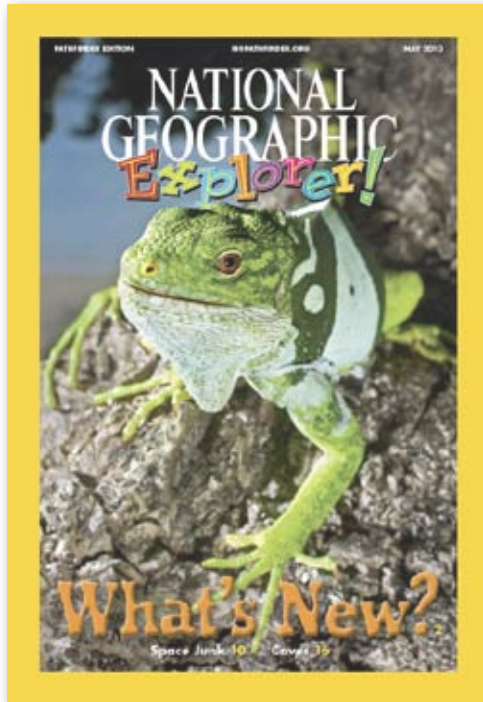


PATHFINDER EDITION MAY 2010
TEACHERS GUIDE



Dear Educator:

In this issue of EXPLORER! your students will venture into some of the most remote places on Earth—and beyond—to find out what scientists are discovering there. “What’s New?” follows teams of explorers as they scour the far reaches of the world in search of undiscovered plant and animal species. In “Caves,” National Geographic photographer and cave explorer Stephen Alvarez takes readers deep into some of the world’s most impressive caves. In “Space Junk,” astrophysicist Jonathan McDowell explains what scientists are doing to monitor the ring of trash around Earth and protect astronauts and satellites from deadly collisions.

Now we’re hard at working planning great issues for the fall. We hope you include us in your planning for next year, too. Remember, if you place your order for next year by May 31, you’ll get a 10% discount. That means EXPLORER! only costs 32 cents per student per issue. You’ll also get a free online Teacher’s Guide, free whiteboard content for one story per issue, and a free classroom poster that builds on the stories in the issue. What an affordable way to meet standards and get your students excited about reading and the world around them!

Speaking of the Teacher’s Guide, please let me know what you think about the guide for this issue. We listened to your comments about changes we made to the Teacher’s Guide earlier this year. We think you’ll find the new-and-improved May Teacher’s Guide even more user friendly and useful. Feel free to email any comments to me at bmaloney@ngsp.com.

Sincerely,

Brenna Maloney

Brenna Maloney
Editor, EXPLORER

What’s New? pp. 2-9

Curriculum: Standards

- Language Arts: Ask questions and set purpose for reading
- Life Science: Diversity of organisms; Interdependence

Literacy Skills

- Reading Strategy: Determine importance
- Vocabulary: Context clues; Academic vocabulary
- Writing: Journals

Space Junk, pp. 10-15

Curriculum: Standards

- Language Arts: Build background knowledge
- Space Science: Effects of space research

Literacy Skills

- Reading Strategy: Make connections
- Vocabulary: Academic vocabulary
- Writing: Creative dialogue

Caves: Deep Into Darkness, pp. 16-23

Curriculum: Standards

- Language Arts: Build background knowledge
- Earth Science: Earth Structures

Literacy Skills

- Reading Strategy: Plan and monitor
- Vocabulary: Academic vocabulary; Sensory language
- Writing: Persuasive writing

What's New?

Objectives

Students will learn:

- how species are classified
- the importance of biodiversity
- some species are in danger of becoming extinct

About the Story

Join National Geographic explorer Kristofer Helgen and other scientists as they look for animals scientists have never seen before. Scientists search rain forests, deserts, oceans, and even neighborhoods to find new species. Each discovery helps scientists better understand our planet's biodiversity and the balance of species needed to keep ecosystems healthy.



New Discoveries

Before reading "What's New?" write the section heads in the left-hand column. Then write questions you think the reader will answer. As you read, stop after each section and write the answer you found in each space. If the reader answered the question.

Section Head	Question	Answer

© VASHESLAV KOSMIN / SHUTTERSTOCK

Before Reading

Tap Prior Knowledge Ask students if they have ever taken a walk or hiked in nature. Encourage them to describe their experiences. If needed, use prompts. Ask: *Did you see any interesting plants or animals? Were any species ones you'd never seen before? Was that exciting? Why?*

Reading Strategy

Determine Importance Ask students to think of three questions they hope the story will answer. Remind students to stop after reading each section and ask:

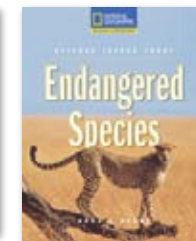
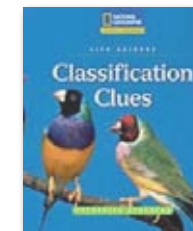
- What is the most important idea in this section?
- Did I answer one of my questions?
- Do I have any new questions?

You can use the activity master on p. T13 to help students determine the important facts in each section.

What's a New Species?

Before reading, make sure students know what a new species is. Explain that it is not an animal that was just born, or one that has never existed until now. A new species is a species that scientists have never seen before. It has not been identified, studied, or named by scientists. That doesn't mean that no one has ever seen the species. It may be known by local people who live near the species' habitat, but who are not scientists. Ask students to find an example of this in "What's New?" (the story of the "flying fox," p. 5)

National Geographic Connections



What's New?

Vocabulary: Context Clues

Explain that readers often encounter unfamiliar words. Read aloud the following sentences from “What’s New?”: “For five weeks, they searched day and night. After all, many animals come out only at night. They’re called nocturnal animals.”

Then ask: *What is a nocturnal animal?* After students discuss the word and what they think it means, point out that they can find the definition in the passage you just read.

Explain that using context clues is one way to figure out new words. Context clues are clues that appear in the text near the unfamiliar word.

As students read, they can list other unfamiliar words and any context clues they find to help define the words.

PATHFINDER EDITION MAY 2010



Access Science

- Direct students to look at the two photos on pp. 4-5. Ask: *Do these animals look familiar?* Point out that even though one or both may look familiar, both are newly discovered species.
- Ask: *What is a new species?* (A new species is a species that scientists have never seen before. If needed, remind students of your Before Reading discussion on new species, p. T2.)
- Ask: *Where are scientists looking for new species?* (They are looking in rain forests, mountains, deserts, oceans, and near villages.)
- Ask: *Why is listening to stories told by villagers important?* (Villagers may know of plants and animals that scientists haven’t seen before.)

Fast Facts

- The team exploring the Bosavi crater in Papua New Guinea discovered their first new species—a frog—almost as soon as they got out of the helicopter. “I nearly trod on it!” says explorer George McGavin.
- Two New York City high school students may have discovered a new species of cockroach. They tested the cockroach as part of a DNA project for science class. Its DNA varied from other known cockroach DNA.
- A new kind of spotted sea ray discovered off the coast of Africa “walks” on its front fins and sucks up worms and crabs from the ocean floor.

What's New?

Academic Vocabulary

Ask students to preview the academic vocabulary on pp. 6-7 by listing the words in boldface. Remind students that these words are defined at end of the article in Wordwise. Have students review each word's definition to ensure they know what it means before they continue reading.

Check understanding by asking students to complete each of the following sentences:

- A deep-sea vent is an example of a _____. (habitat)
- _____ is a molecule that guides how a living thing lives and grows. (DNA)
- Scientists _____, or put species into groups. (classify)
- A species' _____ is easy to remember and say. (common name)
- *Kiwa hirsuta* is the _____ for a newly discovered crab. (scientific name)



Access Science

- Ask: *Why were scientists surprised to find living things near deep-sea vents?* (Deep-sea vents are hostile habitats. They squirt poisonous, hot water.)
- Ask: *Why was it important for scientists to study the life cycle of a caterpillar they thought was a new species?* (They had not seen the caterpillar before, but by studying its life cycle, they determined that the caterpillar turned into a moth they had seen before. So it wasn't new.)
- Ask: *What is the difference between a species' common name and its scientific name?* (A common name can be fun or easy to remember. A scientific name tells about a species' classification.)
- Ask: *How did scientists finally determine that the clouded leopard that lives on Borneo was a unique species?* (They found 40 differences between the DNA of the clouded leopard on Borneo and other clouded leopards.)

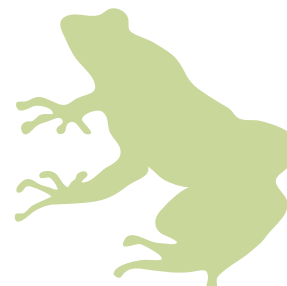
WebConnect

Video of Newly Discovered Marine Species

<http://video.nationalgeographic.com/video/player/news/animals-news/com1-species-vin.html>

"Walking" Sharks and Other New Species

<http://news.nationalgeographic.com/news/2006/09/060918-walking-shark.html>



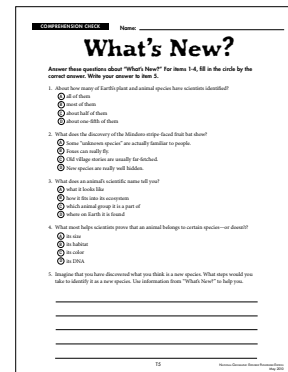
What's New?

Academic Vocabulary

Preview the academic vocabulary on pp. 8-9. Point out *biodiversity* on p. 8. Explain that splitting a new word into known parts can help them better understand the new word.

Ask students if they recognize a word within *biodiversity*. They may recognize *diversity*. Ask them what *diversity* means. Lead them to understand it means “variety.”

Then explain that *bio* means “life.” Tell students that often by putting the individual meanings of word parts together, they can figure out a definition of the larger word. Ask: *What does biodiversity mean?* (A variety of living organisms.)



Access Science

- Ask: *What's one thing scientists want to learn about a new species?* (They want to know how it fits into its ecosystem.)
- Ask: *Why are scientists worried about unknown species?* (Those species may die out before they are discovered.)
- Ask: *What are scientists doing to help new species?* (They are finding ways to protect the species' habitats.)
- Ask: *Is the search for new species over?* (No. Finds like the giant rat remind explorers that there may be many more new species left to be discovered.)

Assess Use the Comprehension Check on p. T15 to assess students' understanding of the story.

Extend the Learning

Geography: Use the “New Faces in Far-off Places” poster in the Teacher's Edition to show the variety of places explorers find new species. Then divide students into small groups. Tell them that they are National Geographic explorers who want to look for unknown species. Have them use a world map and/or satellite photos to search for a place they think they might find unknown species. Then ask them to write a proposal that explains why they want to go there and what they expect to find.

Creative Writing: Use the Explorer's Log on p. T14 to let students imagine they are explorers looking for new species.

Research: Ask students to choose a newly discovered species, research it, and write a paragraph that explains how scientists discovered it and how it fits into its ecosystem. You might have them draw the plant or animal and its ecosystem.

Space Junk

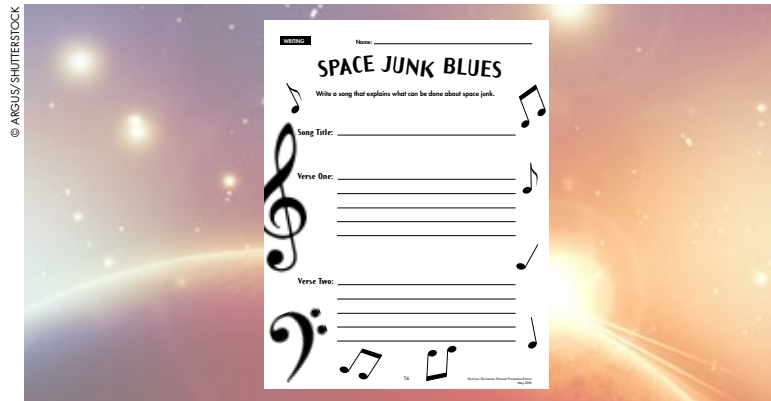
Objectives

Students will learn:

- space is littered with space junk
- space junk orbits Earth
- Earth's gravitational pull affects space junk
- astronauts and space vehicles risk collisions with space junk
- scientists are working on ways to clean up space and reduce trash

About the Story

Blast off with astrophysicist Jonathan McDowell as he studies the junk that gets left behind in space. Learn how this junk threatens space missions and how scientists are trying to reduce the amount of space junk.



Before Reading

Build Background Display the word *garbage*. Ask: *What other words mean the same as garbage?* List student responses.

Pair students and give them three minutes to brainstorm problems caused by trash on Earth. Ask pairs to share their ideas.

Next, tell students that there's trash in space, too. Ask: *What kinds of trash might be in space? What problems could space junk cause?*

Reading Strategy

Make Connections Before reading, ask students to use what they know about trash on Earth to explain how garbage in space could cause problems and what should be done about it. Explain that using what they already know about a topic can help them understand new ideas.

Engage Students

Distribute the activity master on p. T17. Ask students to write a song about space junk based on what they know about the problems that trash causes on Earth. Prompt students by asking:

- *What is space junk?*
- *What problems does space junk cause?*

National Geographic Connections



Space Junk

Academic Vocabulary

Display the words *satellite* and *orbit*.
Use the following steps to teach them.

Pronounce: Ask students to say the word *satellite* aloud with you. Then have students say it by syllable: sat-el-lite.

Explain: Tell students that a satellite is a spacecraft launched by a rocket that goes around a planet or moon.

Engage: Ask students to complete this sentence: The former Soviet Union launched the first _____ in 1957.

Involve: Say: *Tell me if I'm using the word satellite correctly in this sentence: "There are many satellites in space that send important information back to Earth."* Ask students for a thumbs-up or thumbs-down. Explain that those who voted "yes" are correct.

Repeat these steps using for *orbit*.



Access Science

After reading pp. 12-13, help students focus on the concepts of “what is space junk and how does it get there,” by using the Fishbowl cooperative learning strategy. Have half of the class sit in a close circle, facing inward. Have the other half sit in larger circle around them. Ask the inside group to discuss: *What things are considered space junk?* The outside group should listen for new information. Have the groups switch places. Ask the new inside group: *How does space junk get there?*

Read a Diagram Using the diagram on pp. 12-13, ask:

- What does the diagram show? (Earth and space)
- What area around Earth poses the greatest danger to space missions? (where the ring of space trash is)
- How is this area shown in the diagram? (with red dots)
- Which spacecraft are in the greatest danger from space junk? (space shuttles and space station)

Fast Facts

- NASA has an orbital debris program office at Johnson Space Center. They study all aspects of this growing problem and are examining possible solutions.
- Orbital debris (space junk) consists of 42 percent broken up satellite fragments, unused fuel, batteries, paint flakes, etc.; 17 percent rocket bodies; 19 percent mission related junk such as plain trash and spacecraft objects or tools; and 22 percent old nonfunctional spacecraft.
- The length of time space junk stays in Earth's orbit depends upon its altitude. For example, an object 200 to 600 kilometers high will stay a few years, where as junk at an altitude greater than 800 kilometers may stay up there for centuries.
- Most space junk burns up upon reentry into Earth's atmosphere, but some pieces do land in different places in the world.

Space Junk

Academic Vocabulary

Display the words *atmosphere*, *friction*, and *gravity*. Display their definitions from Wordwise (p. 14). Have students connect each word to its definition.

Then have students use each word in a sentence. Tell students that one way to remember new words and make connections between their meanings is to do a “Two in One.” Ask students to come up with sentences using two of the words. Classmates can give a thumbs up if they think the words are being used correctly.

Finally, challenge students to use all three words in a single sentence. You might divide students into small groups and have them compete to see which group can come up with the most sentences that use all three words correctly in a single sentence.

Small Scraps, Big Damage
All that trash can cause problems. Objects orbiting Earth the same distance as the International Space Station whip through space at 17 kilometers (about 10 miles) per second. At that speed, an object the size of a credit card can cause as much damage as a car going 60 kilometers (36 miles) per hour.

There can cause lots of damage. Space trash has crashed windows. It has damaged solar panels. It has even hit the International Space Station. Astronauts have had to patch holes in the station's atmosphere. One piece of trash hit back to Earth and the Russians with patches in Earth's atmosphere. Some think this could be a sign of things to come.

The pieces of trash that hit the station are called space junk. The junk is made of metal, plastic, and other materials. It can be as small as a pin or as big as a car. The junk is made of metal, plastic, and other materials. It can be as small as a pin or as big as a car.

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Gathering Trash in Space
Gathering trash in space is not an easy job. Astronauts are not allowed to throw anything away. They have to collect everything and bring it back to Earth. This is called space junk. It is made of metal, plastic, and other materials. It can be as small as a pin or as big as a car.

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WORDWISE
atmosphere: a layer of gases that surrounds Earth. Friction: force that opposes motion when two objects move against each other. Gravity: force that causes objects to move toward the center of Earth.

LOST IN SPACE
Astronaut Edward White's lost glove and around Earth at 28,000 kilometers per hour before burning up.

A \$100,000 tool bag was lost during repairs to the International Space Station. People could see it from the ground using a telescope.

The 1958 Vanguard I satellite remains in orbit as the oldest piece of space trash.

SPACE JUNK

For items 1-4, fill in the circle by the correct answer. Write your answer to item 5.

- Where does space junk come from?
☐ from the satellites
☐ from the space shuttle
☐ from the space station
☐ from the ground
- What causes space junk to break apart into smaller pieces?
☐ gravity
☐ friction
☐ the atmosphere
☐ heat
- What makes space junk so dangerous?
☐ it travels very fast
☐ it comes in different sizes
☐ it is made of metal
☐ it is radioactive
- Who is most at risk of being hit by space junk?
☐ people on Earth
☐ astronauts in space
☐ satellites in space
☐ the International Space Station
- Write a paragraph about space junk. Explain what space junk is. Then tell what causes space junk and what effects it has.

Access Science

Use the Four Corners cooperative learning strategy to help students focus on the main ideas on pp. 14-15. Split the class into four groups and assign each group one question below.

1. What problems does space junk cause?
2. How do scientists track space junk?
3. Whose problem is it?
4. What are some possible solutions?

Each group should write an answer and report back to the class.

Next, divide students into smaller groups. Tell them they are astronauts on an important mission. Ask each group to choose one piece of space junk in the diagram (p. 15) and describe encountering it in space.

Review Use the Comprehension Check on p. T18 to assess students' understanding of the story.

Extend the Learning

Think Like a Scientist: Tell students to imagine that they work for NASA's Orbital Debris Program. This program studies and tracks trash in space. It is developing ways to reduce it. They just learned that funding might be eliminated for their program. To ensure their research continues, students need to write a letter to the U.S. Congress explaining why this program needs to be funded. Ask volunteers to read their finished letters to the class.

Creative Writing: Invite students to write an ongoing conversation between a space shuttle astronaut and Mission Control regarding a potential hazard with space debris headed toward the space shuttle. Explain that this type of writing is called dialogue and when each person speaks their words should be enclosed with quotation marks. Have student pairs take turns reading their dialogue aloud to the class.

Caves: Deep Into Darkness

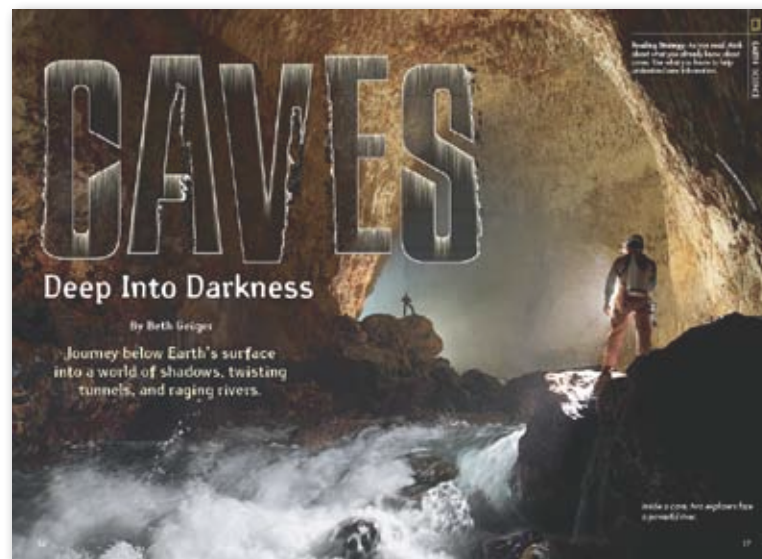
Objectives

Students will learn:

- caves come in many shapes and sizes
- caves are found underground, underwater, and in ice
- how caves form
- about some geologic features of caves such as stalagmites
- some creatures have special adaptations to live in caves

About the Story

Join National Geographic explorer and photographer Stephen Alvarez as he explores the dark and mysterious world of caves. Readers will learn what cavers already know: caves are fascinating geological formations filled with many surprises.



NAME: _____

Explore a Cave

Write what you already know about caves and then write questions you have about caves.

Things I know about caves

Words I think of when I think

Caves

Pictures of caves make me wonder these things

Questions I have about caves

© ABRKADABRA/SHUTTERSTOCK

Before Reading

Tap Prior Knowledge Display the cave poster included in the Teacher's Edition. Ask students to look at the photos on the poster and the story's opener (pp. 16-17) and think about what they already know about caves.

Use the Word Web activity master on p. T20 to help students tap into what they already know about caves and what they want to learn. After reading, return to the web to see if their questions were answered.

Reading Strategy

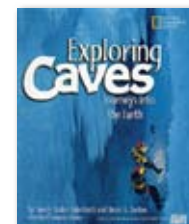
Plan and Monitor Explain that understanding text structure can help readers plan and monitor their reading. In this story, the author presents key science concepts in a logical sequence, or an order that makes sense to the reader. As students read, they can ask themselves: *Does this order make sense to me? Is there another logical way to tell the story?*

Engage Students

Before reading, you may want to give students a visual context to help them understand how caves form. For an animated overview, go to <http://www.pbs.org/wgbh/nova/caves/form.html>. Please preview the animation to make sure it is appropriate for your class. After viewing, ask students to share one surprising thing they learned about caves by watching the animation.

You also may want to use this **hands-on science experiment** to demonstrate how acid can dissolve rock. You'll need baking soda, vinegar, and a see-through cup or bowl. Pour a tablespoon of baking soda into the cup or bowl. Then add a couple of drops of vinegar. The baking soda will release a gas and dissolve. Explain that this is similar to how acid slowly dissolves limestone over hundreds of years.

National Geographic Connections



Caves: Deep Into Darkness

Vocabulary

Sensory Language Ask volunteers to name the five senses (touch, smell, sight, sound, and taste). Then read aloud the first paragraph on p. 18. Ask: *Which senses does the writer tap into?* (sight, sound, touch) Ask students to circle the phrases that tap into those senses. Explain that using sensory language helps readers visualize what they are reading. To explain, say: *Replace the first two paragraphs with this sentence: "You're in a cave." Ask: Do you get the same sense of the setting? How is it different?* Encourage students to look for other sensory language as they read "Caves."

Academic Vocabulary

Preview the academic vocabulary on p. 18. Point out that adding *-er* to the word *cave* changes its meaning to "a person who explores caves." Adding the suffix *-er* to verbs and some nouns can change meanings to describe a person. (example: teach; teacher)



Access Science

Invite student to look at the photos on pp. 18-19. Ask them to discuss how the caves shown in each photo are alike and different. Then ask what kinds of special equipment a caver needs to explore these caves.

After students read pp. 18-19, ask:

- *What is a cave?* (a natural opening in the ground.)
- *How many caves tunnel through Earth?* (millions)
- *In what U.S. state is the longest cave located?* (Kentucky)
- *Where is one of the world's deepest caves?* (near the border of Asia and Europe)

Types of Caves Ask students to explain the different kinds of caves found on Earth and where you can find them. Help students understand that caves can be found in many different places. Point out that although we think of most caves being found in rock, they can also form under water, in lava, or in ice.

Fast Facts

- The study of caves is called speleology. The recreational sport of exploring wild caves is referred to as spelunking or caving. If you participate in this sport, you are called a spelunker or caver.
- Caves host many temporary guests such as bears, mountain lions, foxes, and bats. Permanent residents of caves include certain types of fish, salamanders, crayfish, insects, and spiders. These cave dwellers have adapted to the darkness by increasing their sense of smell and touch, and by depending little, or not at all, on sight.
- Some caves were homes and shelter to early humans. We have learned many things about their lives from the pictographs and petroglyphs left on cave floors, walls, and ceilings.

Caves: Deep Into Darkness

Academic Vocabulary

Tell students that sometimes it helps to be a word detective when they find difficult words in stories. Have students find the boldface words on pp. 20-21.

Ask: What similarities can you find between the words? Responses may include:

- two of the words begin with *stala*
- all three words have three syllables
- they all end in *-ite*

Next, ask students to look at these words' Wordwise definitions on p. 23. Challenge them to use the definitions to find another similarity. (All have something to do with rocks.)

Explain that these clues can help them understand and remember them. Students may want to make a vocabulary organizer to help them learn *helictite*, *stalactite*, and *stalagmite*.



Access Science

Cave Formation Have volunteers explain how many caves are formed. Explain that with limestone caves, water mixes with carbon dioxide in the air. It forms an acid. This acid can eat away at rock, breaking it down and, over time, hollowing out caves and tunnels. To demonstrate, you may want to repeat the hands-on science experiment that was described on p. T9.

Cave Decorations After reading “Water at Work” and “From Pearls to Popcorn,” pair students. Ask each student to share a surprising fact they learned about cave decorations with their partner. Remind students these unique formations occur from minerals that have dripped and hardened over hundreds of years.

WebConnect

Crystal Cave

<http://channel.nationalgeographic.com/episode/giant-crystal-cave-3569/cave-crystal-giants-4>

Deep Southern Caves

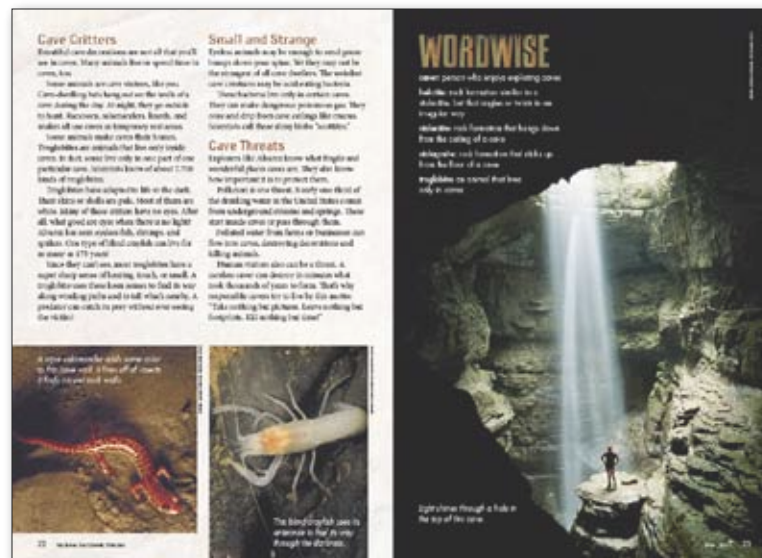
<http://ngm.nationalgeographic.com/2009/06/tag-caves/jenkins-text>

Caves: Deep Into Darkness

Academic Vocabulary

Preview the academic vocabulary on p. 22. Remind students of the similarities they found between the words *stalagmite*, *stalactite*, and *helictite* on pp. 20-21. Ask: *How is the word troglobite similar to the other three words?* (It also ends in *-ite*, is three syllables, and has something to do with caves.)

Challenge students to be word detectives and find another similar word on p. 22. (*snottite*) Ask how they can use the similarities they found between the academic vocabulary words and this one to figure out its meaning. (It ends in *-ite*, too. Since it's in a story about caves, it probably has something to do with cave dwellers or cave formations, just like the other words that end in *-ite*.) Students can use context clues, too.



Comprehension Check Name: _____

Caves

For items 1-4, fill in the circle by the correct answer. Write your answer to item 5.

- When do cave critters live?
 - ☐ underground
 - ☐ under the water
 - ☐ in a cave
 - ☐ all of the above
- Which item is an example of cave decoration?
 - ☐ a stalactite
 - ☐ a stalagmite
 - ☐ a troglobite
- Which answer describes most animals that live their whole lives inside caves?
 - ☐ They bring outside items.
 - ☐ They are pale and blind.
 - ☐ They make poisonous gas.
 - ☐ They live for 175 years.
- What can be the main threat to a cave?
 - ☐ acid from rain
 - ☐ dangerous animals
 - ☐ poor visitors like humans
 - ☐ people and pollution
- Give some advice to cave visitors. Tell them what they should be sure to do with their cave items, and what they should look for once they are inside. Describe both living and nonliving things that cave visitors might see.

Access Science

Cave Critters Ask students to summarize what they learned about animal life in caves. Ask: *What are troglobites? How have they adapted to living in total darkness?* (They use their keen sense of hearing, touch, or smell to find their way or dinner.) Students should mention that some animals just visit caves or use them for temporary shelter.

Assess

- Ask: *Why is it important to study caves?* (answers will vary)
- Ask: *If you want to be a caver, what do you need to remember?* (safety precautions and specific equipment, p. 20)
- Ask: *Name two ways scientists are concerned caves could be damaged.* (polluted water and human visitors, p. 22)

Use the Comprehension Check on p. T21 to assess students' understanding of the story.

Extend the Learning

Creative Writing: Refer students to the motto cavers use: "Take nothing but pictures. Kill nothing but time. Leave nothing but footprints!" Mention that another motto often used by cave enthusiasts is "Cave Softly." Have students work in pairs to think up one or two additional mottoes that would be a good reminder to all who enter caves that these are special areas that need to be protected. Let students share their finished mottoes. Vote on the class' three favorites and display beside the cave poster.

New Vocabulary: Have students find five nouns in the story that they have never used before in their writing. Then have them think how they could combine these five words in a paragraph that would make sense. Allow time for students to review the article to find their five nouns, write the paragraph, and then share with a partner. Remind partners to listen for the correct usage of the words and ask questions to clarify if necessary.

New Discoveries

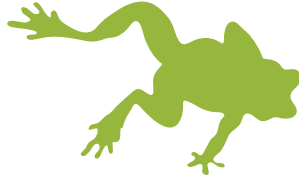
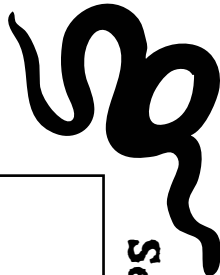
Before reading “What’s New?” write the section heads in the left-hand column. Then write questions you think the section will answer. As you read, stop after each section and write the answer you found to each question, if the section answered the question.

Section Head

Question

Answer

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WRITING

Name: _____

Explorer's Log

Imagine you're an explorer on an expedition for National Geographic. You've just spent an exciting day in the field searching for new species. Now it's time to look back at your day and record what you saw, heard, and felt. Write your log entry in the space below.

What's New?

For items 1-4, fill in the circle by the correct answer. Write your answer to item 5.

1. About how many of Earth's plant and animal species have scientists identified?
☐ (A) all of them
☐ (B) most of them
☐ (C) about half of them
☐ (D) about one-fifth of them
2. What does the discovery of the Mindoro stripe-faced fruit bat show?
☐ (A) Some "unknown species" are actually familiar to people.
☐ (B) Foxes can really fly.
☐ (C) Old village stories are usually far-fetched.
☐ (D) New species are really well hidden.
3. What does an animal's scientific name tell you?
☐ (A) what it looks like
☐ (B) how it fits into its ecosystem
☐ (C) which animal group it is a part of
☐ (D) where on Earth it is found
4. What most helps scientists prove that an animal belongs to certain species—or doesn't?
☐ (A) its size
☐ (B) its habitat
☐ (C) its color
☐ (D) its DNA

5. Imagine that you have discovered what you think is a new species. What steps would you take to identify it as a new species. Use information from "What's New?" to help you.

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5. Imagine that you have discovered what you think is a new species. What steps would you take to identify it as a new species. Use information from "What's New?" to help you.

Sample response: I would study what it looks like and how it behaves. I also would compare it to

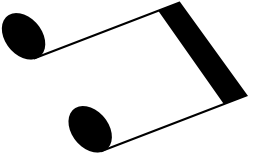
other species that we already know about. I'd ask: How is it alike? How is it different? I also might

take a DNA sample. Since a species' DNA is unique, it can help prove if a species is new or not. I

know that's what helped scientists confirm that the Bornean clouded leopard was a new species.

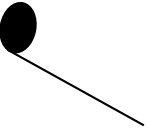
SPACE JUNK BLUES

Write a song that explains what can be done about space junk.

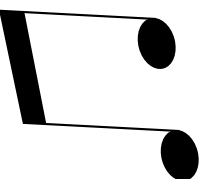
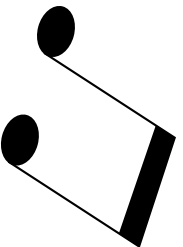


Song Title: _____

Verse One: _____



Verse Two: _____



SPACE JUNK

For items 1–4, fill in the circle by the correct answer. Write your answer to item 5.

1. Where does space junk come from?

- ☐ (A) burned-out satellites
- ☐ (B) old rocket parts
- ☐ (C) trash from space ships
- ☐ (D) all of the above

2. What causes space junk to break apart into smaller pieces?

- ☐ (A) gravity
- ☐ (B) collisions
- ☐ (C) the atmosphere
- ☐ (D) friction

3. What makes space junk so dangerous?

- ☐ (A) It travels very, very fast.
- ☐ (B) It comes in different sizes.
- ☐ (C) It can break apart.
- ☐ (D) It is radioactive.

4. Who is most at risk of being hurt by space junk?

- ☐ (A) people on Earth
- ☐ (B) scientists studying space junk
- ☐ (C) astronauts on space missions
- ☐ (D) Soviet cosmonauts

5. Write a paragraph about space junk. Explain what space junk is. Then tell what causes space junk and what effects it has.

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Sample response: Space junk is made up of small and large pieces of debris from space missions.

Space junk is made of old satellites, tools that astronauts lost, and trash space crews threw away.

Space junk moves very fast—about 5 miles per second. For this reason even small pieces can

cause huge damage if they hit a space craft. Space junk can also fall back to Earth, which is

dangerous to people on the ground.

Explore a Cave

Write what you already know about caves and then write questions you have about caves.

Things I
know about
caves

Words I think
of when I think
about caves

Caves

Pictures
of caves make
me wonder
these things

Questions I have about caves

Caves

For items 1–4, fill in the circle with the correct answer. Write your answer to item 5.

1. Where do caves exist on Earth?

- ☐ A underground
- ☐ B under the water
- ☐ C in cooled lava
- ☐ D all of the above

2. Which item is an example of cave decoration?

- ☐ A a snottite
- ☐ B a flashlight
- ☐ C a helictite
- ☐ D a troglobite

3. Which sentence describes most animals that live their whole lives inside caves?

- ☐ A They hang upside down.
- ☐ B They are pale and eyeless.
- ☐ C They make poisonous gas.
- ☐ D They live for 175 years.

4. What are the main threats to caves?

- ☐ A acid from rain
- ☐ B dangerous stalactites
- ☐ C cave visitors like raccoons
- ☐ D people and pollution

5. Give some advice to cave visitors. Tell them what they should be sure to take with them into a cave, and what they should look for once they are inside. Describe both living and nonliving things that cave visitors might see.

Caves

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5. Give some advice to cave visitors. Tell them what they should be sure to take with them into a cave, and what they should look for once they are inside. Describe both living and nonliving things that cave visitors might see.

Sample response: If you are going to explore a cave, make sure that you have a helmet, a headlight,

kneepads, and ropes. Also make sure you take a partner. Once you are inside the cave, look for

cave decorations such as stalactites, stalagmites, and helictites. Look for underground rivers. Also

look for cave-dwelling animals such as cave salamanders, bats, and crayfish.