack for someone else to use.

Vocabulary

Hyphenated Adjectives: Display the phrases *pizza-eating monster* and *three-legged dog.* Tell students that these hyphenated, two-word adjectives each describe a noun (*monster* and *dog*). Explain that in these examples, two words are connected to make one idea. Model how to interpret a hyphenated adjective: *I know what pizza is, and I understand what eating is. Putting them together like this gives me a vivid picture of a monster that eats pizza.*

Give students a few minutes to scan p. 18 of the story for hyphenated adjectives. (Examples: *V-shaped, banana-shaped, ten-speed, beat-up, teeth-jarring, fold-up, cutting-edge, pedal-pushing.*) Ask them to practice the strategy to figure out the meanings and share their responses.

Before Reading

Text Structure: Tell students that good readers try to figure out how a story is organized before they start reading. Just as highway signs alert drivers to what lies ahead, headlines, subheadings, and pictures can do the same for the reader. Lead students in previewing the story, helping them to see that it is written in chronological order. Point out that the dates mentioned move from long ago to the present day. The author is telling about events in the order in which they happened.

Reading Strategy

Plan and Monitor: Distribute the blackline master on p. T7. To track the main events in the history of bicycles, have students use the time line template as they read. You may want to read the "Bumpy Beginnings" section together and model filling in the time line for the 1860s.

After Reading

- **Time Line:** Discuss with students how using the graphic organizer helped them follow and remember events in the history of the bicycle.
- **Research:** Have student pairs select a mode of transportation (such as cars, motorcycles, boats, or trains). Tell students to research significant dates related to their topic and create a time line that shows key events.
- **Hyphenated Words:** Tell students to fold a piece of paper into two columns. In the right column, have them list ten nouns. Then in the left column, have students create a hyphenated adjective to describe each noun.

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NATIONAL GEOGRAPHIC SOCIETY EDUCATION FOUNDATION

PLAN AND MONITOR

Name: _____

PEDAL POWER

Preview "Pedal Power" in National Geographic Explorer. As you read the story, fill in the time line.

1850

1860s

1890s

1900

1930s

1950

1960s

1970s

2000

REVIEW **Name:** _____

COMPREHENSION CHECK

Answer each question. Fill in the circle by the correct answer.

1. What will happen *first* in NASA's Constellation Program?

- (a) Astronauts will build a space base.
- (b) Astronauts will fly to the moon and back.
- (c) The moon will become a launch pad.
- (d) A lunar rover will explore the moon.

2. Which of the following might be used to carry large pieces of equipment to the moon?

- (a) lunar rovers
- (b) solar panels
- (c) unmanned rockets
- (d) heat shields

3. What makes the moon a better launch pad than Earth for sending rockets to Mars?

- (a) its smooth surface
- (b) its large size
- (c) its weak gravity
- (d) its low temperature

4. How did Diane Doran-Sheehy's team get the gorilla family used to them?

- (a) They brought food for the gorillas.
- (b) They played videos for the gorillas.
- (c) They gave the gorillas toys.
- (d) They made clicking sounds.

5. What makes Kingo unique in his family group?

- (a) his role as leader
- (b) his short coat of hair
- (c) his knuckle-walking
- (d) his ability to charge

6. What will Kusu and Ekendy most likely do when they are fully grown?

- (a) start their own families
- (b) stay with their mothers
- (c) live on their own
- (d) leave the forest

7. What do *poachers* do?

- (a) study wild animals
- (b) illegally hunt animals
- (c) cut down trees
- (d) save endangered creatures

8. According to "Pedal Power," which phrase does *not* describe hobbyhorses?

- (a) wooden frame
- (b) two wheels
- (c) smooth ride
- (d) no pedals

9. What was built from old Cruisers and Classics?

- (a) Sting-Ray
- (b) ten-speed
- (c) BMX bike
- (d) mountain bike

10. Which event is an example of a *trend*?

- (a) Someone "takes a header."
- (b) Kids start racing on dirt tracks.
- (c) An early bike is nicknamed "boneshaker."
- (d) Someone invents a bike to ride sideways.