

NATIONAL GEOGRAPHIC Explorer!

Dear Educator:

Welcome to a new year and a new, expanded Teacher's Guide! Each lesson provides in-depth instructional support to engage your students and help them become active, proficient readers. New features will help you use the magazine to access science content and assess students' understanding of key concepts. You'll also find ideas for English language learners and collaborative learning groups as well as suggested reteaching activities. For a link to interactive whiteboard content, please go to the Teachers tab on our website.

One thing that hasn't changed is our commitment to great storytelling. This issue of EXPLORER is action-packed. Beautiful parrots take flight in Peru. A champion skier rockets down a ramp and soars through the air. Even planet Earth shakes, rattles, and erupts. Family members meet across continents and centuries.

Prized for their beauty and intelligence, millions of parrots have been caught in the wild and sold as pets. In "A Passion for Parrots," readers travel to the rain forest in Peru to learn what is being done to save wild parrots. Biologist Jamie Gilardi explains how he and other concerned scientists worked to increase our understanding of parrots and the threats they face. Students can use the Cause-and-Effect Chain on p. T7 as they read to track the important sequence of events.

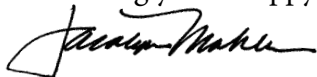
Next, "Active Earth" provides a graphic tour of Earth's layers. From the planet's sizzling core to the crust we call home, students will learn about tectonic plates and their role in earthquakes, volcanic eruptions, and even the formation of mountain ranges. Students can record their purpose for reading on p. T16. The chart and sentence frames will help them apply the visualize strategy to access science content.

"The Winning Edge" explores the science behind extreme skiing. Readers follow Olympic athlete Billy Demong as he powers through a day of training, eating, and counting calories. Demong relies on nutritious food and Newton's three laws of motion to help him start moving, gain speed, and stay airborne during the Nordic Combined event. The activity on p. T25 will support students in making inferences to get the most out of the text.

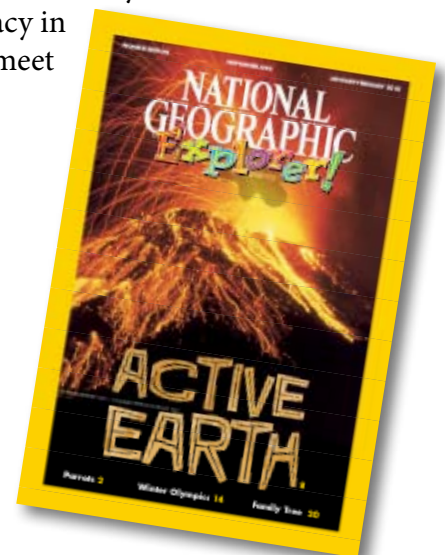
Finally, in "Family Ties," award-winning children's author Patricia McKissack introduces readers to renowned surgeon, Dr. Ben Carson and his quest to trace his family roots. Students will discover how history detective Professor Henry Louis Gates, Jr., managed to unlock Carson's family history using public records, photos, family stories, and DNA testing. The activities on pp. T36 and T37 will help interested students learn more about their own family trees.

As always, our goal is to help you build scientific and content literacy in all learners. We welcome your comments and suggestions to help us meet this important goal.

Wishing you a Happy 2010!



Jacalyn Mahler
Editor in Chief



A Passion for Parrots

Teacher's Guide

Jan.-Feb. 2010

Curriculum Connections

- Language Arts
- Life Science/Ecology
- Geography

Standards Correlations

- Language Arts: Author's point of view
- Life Science: Diversity of organisms; Interdependence
- Geography: Human impact on physical environment; Use and distribution of natural resources

Literacy Skills

- Reading Strategy: Synthesize
- Vocabulary: Persuasive Language
- Writing: Poetry/Onomatopoeia

Activity Masters

Synthesize: Cause-and-Effect Chain, T7

Synthesize: Cause-and-Effect Chain, Answer Key, T8

Comprehension Check, T8

Comprehension Check, Answer Key, T9

A Passion for Parrots

About the Story

In this story, readers follow biologist Dr. Jamie Gilardi into the Amazon rain forest to learn firsthand about parrots. The author explains how the international pet trade has impacted large numbers of these beautiful, intelligent birds. Readers also will learn how the combined efforts of scientists, conservation groups, government officials, and artisans have helped protect parrots.

Fast Facts

- The author is Executive Director of the World Parrot Trust, which has helped support the conservation of more than 40 species of parrots in 22 countries. Students can learn more about the work being done by this organization at <http://www.parrots.org/kids>
- Two characteristics that set parrots apart from other birds are their strong, hooked beak and their four toes. Their beak helps them hold and crush objects. Two of their toes point forward and two backward, which helps them climb and grasp things. Scientists believe that parrots are the only birds that hold their food with one foot to eat.
- CITES (the Convention on International Trade in Endangered Species) is an international agreement between 175 governments to ensure that international trade of wild animals and plants does not threaten their survival. Over 30,000 species of animals and plants are now protected by CITES agreements. However, many animals continue to be at risk from the sale of wildlife products including food products, exotic leather, tourist curios, and medicines.

Vocabulary

Persuasive Language Display the words *smart* and *brainy*. Ask students to think about the words' meanings. (Both mean "intelligent," but *brainy* suggests someone who is very smart and knows a lot.) Explain that the words have similar dictionary definitions, but each one gives a different feeling when you hear it or read it. Discuss students' reactions to each word and if they think it is a positive way to describe a person or an animal.

Next, read aloud the headline and deck on p. 2 of the story. Explain that the author is a biologist who studies birds and has a personal point of view about parrots. Ask: *How do you think he feels about hunters trapping parrots to sell as pets?* Lead students to understand that good readers take into account how a writer might feel about a story's topic. Suggest that as they read this story, they look for words that make them feel a certain way about parrots and trappers. Point out that even the story headline, "A Passion for Parrots," can be a clue about the author's point of view.

(Samples of persuasive language in the story: Positive about parrots—*they are beautiful; parrot families stick together; some are so smart; their beauty and brains have made parrots too popular; wild parrots belong in the forest, flying free.* Negative about trappers and pet trade—*wild parrots are in danger; trappers target the macaw for its beautiful feathers; hunters took as many as they could; something had to be done; sadly, trappers still catch parrots in other places in Peru.*)

A Passion for Parrots

(continued)

Preview and Make Predictions

Students are actively engaged when asked to preview a story and make predictions. Before reading “A Passion for Parrots,” have pairs of students page through the story previewing the photos, captions, and subheads. As they think about the information, ask them to list three things they think they will learn more about in the story. Display several responses and ask what led them to these predictions.

Access Science Content

Display a photograph or map of planet Earth above the words *people* and *animals*. Have students work with a partner to brainstorm what *people* need to survive on Earth. Ask them to repeat the process for *animals*. Then invite volunteers to explain some of the ways that people *use* animals. Lead students to mention food, clothing, companionship, rescue work, and transportation.

Explain that during the last two hundred years, the number of people living on Earth has grown dramatically. This **increase in population**, along with human activities, has led to changes in the **environment** that affect many animal species, including the subject of this story—parrots. Help students explore the key science concepts by using the Think-Pair-Share cooperative learning strategy. Divide the class into four groups. Give each group one of the questions below to consider. First have students think silently about their questions. Then have individuals pair up and exchange thoughts. Finally have pairs share responses with other pairs in their group, then move out and share with one student pair from each of the other three groups. (Encourage groups 2 and 3 to use print or online reference materials to check the definition of the words *endangered* and *extinct*.)

1. Is the world a safe place for all animals? Why or why not?
2. What does it mean for a species to be “endangered”? How do species become endangered?
3. What does it mean for a species to become “extinct”? Does it matter if it happens?
4. Should wild animals be kept as pets? Why or why not?

Finally, lead the entire class to consider this question: *Why should people protect endangered species?* Accept and display reasonable answers, emphasizing that organisms (living things) within an ecosystem are connected and that losing or reducing the numbers of one type can negatively affect many others, even humans. Explain that in this story, students will read about parrots in Peru that were endangered, how that came about, and what actions people took to help Peru’s wild parrots.

A Passion for Parrots

(continued)

Sum Up

After students read the story, have them complete the Cause-and-Effect Chain on p. T7. Point out that some parts of the chain are filled in to guide their thinking. In the first box, they should write what caused the parrots to eat clay. For the other boxes, students need to think about the order in which important events happened. Focusing on these cause-effect relationships will help them summarize the key information. When the chains are complete, invite volunteers to read aloud their responses.

Assess and Reteach

Materials: Comprehension Check, pp. T9 and T10; “A Passion for Parrots” story

Assign the Comprehension Check for “A Passion for Parrots” on p. T9. Use the Answer Key to score the assessment. Based on the results, you may want to reteach key science concepts, including why parrots eat clay, how their population was affected by the pet trade, and the success of various conservation efforts.

Draw students’ attention to the opener on pp. 2-3. Read aloud the deck: *For many years trappers have caught wild parrots to sell as pets. See what some people are doing to protect these beautiful birds.* Then say: *Early in the story, we learn some important things about where these parrots live and their unusual habit of eating clay. Take another look at the section “A Mystery Solved” on p. 4. Read to find out about the parrots’ strange habit of eating clay.*

After students share the author’s research findings, explain that since eating clay was a daily habit, hundreds of parrots would gather at the clay lick every morning. This meant that trappers knew exactly where to go to catch parrots. By following their natural behavior, the birds were at risk of being caught and sold as pets. Another key piece of information from the author is that the hunters always took as many birds as they could. If something weren’t done to stop the hunters, the entire parrot population of this area could have been wiped out.

Explain that just as people’s actions can negatively impact an **ecosystem** through **overuse**, human actions also can help put things back in balance. The story describes several successful ways that people got involved to protect parrots. Ask students to scan p. 6 and jot down the actions people took that had a positive effect on the parrot population of Peru. (Answers should include: the government turned parts of the rain forest into new national parks and made old parks bigger; ecotourism raised money to protect the parrots; local people make and sell wall hangings to pay for guards at the clay licks.)

A Passion for Parrots

(continued)

Extend the Learning

Geography Invite volunteers to take part in a Peru Geography Bee. Divide the class into four or five teams. Allow time for each team to find the answers to the following questions. Then have a class competition to see which team can correctly answer the most questions. Students can visit <http://maps.nationalgeographic.com> to explore National Geographic's online atlas.

- On what continent is Peru located? (*South America*)
- What five countries border Peru? (*Ecuador, Colombia, Brazil, Bolivia, and Chile*)
- Name Peru's capital city. (*Lima*)
- Which ocean lies to the west of Peru? (*Pacific*)
- What major mountain range is found in Peru? (*Andes*)
- CHALLENGE QUESTION: What famous ancient Inca site is in Peru? (*Machu Picchu*)

Language Arts Remind students that in the story, the author describes hearing *screeches* and *squawks*. Explain that these are examples of *onomatopoeia*, or words that imitate a sound. Other examples are *oink*, *clang*, *slurp*, *creak*, and *whoosh*. Have students write a poem about the parrots at the clay lick, using onomatopoeia. Invite volunteers to read their poems aloud.

Make Comparisons Using the poster "A Peek at Parrots," help students see what makes a parrot a parrot and recognize there are also differences within the parrot population. Point out there are six different parrots shown in the poster. Invite student volunteers to come up and read each photo caption aloud. Have students write down an important detail. When the process has been completed with each caption, review what was learned by having several students share responses.

Challenge - Synthesize Individually or in small groups, students can research another species that is endangered or near extinction. They can focus on an animal in their state or elsewhere in the world. Allow students to research what is currently being done to save and protect this animal. Then ask students to list three useful things people can do to help the species. Encourage them to think beyond contributions of money. Invite students to share their lists and ask classmates to select several ideas from those presented that have merit and could be implemented.

A Passion for Parrots

Read "A Passion for Parrots" in NATIONAL GEOGRAPHIC EXPLORER. Then think about how people's actions affected the parrots in Peru. Complete the cause-effect chain below.

CAUSE



EFFECT/CAUSE



EFFECT/CAUSE



EFFECT/CAUSE



EFFECT/CAUSE



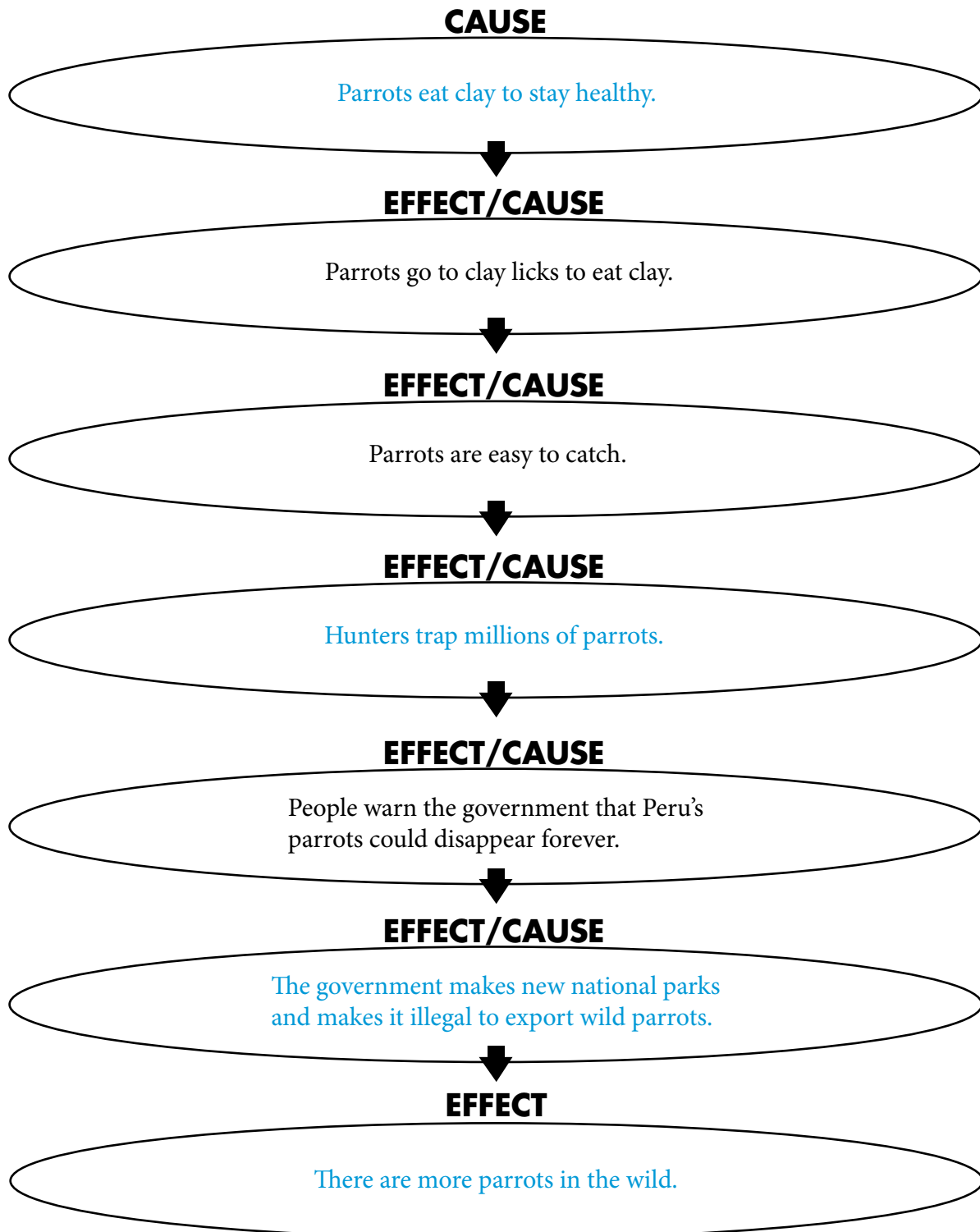
EFFECT/CAUSE



EFFECT

A Passion for Parrots

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COMPREHENSION CHECK

Answer these questions about "A Passion for Parrots." For items 1–4, fill in the circle by the correct answer. Write your answer to item 5.

1. Why do parrots eat clay?
 - (A) It provides extra vitamins.
 - (B) It gets rid of toxins in their food.
 - (C) It provides the water they need.
 - (D) It keeps their colors bright.

2. Why are clay licks sometimes dangerous places for parrots?
 - (A) The parrots become easy targets for trappers.
 - (B) Clay licks are toxic to parrots.
 - (C) Tourists often scare parrots at clay licks.
 - (D) Clay licks are home to animals that eat parrots.

3. Which of these hurts the wild parrot population in Peru?
 - (A) guards in parks
 - (B) tourist lodges
 - (C) the pet trade
 - (D) all of the above

4. What effect has ecotourism had on wild parrots?
 - (A) It has helped them by raising money to protect parrots.
 - (B) It has harmed the parrots' natural environment.
 - (C) It has helped parrots by completely ending their export.
 - (D) It has placed more parrots in captivity.

5. Conservation groups, the government, ecotourists, and local people work together to protect Peru's wild parrots. Explain what these groups do to help the parrots stay safe.

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5. Conservation groups, the government, ecotourists, and local people work together to protect Peru's wild parrots. Explain what these groups do to help the parrots stay safe.

Sample top-scoring response: People who care study wild parrots and tell people about the danger
they are in. The government made parts of the rain forest into national parks. Hunters cannot trap
wild parrots there. Tourists go to Peru to see the parrots. The money they spend helps to pay for
people who guard the parrots. Local people make and sell beautiful cloth wall hangings that show
the rain forest's animals. The money they make also goes toward protecting the parrots.

ACTIVE EARTH

Teacher's Guide

Jan.-Feb. 2010

Curriculum Connections

- Language Arts
- Earth Science
- Geography

Standards Correlations

- Language Arts: Vocabulary development
- Earth Science: Earth structures; Forms of energy;
Role of models in practice of science
- Geography: Maps; Spatial organization

Literacy Skills

- Reading Strategy: Visualize
- Vocabulary: Sensory Details
- Writing: Research

Activity Masters

Access Science Content, T16

Access Science Content, Answer Key, T17

Comprehension Check, T18

Comprehension Check, Answer Key, T19

ACTIVE EARTH

About the Story

Earth is an active, dynamic planet. It shakes and rattles, sizzles and oozes. In this story, students will learn about geological processes that occur above and below Earth's surface. Readers will explore Earth's three main layers and discover how ever-shifting tectonic plates create earthquakes, volcanoes, and mountain ranges.

Fast Facts

- *The JR* is a ship run by several research organizations and universities. Its initials stand for *JOIDES Resolution*. The ship has been in operation since 1985 and is a floating scientific research center with the sole purpose of drilling into Earth's crust to bring up samples for examination. This research will help scientists understand more about Earth's layers and constant movement. As of fall 2009, the deepest hole they had drilled reached over 2 kilometers (1.3 miles) into Earth's crust.
- The Richter Scale was invented by Charles Richter in 1935 to measure the amount of seismic energy released by an earthquake. On May 22, 1960, an earthquake struck Valdivia, Chile, with a magnitude of 9.5 on the Richter scale. It is the strongest earthquake ever recorded.

Vocabulary

Sensory Details Have students close their eyes and imagine the scene as you read aloud these sentences: *At first, Earth was just a big blob of melted rock. Earth's crust is broken into huge pieces, like a jigsaw puzzle. Molten rock oozes into deep valleys.* Then ask students to open their eyes and describe what they pictured.

Next, display labels or pictures for the five senses: *sight, hearing, touch, smell, taste*. Model using sensory details to understand the writer's ideas. For example, say: *When I read, Earth's moving plates crash into each other, I imagine huge areas of land as big as states or countries slamming into each other with such force that land is pushed upwards to form mountains. All that crunching and banging would be so noisy and probably feel like an earthquake.* Continue with the other phrases, leading students to explain how sensory details helped them better understand and remember the information about Earth.

Finally, have student pairs brainstorm sensory words that describe earthquakes and volcanoes. Encourage them to indicate which of the displayed senses the words appeal to. You may want to use a T-chart to display responses, with *earthquake* and *volcano* at the top of the T.

ACTIVE EARTH

(continued)

Preview and Set a Purpose

When students set a purpose for reading, they become engaged readers. Lead students in previewing the story and setting a purpose. Direct attention to the headline and deck on p. 9. Ask students to think about what they already know about our active Earth. Model tapping into prior knowledge. For example, say: *I know Earth has three layers. I also know the layer we live on is called the crust and it is always changing.* Have students turn and talk with a partner, brainstorming what they know about earthquakes and volcanoes and how Earth's surface changes. Ask volunteers to share ideas that came up.

Next, model for students how to set a purpose for reading by combining what they know with what they think they will learn about based on their preview. Say: *I know a bit about Earth's layers. By skimming the photos, captions, and boldface words, I was reminded about Earth's moving plates. I need to read more to find out what Earth's three layers are like and what makes the plates move. My purpose for reading this story will be to find out how the moving plates create volcanoes and earthquakes.* Distribute p. T16 and have students complete the sentence by writing their purpose for reading the story.

Access Science Content

Remind students that as they're reading, good readers use the writer's words to create pictures in their minds. This is called **visualizing**. When readers combine these mental pictures with things they already know, it becomes easier to understand and remember the information. Explain that in "Active Earth," the writer uses descriptions that help readers create a kind of mental photo album of Earth.

Display the following sentence from the story: *To picture Earth, think of a boiled egg.* Explain that students can use what they know from observing an egg to understand something in nature they can't see. Say: *This sentence about a hard-boiled egg helps me get a better picture of Earth's layers. The writer is giving me a great model. A **model** is an object that stands for something else. In this case, it's a hard-boiled egg. The egg has a thin shell like Earth's crust. Underneath is the thick white part of the egg, which is like Earth's mantle. In the center is the yolk, which is like Earth's core. Now I have a good picture of Earth's layers in my mind.* To reinforce these ideas, direct students' attention to the diagram of Earth's layers on p. 10 of the story. Guide them in connecting each layer to the corresponding part of the egg.

Before students begin reading, suggest they check the purpose for reading they recorded on p. T16. Have them use the chart on that page to record what they imagine each layer is like.

English Language Learners You may want to pair ELL students with fluent English readers. Have partners read aloud to each other, alternating sentences or paragraphs. At the end of each paragraph, students can take turns summing up with words or drawings what they learned.

ACTIVE EARTH

(continued)

Sum Up

After students read the story, invite volunteers to use their completed charts to share what they learned about Earth's layers. Ask them to support their responses with words and phrases from the text. Then, to demonstrate understanding of the key science concepts, have students complete the numbered sentence frames on p. T16. Encourage them to read their work aloud to a partner and show thumbs-up when they are ready to share it with the class.

Assess and Reteach

Materials: Comprehension Check, pp. T18 and T19; “Active Earth” story; “Earth in Motion” poster

Assign the Comprehension Check for “Active Earth” on p. T18. Use the Answer Key to score the assessment. Based on the results, you may want to reteach key science concepts. For example, students may be unclear about **tectonic plates** and their role in creating earthquakes and volcanoes. To help students better understand the phenomena, display the “Earth in Motion” poster found in the Teacher’s Edition.

First, have students view the world map. Using the map key, ask a volunteer to trace all the plates and boundary lines. Help students find the boldface words *tectonic plates* on p. 11 of the story. Remind them that Earth’s core heats the mantle. Heated rock in the mantle rises up, then sinks as it cools. This rising and sinking creates currents that push and pull on the plates that float above.

Explain that this movement of the plates is what causes most earthquakes and volcanoes. Point out the diagrams on the right side of the poster and ask a student to read aloud the boundary definitions: **transform**, **divergent**, and **convergent**. Ask students to match the photos at the bottom of the poster with the type of boundary they represent.

Finally, have small student groups put Heads Together to discuss each of the following questions. Refer students to p. 12 of the story, if needed. After the group talks about a question, have a student recorder write down the group response. Display responses, noting similarities and differences in answers. To reinforce student learning, have students fold a blank piece of paper into thirds and draw a picture that depicts the answer to each question. Make sure students label their drawings with the correct term.

1. What happens at a convergent boundary?
2. What happens at a divergent boundary?
3. What happens at a transform fault?

ACTIVE EARTH

(continued)

Extend the Learning

Think Like a Scientist Tell students that *The JR* has a website where they can post questions for the people working on the ship. (<http://joidesresolution.org/node/41>) Invite students to think of questions they would like to ask someone working aboard *The JR*. Point out that there are different kinds of scientists such as geologists and marine biologists. There are also laboratory technicians, engineers, and the crew that operates the ship. After thinking of a question, students should decide who might be the best person aboard the ship to ask. (Example: A question about how they do the drilling should go to the engineer, but a question about how they test the samples could go to a geologist.) As a class, choose five questions to submit.

Interpret Maps Point out the maps on p. 11 of the story. Explain that the first map shows the Earth's continents as one land mass called Pangaea. As the plates moved over many millions of years, the continents slowly pulled apart. To reinforce this idea, you may want to have students cut out the current shapes of the continents and try to fit them together like a puzzle, creating one land mass or Pangaea. Provide students with a simple outline map of the world. Have them cut out the continents and try fitting them together, as shown on p. 11. Then ask them to glue the continents on a piece of construction paper in their proper place as they are today. Remind students that this process has taken millions of years. Although the movement of the continents continues today, it is very slow.

Challenge: Research U.S. Volcanoes The United States is home to many volcanoes. Some have been active in recent history; while others lay dormant. Have students work in small groups to research a volcano in the United States. Groups can write a one-page report with the information they find. Reports should include: location, size, type of volcano, date of last eruption, what occurred, probability of eruption in the future, potential effect of an eruption on nearby cities or towns, etc. Possible volcanoes to research are: Mount Shasta, Mount Hood, Mount St. Helens, Mount Rainier, Kilauea, and Haleakala. Have students share their findings in an oral presentation to the class. As students present their reports, use a world map and self-stick notes to label and mark each volcano.

ACTIVE EARTH

Before you read “Active Earth” in NATIONAL GEOGRAPHIC EXPLORER, preview the story. Decide what you want to learn.

1. I want to read the story to _____

As you read the story, note what the writer says about Earth’s layers. Then write what you imagine.

Name of Layer	Writer’s Words	What I Imagine
2.		
3.		
4.		

Complete each sentence to show what you learned. Use these six words: **core, crust, earthquakes, mantle, pieces, volcanoes.**

5. The _____ is Earth’s deepest layer.
6. Everything we see around us is part of Earth’s _____.
7. Earth’s thickest layer is called the _____.
8. Earth’s crust is broken into _____.
9. When plates split apart, _____ may form.
10. When two plates slide past each other, _____ can occur.

ACTIVE EARTH

Before you read “Active Earth” in NATIONAL GEOGRAPHIC EXPLORER, preview the story. Decide what you want to learn.

1. I want to read the story to learn about volcanoes and earthquakes and Earth's layers.

As you read the story, note what the writer says about Earth's layers. Then write what you imagine.

Name of Layer	Writer's Words	What I Imagine
2. core	<ul style="list-style-type: none"> • deepest layer • very hot • Earth's “yolk” 	Answers will vary.
3. mantle	<ul style="list-style-type: none"> • thick • like an egg white • made of partly melted rock 	Answers will vary.
4. crust	<ul style="list-style-type: none"> • cool crust • eggshell • all you see is part of it 	Answers will vary.

Complete each sentence to show what you learned. Use these six words: **core, crust, earthquakes, mantle, pieces, volcanoes.**

5. The core is Earth's deepest layer.
6. Everything we see around us is part of Earth's crust.
7. Earth's thickest layer is called the mantle.
8. Earth's crust is broken into tectonic plates.
9. When plates split apart, volcanoes may form.
10. When two plates slide past each other, earthquakes can occur.

COMPREHENSION CHECK

Answer these questions about "Active Earth." For items 1–4, fill in the circle by the correct answer. Write your answer to item 5.

1. Which part of Earth does the author compare to an egg yolk?
☐ (A) the mantle
☐ (B) the crust
☐ (C) the core
☐ (D) the plates
2. If you could stand in Earth's core, what would you say?
☐ (A) "I'm cold."
☐ (B) "I'm drifting!"
☐ (C) "It's hot down here!"
☐ (D) "Hello, I'm Pangaea."
3. Which phrase best describes Earth's crust?
☐ (A) huge, slow-moving pieces
☐ (B) connected continents
☐ (C) far below Earth's surface
☐ (D) solid and unchanging
4. What caused the Himalaya to form?
☐ (A) a transform fault
☐ (B) a convergent boundary
☐ (C) a divergent boundary
☐ (D) a volcanic eruption
5. Think about how Earth's continents have changed over time. Explain why the east coast of South America and the west coast of Africa would fit together like two puzzle pieces.

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Sample top-scoring response: Long ago all the continents were joined together. Over time, the pieces drifted further and further apart. Since they were once joined together, they could still fit together like puzzle pieces if you moved them back to their original positions.

THE WINNING EDGE

Teacher's Guide

Jan.-Feb. 2010

Curriculum Connections

- Language Arts
- Physical Science
- Health/Nutrition

Standards Correlations

- Language Arts: Determine essential information by inferring
- Physical Science: Motion of objects

Literacy Skills

- Reading Strategy: Making Inferences
- Vocabulary: Action Words
- Writing: Descriptive Paragraph

Activity Masters

Make Inferences, T25

Make Inferences, Answer Key, T26

Comprehension Check, T27

Comprehension Check, Answer Key, T28

THE *WINNING* EDGE

About the Story

Billy Demong has his sights set on a gold medal in the Nordic Combined event in the 2010 Winter Olympics. In this story, readers learn how he uses skill, endurance training, and an understanding of objects in motion to achieve the winning edge.

Fast Facts

- The XXI Olympic Winter Games will be held in Vancouver, BC, Canada from February 12-28, 2010. Over 80 nations and 5,500 athletes will participate in 86 events.
- Every Olympic Games selects mascots that are representative of the city or country where the games are held. The mascots for the 2010 Winter Olympics are: *Miga*, a mythical sea bear, part orca and part Kermode bear; *Quatchi*, a sasquatch; and *Mukmuk*, a Vancouver Island marmot.

Vocabulary

Action Words Display this sentence: *Watch him go down the hill.* Circle or highlight the word *go*, and ask a volunteer to tell what it means (to move). Point out that English has many other action words that tell how someone or something moves. These words are often a better choice than *go* because they give a clearer idea of how the person or thing is moving. Model this by repeating the sentence, substituting the word *race* for *go*. Ask students to think of other action words that could replace *go* in the sentence. You may want to have English Language Learners brainstorm with a more fluent partner. As students share ideas, display their responses.

Next, have a volunteer read aloud the first paragraph on p. 15. Ask students to jot down action words they hear. (Answers: *zoom, race, fly*) Have students think of a favorite game or sport. Ask them to use vivid action words like these to write three sentences that describe how the players or athletes move. After students share their best sentence with the class, display a list of action words for students to use in future writing assignments.

Preview and Make Predictions

Topic-Related Vocabulary Display the following words in random order inside separate ovals: *energy, muscles, gravity, jump, skiers, pushes, force*. Create a backwards web by drawing a line from each word back to an empty square in the middle. Read the words aloud with students and say: *All the words appear in the next story we will read. Can you guess what it is going to be about?* To help focus ideas, direct students to the story opener on pp. 14-15. Then have them make their predictions. Summarize student predictions and record one in the middle of the web. Tell students you will revisit their prediction after reading the story to see if they were correct.

English Language Learners To assist ELL students, you may want to do a picture walk of pp. 14-17. Read the photo captions aloud. Discuss the different ways that Demong moves his body and explain how he needs energy and strength to compete in the Olympics.

THE **WINNING** EDGE

(continued)

Access Science Content

Demonstrate Law #1 Use a model to introduce students to the concepts of **force** and **gravity**. First, set a ball on the floor. Ask: *What do you observe? Why do you think the ball isn't moving?* After students respond, explain that in order for an object at rest to start moving, there has to be some sort of force such as a push or pull. This force can come from different sources, including a source from nature such as wind, a human action such as a kick (demonstrate with the ball), or an object such as a magnet. Lead students to understand that when you kicked, your bones and muscles supplied the strength and energy to move the ball. Explain that when they read the story, they will discover how an athlete manages to get off to a good start when he competes in the Olympic games.

Next, have a volunteer hold the ball above his or her head. Poll the class to predict what will happen when the student lets the ball go. Then prompt the volunteer to drop the ball. Explain that the ball falls to the ground due to gravity, which is a force that acts on objects and people. Gravity pulls things toward the center of Earth.

Introduce Law #2 Use an imagined game to introduce students to the concept of **mass**. Display photos of a tennis ball and a bowling ball. Have students imagine what it would be like to roll these balls across a playground. Ask: *Which ball would need more force to keep rolling on the ground? Why?* Explain that students would have to push harder to keep the bowling ball moving because it has more mass than the tennis ball. The lower an object's mass, the less force it needs to keep going or go faster.

Demonstrate Law #3 Use a model to introduce the concept of **air resistance**. Hold a small piece of light fabric or toy parachute above your head and demonstrate how slowly the object floats to the ground. Explain that although gravity is acting on it, when the falling object pushes air downward, some of the air pushes back upward. This slows the object's fall to Earth.

As students read the story, encourage them to think about how the athlete's body is like a moving ball or falling object.

Sum Up

Ask for a show of hands for those students who accurately predicted the story topic based on the vocabulary. Then distribute the Inference Chart on p. T25. Remind students that by combining ideas in the text with what they know, readers can figure out what a writer doesn't say directly. Model how to **make inferences** to complete the first item. Say: *When I came across this sentence in the story, I used what I know about Olympic athletes to read between the lines. The writer says that Demong owns a very special machine that might win him an Olympic medal. I know that winning athletes need to be in good physical shape. So I figured out that Demong's machine is his body.* Model filling in the first row of the chart based on your think aloud. Then have students work in pairs to complete the chart. When the charts are complete, invite volunteers to share their responses.

THE **WINNING EDGE**

(continued)

Assess and Reteach

Materials: Comprehension Check, pp. T27 and T28; “The Winning Edge” story

Assign the Comprehension Check for “The Winning Edge” on p. T27. Use the Answer Key to score the assessment. Based on the results, you may want to reteach key science concepts. For example, students may not understand how Demong’s diet and training enhance his performance or how the laws of motion affect how fast he skis or how far he jumps.

Display the words *energy*, *endurance*, and *strength*. Have volunteers take turns reading aloud the section “Powering the Machine” on p. 15 of the story. Pause at the end of each paragraph and ask students to turn to a partner to sum up the main idea. As students share their responses, help them relate the information to the key words displayed. Reinforce that Demong chooses the food he eats based on the energy he gets from the calories. This is the important foundation he needs to do his daily training, which helps him compete in the grueling Olympic events. Read aloud the last two sentences that sum up the ideas in this section: *As he exercises, his body breaks down his breakfast to create energy. The energy builds his muscles and fuels his workout.*

If needed, repeat this process on pp. 16 and 17 of the story to reteach the laws of motion. Then work with students to state each law of motion in their own words. Sample responses:

Newton’s Laws of Motion

1. To start moving, an object needs a force like a push or pull.
2. The amount of force a moving object needs to gain speed depends on its mass.
3. When an object pushes against something like air, the thing pushes back.

THE WINNING EDGE

(continued)

Extend the Learning

Plot the Data Encourage students to find out how Billy Demong fares in the Nordic Combined event and how many medals U.S. athletes win each day during the two-week Winter Olympics. Suggest that they use print and online resources to find the information. As a class, create a bar graph to track the number of U.S. bronze, silver, and gold medals. You may also want to select volunteers to be “Demong Watchers” to keep the class informed on his performance in the ski jumping and cross-country events.

Writing Invite students to imagine they are an athlete in the Winter Olympic Games. Ask them to write a paragraph that explains which event they are competing in and why. Tell them to be sure to describe how they have trained, including how they strengthened their muscles and prepared for their event. Select students to share their completed writing.

Food Choice Log Explain to students that it’s important to be aware of our food and calorie intake, even when we’re not competitive athletes. Encourage them to keep a log of everything they eat and drink for one school week, with the estimated number of calories listed next to each item. Explain that children 7 to 10 years old with an average activity level need about 1,700-2,000 calories a day to maintain their weight. Any more and they will gain weight. Point out that students can find calorie amounts for foods on food packaging and labels. The cafeteria manager may have information about the calories in school lunches. You also may want to invite a health professional to come in and talk to students about good food choices and healthy lifestyles.

You can share the following information to help students calculate the amount of calories they burn for every 30 minutes of the following daily activities.

ACTIVITY	CALORIES BURNED	ACTIVITY	CALORIES BURNED
Bicycling	210	Ice Skating	150
Running	375	Watching TV	50
Sleeping	40	Swimming	300
Frisbee	105	Gymnastics	140
Hacky Sack	140	Horseback Riding	140
Karate/Judo	351	Playing Piano	88
Jump Roping	350	Shoveling Snow	210
Skateboarding	176	Skiing Downhill	211
Sweeping Garage	140	Flag Football	281
Walking the Dog	123	Fishing	140

Challenge The Winter Olympics is comprised of competitions that fall into three categories: on snow, on the track, and on the rink. Students can select an event they would like to learn more about and research it using print or online resources. Suggest they create an information sheet or poster about the event. Events include: biathlon, freestyle aerials, super-g, luge, skeleton, curling, ice dancing, and short track. A complete listing of events and other Olympic information can be found at: www.olympic.org. You may want to extend this activity by displaying the completed posters and graphing the number of medals the U.S. receives in the event.

THE WINNING EDGE

Read the sentences from "The Winning Edge." Add what you know from your own experience. Then write what you think the writer means.

I Read	I Know	And So...
1. This machine just might win him an Olympic medal.		
2. How much energy will this big breakfast give him. Will it be enough?		
3. To go forward, Demong pushes his skis against the snow.		
4. He holds his body in a wide, V-shape. That keeps him in the air longer.		

THE WINNING EDGE

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I Read	I Know	And So...
1. This machine just might win him an Olympic medal.	SAMPLE RESPONSES Athletes have to be strong and healthy.	SAMPLE RESPONSES The machine is his body.
2. How much energy will this big breakfast give him. Will it be enough?	 You get energy from the food you eat.	 Demong worries about eating enough food so that he has energy to practice his sports.
3. To go forward, Demong pushes his skis against the snow.	 The story says it takes a force to start moving.	 Pushing against his skis must be a type of force.
4. He holds his body in a wide, V-shape. That keeps him in the air longer.	 The story says air pushing against him slows his fall.	 When he holds his body in a V-shape, more air pushes against it.

COMPREHENSION CHECK

Answer these questions about “The Winning Edge.” For items 1–4, fill in the circle by the correct answer. Write your answer to item 5.

1. For skier Billy Demong, what “powers the machine”?
☐ (A) ski jumps
☐ (B) push-ups
☐ (C) food energy
☐ (D) gravity
2. In this story, what is the meaning of *mass*?
☐ (A) an object’s weight and size
☐ (B) an object’s speed
☐ (C) how an object looks and feels
☐ (D) how far an object travels
3. What keeps ski jumpers from floating away into space?
☐ (A) mass
☐ (B) energy
☐ (C) calories
☐ (D) gravity
4. Why does Demong hold his body in a V-shape when he competes in the ski jump?
☐ (A) to stay up in the air longer
☐ (B) to land on the ground softly
☐ (C) to burn more calories
☐ (D) to build the muscles in his legs
5. Think about Newton’s three laws. Explain how Billy Demong uses one.

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5. Think about Newton’s three laws. Explain how Billy Demong uses one.

Sample top-scoring response (accept any one of the following responses): 1. One law says that

something cannot start moving without a force such as a push. Billy uses a push to get himself moving

down a ski jump. 2. One law says that the amount of force something needs to keep moving depends

on its mass. By pushing hard, Demong passes other skiers in a cross-country race. 3. One law says

that when an object pushes on something, the thing pushes back. Billy uses this law when he makes a

V-shape with his body in the air. It slows his fall back to the ground so he can stay up in the air longer.

Family Ties

Teacher's Guide

Jan.-Feb. 2010

Curriculum Connections

- Language Arts
- Social Studies
- Life Science

Standards Correlations

- Language Arts: Determine main idea
- Social Studies: Examine primary and secondary sources;
Time, continuity, and change
- Life Science: Genes and heredity

Literacy Skills

- Reading Strategy: Summarize
- Vocabulary: Academic Vocabulary
- Writing: Family Tree; Interview Responses

Activity Masters

Comprehension Check, T34

Comprehension Check, Answer Key, T35

Family Tree Template, T36

Family History Interview, T37

Family Ties

About the Story

“Family Ties” introduces students to genealogy through the personal story of renowned neurosurgeon Dr. Ben Carson. Readers will learn about different tools history detectives use to unlock family histories. Using public records, photographs, oral histories, and DNA tests, Professor Henry Louis Gates, Jr., helped Carson learn about his ancestors’ lives. Readers can follow the step-by-step instructions at the end of the story to create their own family trees.

NOTE: Each child comes from unique family circumstances. Some students may not be comfortable exploring their personal genealogy and biological relationships.

Fast Facts

- A census is the gathering of information about every household in the U.S. The Constitution requires a census be taken every ten years. The next census will take place this year, 2010, and is bound to reflect the rapidly changing demographics of the country. The Census Bureau predicts that by 2050, the majority of Americans will be people of color. Census records are also an important tool for genealogists. These detailed records are available to the public and often provide the missing piece in a family tree.
- Through National Geographic’s Genographic Project, students can explore the migratory history of mankind: <https://genographic.nationalgeographic.com>.

Vocabulary

Teach Key Concept Vocabulary Display these key words from the story: *ancestor*, *genealogy*, *document*, *gene*, and *determination*. Use the following steps to teach the word *ancestor*:

1. **Pronounce** Tell students when they read “Family Ties,” they are going to find out how they can learn about their *ancestors*. Ask students to say the word *ancestor* aloud with you. Then have students pronounce it again, by syllable: *an-ces-tor*.
2. **Explain** Tell students that *ancestor* refers to a family member from the past. Say: *My mother’s grandmother was one of my ancestors.*
3. **Engage** Ask students to help you complete this sentence: *My great-grandfather Charles was born in Chicago in 1900. He is one of my _____. (ancestors)*
4. **Involve** Say: *Listen to this sentence and tell me if I’m using the word ancestor correctly. My sister is my ancestor.* Ask students for a thumbs-up or thumbs-down. Explain that those who voted ‘no’ are correct because *sister* refers to someone in your current family who is a relative, but an *ancestor* is a relative from long ago.
5. **Elaborate** Ask: *Where might you find the word ancestor—in a math book or in a history book?* Accept responses from students. Reinforce good reasoning.

Repeat the process to introduce the other key concept vocabulary.

Family Ties

(continued)

Build Background

Tap Prior Knowledge Use a two-minute Fast Write to focus students on the topic of family history. First, give them one minute to think about everything they know about their families such as where their family has lived, how many aunts and uncles they have, and what they know about their grandparents' past. After one minute of "think time," allow students to write for two minutes. Tell them it is alright to use only words or phrases as long as they get the information down on paper. Ask for several volunteers to share something interesting they remembered about their family's history. Have students keep these Fast Writes as they may be helpful in completing some of the after-reading activities.

English Language Learners Many ELL students have family in other countries, so it's important to help them understand that this story relates to them as much as other students. Encourage ELL students to think about their families and relatives that may live far away. Ask: *How can you find out about your family in other countries? Do you talk on the phone, go visit, or write letters?* Record students' responses, then add: *Your family members who live here are a good first resource.* Explain that public records and other documents from many countries are available on the Internet for students' research.

Access Science Content

Point out that people sometimes tell us that we "take after" a relative or "have" a parent's eyes. Explain that there's a reason that we look like our relatives. We inherit our looks from **genes** that are passed from parents to children.

Have students listen as you read aloud each of the following statements. On a paper numbered 1-10, they should write an *I* if they think the item described is inherited from their parents. They should leave the number blank if they think the item is not determined by heredity.

- | | |
|--|------------------------------|
| 1. Your favorite food is pizza. | 6. You have dimples. |
| 2. Your hair is red. | 7. You hate hardboiled eggs. |
| 3. Blue is your favorite color. | 8. You have brown eyes. |
| 4. You can curl the sides of your tongue. | 9. You are allergic to cats. |
| 5. The bottom of your earlobes are closely joined to your jaw. | 10. You love horses. |

Review students' responses. (*Answers: 2, 4, 5, 6, 8, and 9 are inherited traits.*)

Explain that our bodies are made of millions of cells. Inside each cell is DNA, which contains genes. DNA is a kind of map that tells our body how to grow. These "maps" are passed down from our grandparents to our parents, and their maps are passed to us. So our genes are part of our family history, too.

Family Ties

(continued)

Practice: Main Ideas

Explain to students that summarizing helps good readers stay focused and remember what they read. When you summarize nonfiction, you figure out the most important ideas or events. Read aloud the first two paragraphs in the sections “Our Ancestors’ Names” on p. 20. Then model pausing to summarize the paragraphs.

Say: In these paragraphs, the writer introduces us to Professor Henry Louis Gates, Jr. She says that he visited Ellis Island. That seems to be a special place where millions of people first landed in the United States. But Gates couldn’t find clues about his family there. We learn that most African Americans came on slave ships and were sold to slave owners. Names were often changed so family histories were lost.

Then explain: *To sum up the main idea, I ask myself: “What ideas or information does the writer emphasize? Here, she wants us to meet Henry Louis Gates, Jr. She also wants readers to know that African American families have an extra challenge when it comes to learning about their ancestors. I think that’s the main idea of these paragraphs. What do you think the writer will talk about next?”* After students respond, have students work in pairs to read the rest of p. 20.

At the end of p. 20, have students pause to answer these questions: “What did I just read? What was the most important information?” Have students compare their summary statements. Point out that there are lots of details shared on the page about Carson’s mother and family but a summary statement needs to get across the big idea. Lead students in coming up with good, complete summaries such as: *Professor Gates helped Dr. Carson learn more about his ancestors. He traced Carson’s mother’s family back to white slave-owners in Georgia.*

Have students read the rest of the story independently. Tell them to focus on the steps that Gates followed to learn more about Carson’s ancestors.

Sum Up

Summarize/Steps in a Process Display the following discussion prompts:

- What questions did Professor Gates want to answer?
- What tools did he use in his research?
- What did he find out?

Use the prompts to lead students in summarizing the story. Help them connect the research tools and clues with specific discoveries about Ben Carson’s family history. Finally, ask students what they want to remember from reading the story.

Family Ties

(continued)

Assess and Reteach

Materials Comprehension Check, pp. T34 and T35; “Family Ties” story

Assign the Comprehension Check on p. T34. Use the Answer Key to score the assessment. Based on the results, you may want to reteach the key concepts.

First, remind students that this story explains how people can learn about their family histories. Work with students to create a web of the different tools used by history detectives. Help them scan the story to locate references to various tools such as census information, birth, marriage and death records, slave sales, newspapers, letters, family photos, DNA, and family stories. Invite volunteers to read aloud the text where the reference to each tool appears. Review the type of useful information each item can provide.

Next, remind students that Gates faced special challenges when researching the family histories of African Americans. Lead students to understand that because ancestors of most African Americans arrived on slave ships, they did not have immigration papers or other public documents that were recorded. Also, many slave owners changed the names of slaves and separated and sold members of a family.

Finally, remind students that when the paper trail ended, Gates used science—in the form of DNA testing—to help trace Carson’s roots.

Extend the Learning

NOTE: Every family situation is unique. Students may be adopted, live in a single-parent home, or have large stepfamilies, etc. If a student is not comfortable exploring his or her family tree, consider making these assignments optional.

Family Tree As a culminating activity, students can create their own family trees. Distribute the blank template on p. T36 and review the directions with students. Encourage them to also reread pp. 20–21 of the story and use the family tree graphic as a reference. If students are unable to complete the tree, suggest they use the detective tools described in the story and get help at home from family members.

Interview As family history detectives, students can get useful information by interviewing an older relative. Knowing where to start may be challenging. Distribute p. T37, which lists a number of interview questions. Give students sufficient time to complete their detective work. Then ask them to write a paragraph that describes the three things they found most interesting.

COMPREHENSION CHECK

Answer these questions about "Family Ties." For items 1–4, fill in the circle by the correct answer. Write your answer to item 5.

1. Why do history detectives study immigration records?
 - (A) Immigrants kept good records of their travels.
 - (B) Immigration records are better than other records.
 - (C) There is no other way to research family histories.
 - (D) Many Americans' ancestors were immigrants.
2. What is a *census*?
 - (A) a document that shows when and where people buy land
 - (B) a diagram that shows how people are related
 - (C) a period of one hundred years
 - (D) an official count of the people who live in a place
3. Which of these did Professor Gates use to research Dr. Ben Carson's family history?
 - (A) the census of 1870
 - (B) DNA tests
 - (C) old family photographs
 - (D) all of the above
4. According to the writer, what do we inherit from our ancestors?
 - (A) traditions, stories, and genes
 - (B) family trees, scrapbooks, and quilts
 - (C) food, newspapers, and videos
 - (D) dogs, farms, and computers
5. Why is it especially hard for many African Americans to trace their family histories?

COMPREHENSION CHECK

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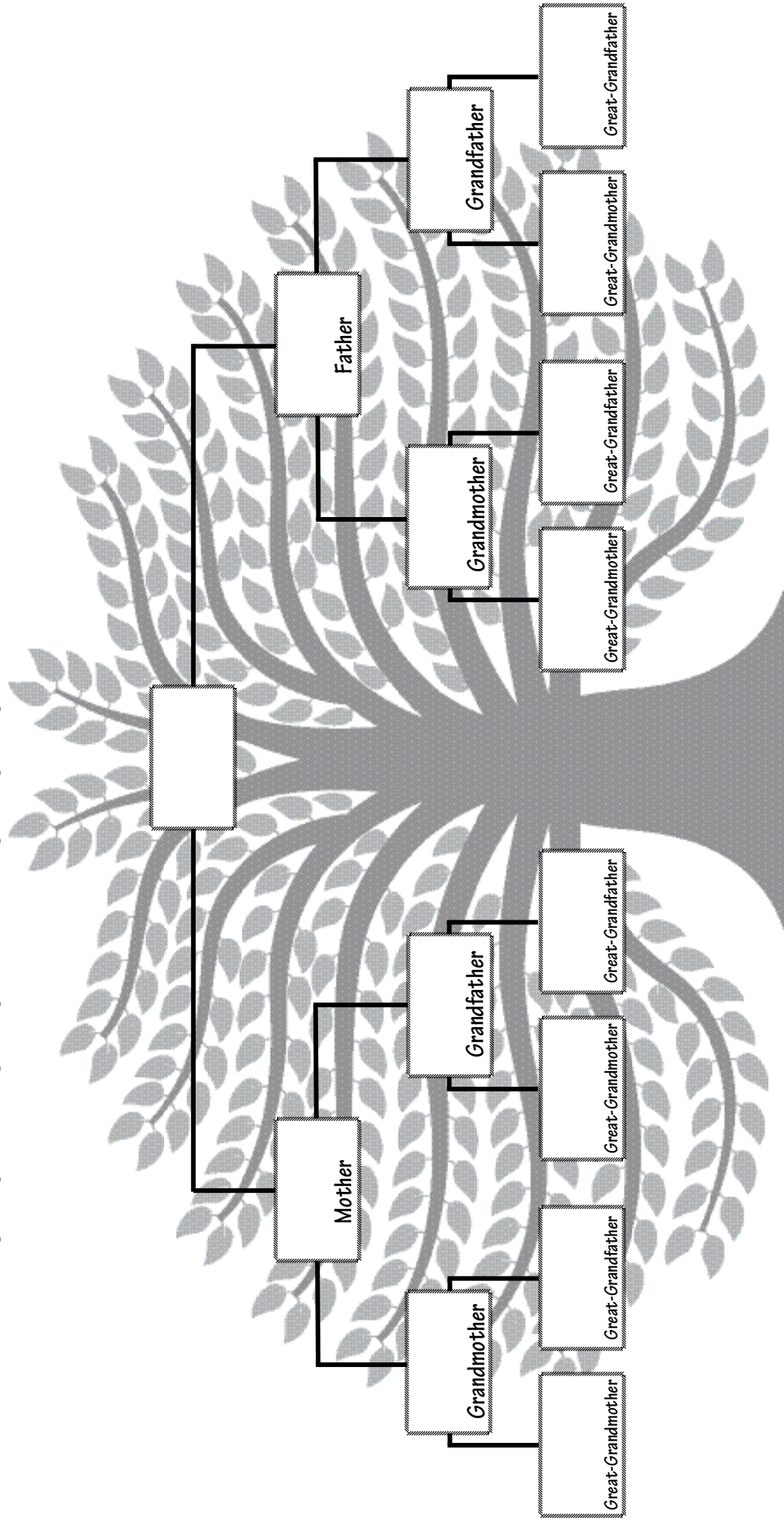
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5. Why is it especially hard for many African Americans to trace their family histories?

Sample top-scoring response: Many African Americans' ancestors entered the United States on slave ships. They did not go through Ellis Island so there are no records telling when they came to the U.S. Also, slave owners often gave slaves new names with just a first name. This made family histories even harder to trace. Often, families were split apart so memories and stories were lost. For all these reasons, it is very hard for many African Americans to trace their family histories.

Name: _____

Family Ties

Make a family tree to share with your friends and relatives. Write your name at the top. Then write your parents', grandparents', and great-grandparents' names in the boxes below.



Family Ties

Interview a relative to help you learn about your family history. Use these questions. Write the answers on the back of this page. Be sure to thank your relative.

- 1.** What is your full name? Do you have a nickname? If so, where did it come from?
- 2.** When and where were you born?
- 3.** Do you have brothers and sisters? What are their names?
- 4.** Where did you grow up and what was it like?
- 5.** What kind of jobs did your parents have?
- 6.** What subjects did you like in school?
- 7.** Did you have special family chores to do?
- 8.** Did you have any pets as a child? What were their names?
- 9.** What do you remember about your grandparents?
- 10.** Do you know any stories of ancestors who lived long ago?