

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 compelling 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 portions of planet Earth shake, rattle, and drift apart. Science and historical sleuthing reunite family members separated by centuries and continents.

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

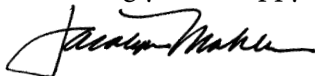
Next, "Active Earth" provides a graphic tour of Earth's layers. From the planet's sizzling core to the crust we call home, students will learn about tectonic plates and their role in earthquakes, volcanic eruptions, and even the formation of mountain ranges. Students can record their purpose for reading 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. Students can use the activity on p. T25 to make inferences and get the most out of the text as they read.

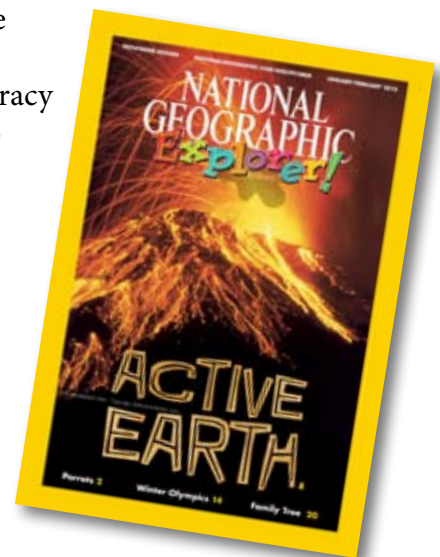
Finally, in "Family Ties," award-winning children's author Patricia McKissack introduces readers to renowned brain surgeon Dr. Ben Carson and his quest to trace his family roots. Students will discover how history detective Professor Henry Louis Gates, Jr., managed to unlock Carson's family history using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

Activity Masters

Synthesize: Cause-and-Effect Chain, T7

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

Comprehension Check, T9

Comprehension Check, Answer Key, T10

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 local artisans have helped protect wild parrots in areas of Peru.

Fast Facts

- The story's 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>
- 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 exceptionally 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 positive when used 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 particular 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—*Parrots are smart and beautiful, stunning rainbow, world's most beautiful birds, never boring, strong family ties, some of the world's most intelligent animals.* Negative about trappers and pet trade—*put many parrot populations at risk, pushed some... to near extinction, eager to capture, we all felt that something had to be done, take as many birds they can.*)

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 process and evaluate 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 of planet Earth beside the words *people* and *animals*. Have students work with a partner to brainstorm what people need to survive on the planet. Ask them to repeat the process for animals. Then work with the class to create a list of **natural resources** found on Earth that living things use, including air, water, plants, minerals, etc. Finally, invite volunteers to explain some of the ways that people use animals. Lead students to mention food, companionship, rescue work, and transportation.

Explain that during the last two centuries, the number of people living on Earth has increased significantly. 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 setting up four Jigsaw cooperative learning groups. A student from each group goes to a designated area to discuss one of the following questions:

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?

Ask students to take notes in their discussion groups and report back to their original Jigsaw group on their assigned questions. Then as a whole class, revisit each question, allowing students to expand their thoughts and ideas. Finally, lead students to consider this question: *Why should people protect endangered species?* Accept and display reasonable answers, emphasizing that organisms within an ecosystem are connected and that losing or reducing one 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 the wild parrots.

A Passion for Parrots

(continued)

Sum Up

After students read the story, have them **synthesize** the information by completing 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 chain of events that occurred in sequence. Focusing on these cause-effect relationships will help them summarize the main ideas in the story. When the chains are complete, invite students 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: *Parrots are smart and beautiful. Over the years, people have trapped millions to sell as pets. Come to Peru to see what’s being done to save wild parrots.* Then say: *Early in the story, we learn some important things about the habitat of these parrots and their unusual behavior 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 trappers always took as many birds as they could. If something weren’t done to stop the trappers, 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 interventions. 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: ecotourism raised money to protect the parrots; the government extended the boundaries of the national parks; local people make and sell *arpilleras* 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. Allow time for them to write questions and research the answers. Then have a class competition to see which team can answer the most questions. To help students prepare, you may want to display the following questions. Students can visit <http://maps.nationalgeographic.com> to explore National Geographic's online interactive atlas.

- On what continent is Peru located? (*South America*)
- In which hemisphere is Peru located? (*Western Hemisphere*)
- 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 famous ancient Inca site is in Peru? (*Machu Picchu*)
- CHALLENGE QUESTION: Estimate how many miles Peru is from your school.
How can you find the answer?

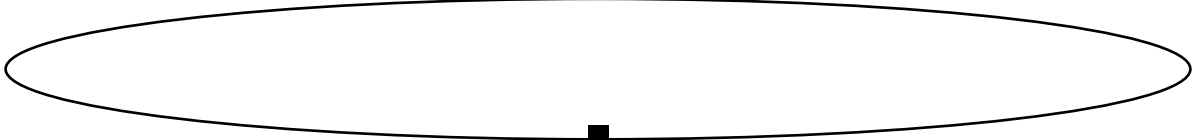
Language Arts Remind students that in the story, parrots are described as *squawking* and *screeching*. Explain that these are examples of *onomatopoeia*, or words that imitate a sound. Other examples are *oink*, *clang*, *slurp*, *creak*, and *whoosh*. Have students write a poem about the parrots at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

Synthesize Across Texts 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 develop a written action plan that outlines three to five useful things people can do to help the species. Encourage students to think beyond contributions of money. Suggest that they organize their action plan around the 5 W's: *What? Where? When? Who?* and *Why?* Invite students to share their plans and ask classmates to select one idea from each presentation that has 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



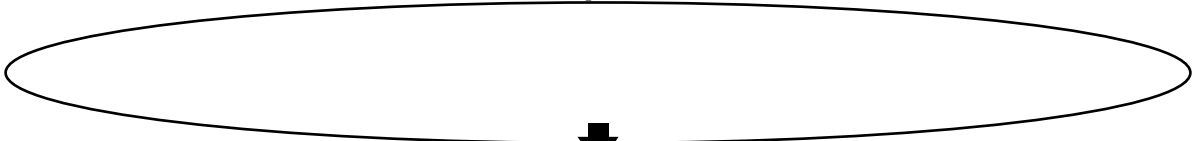
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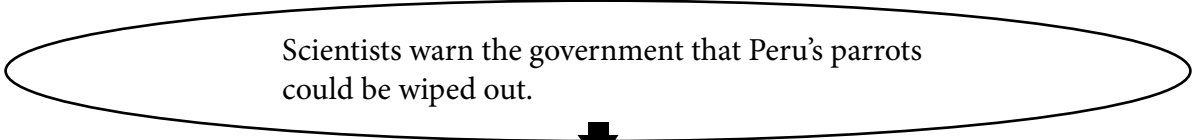
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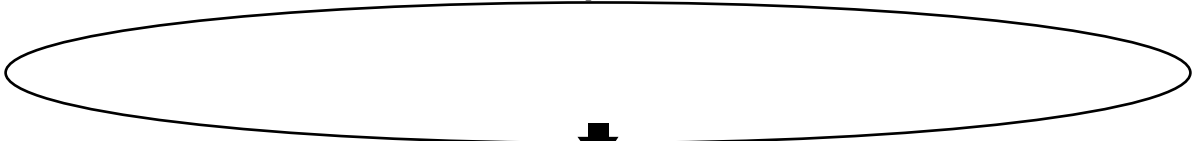
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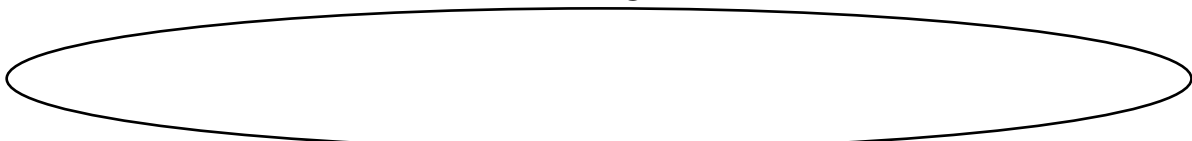
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EFFECT/CAUSE



EFFECT



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

Parrots eat clay to stay healthy.

**EFFECT/CAUSE**

Parrots go to clay licks to eat clay.

**EFFECT/CAUSE**

Parrots are easy targets for trappers.

**EFFECT/CAUSE**

Trappers catch millions of parrots.

**EFFECT/CAUSE**

Scientists warn the government that Peru's parrots could be wiped out.

**EFFECT/CAUSE**

The government creates national parks and makes it illegal to export wild parrots.

**EFFECT**

There are more parrots in the wild.

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 nutrients.
 - (B) It protects them from 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 dangerous predators.
3. Which of these hurts the wild parrot population in Peru?
 - (A) *arpilleras*
 - (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 for parrot protection.
 - (B) It has harmed the parrots' natural environment.
 - (C) It has helped them 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. Write a paragraph that tells what these groups do to help parrots stay safe.

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Sample top-scoring response: Conservation groups study wild parrot populations and make people aware of the danger the animals face. The government passes laws that set aside areas for parks where hunters cannot trap wild parrots for the pet trade. Ecotourists travel to Peru to enjoy the wildlife of the Amazon, and the money they spend helps to pay for people who guard the parrots. Local people make and sell beautiful weavings that show the wildlife of the Amazon, and 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 core 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. This is the strongest earthquake ever recorded.

Vocabulary

Sensory Details Have students close their eyes and imagine the scene as you read aloud these phrases from the story: *volcanoes sizzle, molten rock oozes, earthquakes rattle and shake, it's hotter than hot*. Then ask students to open their eyes and describe what they pictured.

Display labels 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 the words volcanoes sizzle, I imagined smoke coming out of a big, hulking mountain that was making loud rumbling sounds. I imagined hot air filled with smoke and ash*. Continue with the other phrases, leading students to explain how using sensory details helped them better understand and remember what the writer describes.

Suggest that as they read the story, students use self-stick notes to jot down phrases that appeal to one or more of the senses, and to use the writer's words to imagine what the different layers of Earth are like.

ACTIVE EARTH

(continued)

Preview and Set a Purpose

When students set a purpose for reading, they become engaged readers. Lead them 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 Earth's layers and how its surface changes.

Next, model for students how to set a purpose for reading by combining what they know with what they learned from their preview. Say: *I know a bit about Earth's layers. By skimming the photos and captions, I was reminded about Earth's tectonic plates. I need to read more to find out what Earth's three layers are like and why the plates move around. My purpose for reading this story will be to find out what makes the plates move and how the moving plates create volcanoes and earthquakes.* Distribute p. T16 and have students write their purpose for reading the story at the top of the page.

Access Science Content

Remind students that good readers **visualize**, or use the writer's words to create pictures in their minds as they're reading. When they combine these images with things they know from their own lives, it becomes easier to understand the writer's ideas. In "Active Earth," the writer uses sensory details and comparisons to help readers create a kind of mental photo album of Earth.

Display the following sentence from the story: *To picture Earth's layers, think of a hard-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.*

Direct students' attention to the diagram on p. 10 of the story. Guide them in connecting each layer to the corresponding part of a hard-boiled egg.

Before students begin reading, suggest they check the purpose for reading they recorded on p. T16. As they read, encourage them to 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 and how **visualizing** helped them better understand what they read. Ask them to support their responses with words and phrases from the text. To demonstrate understanding of the key science concepts, have students complete the numbered sentence frames at the bottom of p. T16. Encourage them to read their work aloud to a partner and show thumbs-up when they are ready to share their work 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, set up a Four Corners cooperative learning group. Have students form four groups and gather in a corner of the classroom. Assign one of the following questions to each group. Students should think and write about each question individually before participating in a brief group discussion. Then one or two volunteers from each group can report back to the class with the group's response.

1. What can we learn from examining where the deadliest earthquakes have occurred in the last 100 years?
2. What happens at a convergent boundary?
3. What happens at a divergent boundary?
4. 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 students 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*. Remind them there are different kinds of scientists such as chemists, 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 core samples could go to a chemist or laboratory technician.) As a class, choose five questions to submit.

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 include: Mount Shasta, Mount Hood, Mount St. Helens, Mount Rainier, Kilauea, and Haleakala. Have students share their findings in an oral presentation.

Challenge Invite students to find out everything they can about the Richter Scale. You may want to display the following questions to guide their research:

- How does it work?
- Where are the scales located?
- How is the data collected and recorded?
- What are some of the largest earthquakes measured by the Richter Scale?
- Where and when did they occur?
- Can the Richter Scale help scientists predict future earthquakes?

As they research, students can refer to this U.S. Geological Survey website to find data about recent seismic events: <http://earthquake.usgs.gov/eqcenter/recenteqsww/>. Invite students to share what they learn. As an ongoing follow-up, students can keep a log of earthquakes that occur around the world during the school year and create a bar or line graph showing each quake's magnitude on the Richter Scale.

ACTIVE EARTH

Before you read "Active Earth" in NATIONAL GEOGRAPHIC EXPLORER, preview the story. Decide what you want to learn and complete the sentence.

1. I want to read the story to _____

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

Layer	Writer's Words	What I Imagine
2.		
3.		
4.		

Complete each sentence to show what you learned.

5. The _____ is Earth's deepest layer.
6. Everything we see around us is part of Earth's _____ .
7. Earth's core is 6,650°C and made of _____ .
8. Earth's crust is broken into _____ .
9. Volcanoes occur where _____ .
10. Earthquakes are caused when _____ .

ACTIVE EARTH

Before you read "Active Earth" in NATIONAL GEOGRAPHIC EXPLORER, preview the story. Decide what you want to learn and complete the sentence.

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

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

Layer	Writer's Words	What I Imagine
2. core	<ul style="list-style-type: none"> • thousands of miles below your feet • hotter than hot • Earth's "yolk" 	Answers will vary.
3. mantle	<ul style="list-style-type: none"> • like an egg white • made of partially 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.

5. The core is Earth's deepest layer.
6. Everything we see around us is part of Earth's crust.
7. Earth's core is 6,650°C and made of metals.
8. Earth's crust is broken into tectonic plates.
9. Volcanoes occur where plates pull apart.
10. Earthquakes are caused when plates slide past each other.

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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☐ (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.

Sample top-scoring response: Long ago there was just one land mass on Earth. It was called

Pangaea. It floated on top of Earth's mantle, which is a layer of warm rock that constantly moves.

The land mass slowly broke apart into different pieces as the heat rose from Earth's core and made

cracks in the land mass. 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: Properties of matter; Forms of energy;
Role of laws in scientific knowledge
- Health: Human anatomy; Nutrition

Literacy Skills

- Reading Strategy: Make Inferences
- Vocabulary: Action Words
- Writing: Critical Thinking

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 discover how he uses skill, endurance training, and an understanding of objects in motion to achieve the winning edge. Students learn about Newton's Laws of Motion as they follow Demong in ski jumping and cross-country skiing events.

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 different 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 that's part orca and part Kermode bear; *Quatch*, a sasquatch; and *Mukmuk*, a Vancouver Island marmot.
- Sir Isaac Newton (1642-1727) was born in England. He is best known for his study of physics and describing three basic laws of nature known today as Newton's Laws of Motion.

Vocabulary

Action Words Display the 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. (*rocket down, glide, fly*) Have students think of a favorite game or sport. Ask them to write three sentences with vivid action words 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 each of the following words in random order inside an oval: *energy, strength, gravity, muscles, jumping, ski, pushes, force*. Create a backwards web by drawing a line from each word back to an empty square in the middle. Ask students to look at the words from the story and predict what it will be about. Say: *What topic links all these words? What do you think you will be reading about?* To help focus their thinking, direct attention to p. 14 of the story. Have them consider the photo as they make their predictions about the topic. Summarize student predictions and write a class response in the middle of the web. Tell students they will review the prediction after reading the story to see if it was correct.

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, it has to be acted upon by a 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 in an Olympic competition.

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 concepts of **mass** and **acceleration**. 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 require 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 in the word web. 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 if Demong can keep his machine working in top form, he may win a medal. I know that winning athletes need to be in great physical shape. So I figured out that Demong's machine is actually his body.* Model filling in the first row of the chart based on your think aloud.

Next, have students work in pairs to complete the chart. Invite volunteers to share the writer's words, what they added from prior knowledge, and the inference they drew.

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 athletic performance (rules of biology) or how the laws of motion affect how fast he skies or how far he jumps (rules of physics).

Display the words *energy*, *endurance*, and *strength*. Have volunteers take turns reading the section “Powering the Machine.” 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 is aware of the food he eats and tries to calculate the energy he will get from the calories consumed. This is the important foundation he needs to do his daily training, which will allow him to compete in the grueling Olympic events. Read aloud the last sentence that sums up the ideas in this section: “Demong’s breakfast is now becoming the energy he needs to build his muscles and fuel his workout.”

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 on February 14. Suggest that they use print and online resources to compare his performance to that of other racers using a bar or line graph.

Role-Play an Interview Students can extend the preceding activity by role-playing an interview between Demong and a sports journalist. Encourage the interviewer to prepare at least ten questions, including several that go beyond a simple “yes” or “no” answer. Have students practice rehearsing the questions and answers before they perform for the class.

Challenge Divide students into three groups by having them number off by 1s, 2s, and 3s (corresponding to Newton’s 3 Laws of Motion). Explain that their assignment is to design a class demonstration that illustrates one of Newton’s Laws of Motion. Their demonstration could take the form of a hands-on experiment, short skit, multimedia presentation, or poster. After groups present to the class, take a vote to choose the groups that were the “Best Teachers” and “Most Creative Scientists.”

Food Choice Log Explain to students that it’s important for everyone 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 a 10-year-old child with an average activity level needs about 1,700-2,000 calories a day to maintain his or her weight. Any more, and there will be weight gain. You may want to invite a professional nutritionist or nurse to the class to help children review their logs and discuss healthier food choices they might make.

THE WINNING EDGE

Read the sentences from “The Winning Edge” in the chart below. In the second column, write what you know from your own experience. In the third column, write the full meaning the writer left unsaid.

I Read	I Know	And So...
1. If Demong can keep his machine working in top form, it just might earn him an Olympic medal.		
2. He is trying to calculate how much energy his breakfast will give him. Will it be enough?		
3. Endurance alone won't get him the gold. He needs strong muscles too.		
4. The number of extra calories he eats is about the same as the number he burns for energy.		

THE WINNING EDGE

Read the sentences from “The Winning Edge” in the chart below. In the second column, write what you know from your own experience. In the third column, write the full meaning the writer left unsaid.

I Read	I Know	And So...
1. If Demong can keep his machine working in top form, it may even earn him an Olympic medal.	Athletes have to be strong and healthy.	His machine must be his body.
2. He is trying to calculate how much energy his breakfast will give him. Will it be enough?	Food gives people energy.	He wants to make sure that he eats enough food.
3. Endurance alone won't get him the gold. He needs strong muscles too.	Athletes build muscles by lifting weights.	Demong will probably lift weights to build strong muscles.
4. The number of extra calories he eats is about the same as the number he burns for energy.	If you eat food with too many calories, you can gain weight.	It must be important for Demong to keep his weight low.

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 selection, what is the meaning of *mass*?
☐ (A) the weight and size of an object
☐ (B) the speed of an object
☐ (C) the look and feel of an object
☐ (D) the distance an object travels
3. What keeps ski jumpers from floating away into space?
☐ (A) mass
☐ (B) air resistance
☐ (C) visualization
☐ (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 Sir Isaac Newton’s three laws of motion. Explain how Billy Demong uses one of these laws to get going, gain speed, or fly far.

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5. Think about Sir Isaac Newton’s three laws of motion. Explain how Billy Demong uses one of these laws to get going, gain speed, or fly far.

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/Genealogy
- 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: Interview

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 at <https://genographic.nationalgeographic.com>.

Vocabulary

Teach Key Concept Vocabulary Display these key words from the story: *ancestor*, *genealogy*, *immigrants*, *maternal*, *public record*, and *roots*. 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: *In what types of texts would you expect to find the word ancestor?* Accept responses from students. Reinforce logical answers such as biographies, history textbooks, and newspaper articles.

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, where their parents grew up, and what their grandparents' childhoods were like. 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 to 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' further 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 a G if they think the item described is determined by genes. They should leave the number blank if they think genes are not a determining factor.

- | | |
|--|------------------------------|
| 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 determined by genes.*)

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

Summarize 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 paragraph in the section “Our Ancestors’ Names” on p. 20. Then model, pausing to summarize the paragraph.

Say: In this paragraph, the writer introduces us to Professor Henry Louis Gates, Jr. She says that he is a history detective who 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. Why is that?

After students respond, explain: *To sum up the main idea of this paragraph, I ask myself: “What ideas or information does the writer emphasize? Here, she wants us to know who Henry Louis Gates, Jr., is. 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 the paragraph. Often, writers put the main idea at the beginning or end of a paragraph. As I read on, I’m probably going to learn more about this extra challenge and what it has to do with Professor Gates’ work.”*

Have students work in pairs to read each of the remaining paragraphs in this section. Suggest that they note repeated words on self-stick notes. At the end of each paragraph, students should pause to write the answers to these questions: “*What did I just read? What was the most important information?*” Have students compare their notes and summary statements.

Finally, ask students to read the rest of the story independently. Tell them to focus on the steps that Professor Gates followed to learn about Ben 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’d like to take away from reading the story and if it has changed their thinking in any way.

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, including immigration records, census information, birth, marriage and death certificates, 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 research tool can provide.

Next, remind students that Prof. Gates faced extra challenges researching the family histories of African Americans. Lead students to understand that because ancestors of most African Americans arrived aboard slave ships, they did not have immigration papers or other public documents that were recorded. Also, many slave owners changed slaves’ names and separated and sold members of a family. This made it even harder to keep track of the people in a family.

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

Extend the Learning

NOTE: Every family situation is unique. Students may be adopted, live in a single-parent home, or have large step families, 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 on those pages 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 short paper that describes the three things they found most interesting from the interview.

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 are immigration records often a good place to research family histories?
☐ (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

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

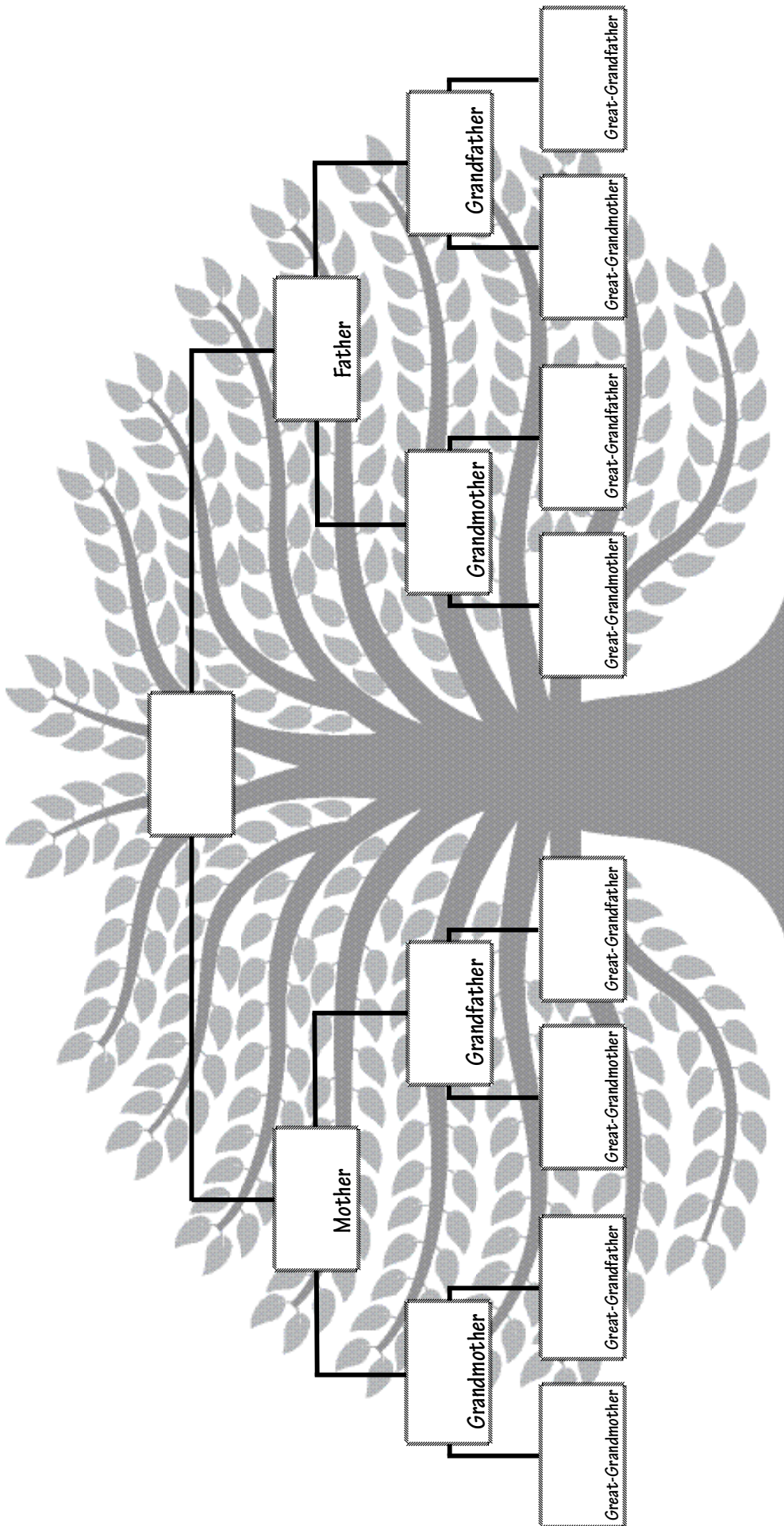
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☐ (D) dogs, farms, and computers
5. Why is it especially hard for many African Americans to trace their family histories?

Sample top-scoring response: Many African Americans' ancestors entered the United States on
slave ships. They did not go through Ellis Island, like other newcomers did. So no records were kept
of their arrival in the U.S. Also, slave owners often renamed slaves 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' and 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. At the end of the interview, 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 kind of games did you play growing up?
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?
11. Do you have any family heirlooms?
12. What world events had the most impact on you as a child?
13. Did your family have special traditions?
14. How did you celebrate holidays?
15. What is your favorite family story about an ancestor?