

# NATIONAL GEOGRAPHIC Explorer!

## Pioneer Edition

[nationalgeographic.com/ngexplorer/pioneer/teachers](http://nationalgeographic.com/ngexplorer/pioneer/teachers)

### Dear Educator:

Some of the most rewarding experiences in teaching are the *Aha!* moments. These are the times when your students put ideas together in new ways and make remarkable connections.

This issue of EXPLORER provides your students with many opportunities to connect facts and ideas.

"Nature's Transformers" introduces readers to four very different animals and explores the link among them: a metamorphosis between birth and adulthood.

"Celebrate Earth," in honor of Earth Day on April 22, shows how people around the globe are connected by their concern for and efforts to protect our planet.

Two final stories help students connect the past and present. "Fossil Facts" explains how the remains of long-extinct plants and animals help us understand what life was like on Earth long ago.

"Take Flight With Kites" encourages students to see kites in a new way. More than just toys, kites have been used for thousands of years to celebrate, catch food, and even answer important scientific questions.

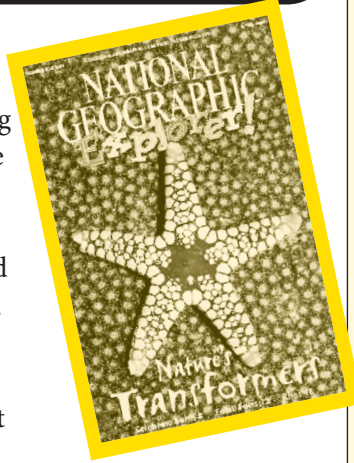
"Only connect!" wrote E.M. Forster. We agree, and we're proud to offer such a rich resource for the mind-building adventure of making connections.

Sincerely yours,



Jacalyn Mahler  
Editor in Chief

P.S. You can make a key connection of your own by calling 1-800-368-2728 to renew your subscription!



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## In This Issue

### NATURE'S TRANSFORMERS PP. 2-7

#### Curriculum Connections

- Life Science • Language Arts

#### Standards Correlations

- **Life Science:** Characteristics of organisms
- **Language Arts:** Informational text, Text structure, Visual media

#### Literacy Skills

- **Reading Strategy:** Synthesize
- **Vocabulary:** Words That Signal Comparisons
- **Writing:** Descriptive Language

### FOSSIL FACTS PP. 12-17

#### Curriculum Connections

- Earth Science • Life Science • Language Arts

#### Standards Correlations

- **Science:** Fossils, Earth materials
- **Language Arts:** Main idea, Text features

#### Literacy Skills

- **Reading Strategy:** Determine Importance
- **Vocabulary Focus:** Definition Clues
- **Writing:** Journal Entry

### TAKE FLIGHT WITH KITES PP. 18-23

#### Curriculum Connections

- Social Studies • Science • Language Arts

#### Standards Correlations

- **Social Studies:** Culture, Inventions
- **Language Arts:** Characteristics of genres

#### Literacy Skills

- **Reading Strategy:** Make Connections
- **Vocabulary Focus:** Proper Nouns
- **Writing:** Observations, Poem

## Answer Key

**Fossil Facts** • Teacher's Guide, p. 5

*Possible answers:* the type of animals that lived on Earth, their size, their speed, and when they lived

**Take Flight With Kites** • Teacher's Guide, p. 7

**Celebrate/Fun.** Chinese New Year, Indian kite fights

**Understand.** Weather kites, aerial photography, learning to build planes **Food.** Indonesian fishing kites, Thai farmers tried to prevent floods **War.** Chinese soldiers used kites to spy on enemies.

**Review** • Teacher's Guide, p. 8

1. d 2. d 3. b 4. d 5. a 6. a 7. c 8. d

## Next Issue

### Layers of Life

Climb from the forest floor to the treetops, exploring the Amazon rain forest.

### Wall of Wonder

Join an adventurer as he treks the length of China's Great Wall.

### Animal Armor

Meet some of nature's toughest creatures—animals with shells.

# Nature's Transformers



## About the Story

Some animals go through dramatic changes between birth and adulthood. In this story, students will learn about metamorphosis through four of nature's transformers: frogs, rhinoceros beetles, starfish, and sea slugs.

## Fast Facts

- Tadpoles are also called pollywogs, which comes from a Middle English word that means “wiggle.”
- Like snails, slugs are members of the gastropod family. Gastropod literally means “belly foot.”
- Starfish can be just a centimeter (0.4 inch) across to as large as 91 centimeters (3 feet) across.

## Vocabulary

**Words That Signal Comparisons:** Tell students that they are going to learn about some baby animals that are very different from their parents. Explain that writers use words such as *different*, *same*, and *also* to compare things.

Read aloud the first paragraph of the story. Point out the words *taller* and *stronger*. Ask students what the writer is comparing (how students look now compared to how they looked when they were five or six). Discuss how the word endings *-er* and *-est* are other clues that the writer is comparing two or more things.

## Before Reading

**Preview:** Read aloud the first two paragraphs of the story (p. 4). Point to the word *metamorphosis* and explain that it means “big changes in the way an animal looks.”

Invite students to continue previewing the story by viewing the photos and captions. Name each animal shown and ask students to repeat the name. Then ask: *What do you think the story will be about?* (how frogs, rhinoceros beetles, starfish, and sea slugs change)

## Reading Strategy

**Put the Ideas Together:** Explain that when you read stories with a lot of facts, it helps to think about how all the ideas fit together. For example, in this story students will read about four different animals that are alike in one important way. Distribute the work sheet (next page). As students read, have them record important facts about each animal on a note card. Model completing the first card after students read the section Fantastic Frogs.

## After Reading

- **Practice the Strategy:** Have students review what they wrote on the four note cards on the work sheet. Then have them think about how the facts fit together and answer item 5 on the bottom of the work sheet.
- **Life Science:** Have students choose an animal from the story and create a poster about it. Posters might include a diagram of the animal's metamorphosis as well as basic information, such as size, habitat, prey, predators, and life span.
- **Language Arts:** Point out some of the descriptive language that the author uses to talk about the animals in the story. Then have students pick three photos from the story and write captions that include descriptive language. The class can then vote for the best captions.



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Name: \_\_\_\_\_

# Nature's Transformers

Read "Nature's Transformers" in **NATIONAL GEOGRAPHIC EXPLORER**.  
Use the note cards to write what you learn.

## 1. What I Learned About Frogs

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## 2. What I Learned About Rhinoceros Beetles

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## 3. What I Learned About Starfish

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## 4. What I Learned About Sea Slugs

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## 5. How would you explain metamorphosis to a friend?

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# Fossil Facts

## About the Story

Fossils are a record of life on Earth. In this story, students will learn about specific fossil facts as well as the work of paleontologists and the type of information fossils can provide.

## Fast Facts

- The oldest known fossils are 3.5 billion years old.
- People are always finding new fossils. Sometimes they turn up as a result of Earth’s plates crashing into one another. Fossils can also be revealed when wind and water erode a landscape.
- Most fossils are found in sedimentary rock, which formed from layers of sand and mud at the bottom of a body of water.
- Paleontologist Paul Sereno, who is a National Geographic Explorer-in-Residence, is quoted in the story. He has found the fossil remains of half a dozen dinosaur species and the world’s largest crocodile, *Sarcosuchus imperator*. Nicknamed SuperCroc, it was 12 meters (40 feet) long and preyed on dinosaurs.
- Fossils from the Grand Canyon’s layers have shown when life-forms lived. The oldest fossils, nearly a billion years old, show only algae. The newest fossils, from about 300 million years ago, came from amphibians and reptiles.

## Vocabulary

**Definition Clues:** Read aloud the second and third paragraphs of the story (p. 14). Ask: *What does the word fossil mean? How do you know?*

Point out that the word is defined right in the story: “Fossils are remains of plants or animals from long ago.” Discuss how writers often tell what words mean and that readers just need to look for clues words such as *is*, *are*, *called*, and *means*. Suggest that when students come across a new word, they look for an explanation of the word in the story. (Other story words defined in context: *trace fossils*, *paleontologist*)

## Before Reading

**Preview Subheads:** Direct attention to the orange subheads that appear throughout the story. Tell students that they can get an idea of what the story will be about from these subheads. Encourage students to keep the subhead in mind as they read each section. Explain that the subhead provides a clue to the main idea of the section and thus can help them zero in on the most important information in that part of the story.

## Reading Strategy

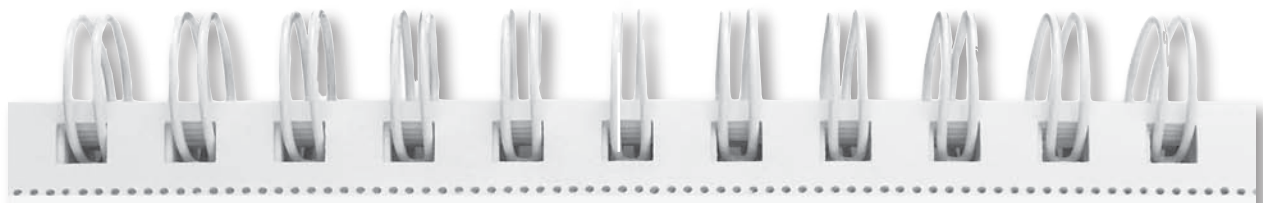
**Determine Importance:** Discuss with students how good readers focus on what’s most important in their reading. While all the facts may be interesting, some stand out in helping readers understand the main points the author is making. As students read the story, encourage them to highlight, underline, or put self-stick notes next to the information the writer most wants them to know.

## After Reading

- **Content Literacy:** Distribute the work sheet (next page) and review the directions with students. Student responses should mention these types of information: what the animal was, its size, speed, and when it lived. If students need additional help, refer them back to the subheads.
- **Science Inquiry:** Have students reread the Finding Fossils section (p. 15). Invite students to discuss what it might be like to be a paleontologist. Have them imagine that they are searching for fossils with Paul Sereno and write a journal entry about a day in the field.
- **Life Science:** Display the “Fossil Formation” poster. Reread the first paragraph of the Sink or Stick section (p. 14). Then use the images and captions on the poster to talk students through the process. As you explain each step, ask students to summarize it in their own words. When you have explained all the steps, invite volunteers to come up to the poster and explain how fossils are formed.

# Fossil Facts

Read "Fossil Facts" in NATIONAL GEOGRAPHIC EXPLORER. Then complete the sentences below.



## What Fossils Can Tell Us

Fossils can tell us \_\_\_\_\_

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Fossils can also tell us \_\_\_\_\_

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In addition, fossils can tell us \_\_\_\_\_

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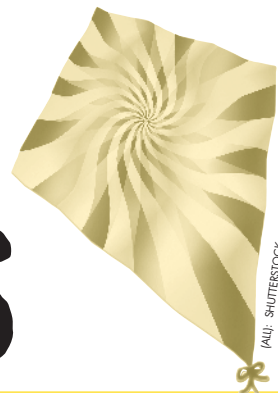
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On top of all that, fossils can tell us \_\_\_\_\_

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# Take Flight With KITES



(AQU) SHUTTERSTOCK

## About the Story

For centuries, people around the world have been captivated by kites and found inventive ways to use them. This story introduces students to the history of kites and the reasons people have flown them—from celebrating life events and catching food to waging war and explaining the natural world.

## Fast Facts

- According to Chinese legend, a peasant got the idea for the first kite when the wind blew his hat off and he grabbed the string connected to it.
- In December 2002, the Ice Kites Expedition used kite-drawn buggies to zip across frozen landscapes in Antarctica.

## Vocabulary

**Proper Nouns:** Ask: *Have you ever had someone mispronounce your name? Did you think, “What’s so hard about saying my name?”* Explain that good readers don’t skip over proper nouns. They use the same strategies that help them read other unfamiliar words. They look for familiar word parts or letter groupings, and they sound out each part of the name.

Preview the place-names mentioned in the story; model their pronunciation and help students locate these places on a map or globe. Then point out the name *Alexander Wilson* (p. 22). Invite volunteers to pronounce the name. Have students look at other proper nouns in the story and practice pronouncing them.

## Before Reading

**Activate Prior Knowledge:** Invite students to share what they know about kites. Encourage them to describe kites they’ve seen or even flown. Then explain that they are going to learn about why people have flown kites in the places you located on the map or globe.

## Reading Strategy

**Make Connections:** Point out the label *Social Studies* (p. 18). Ask what students expect to find in a social studies article. (Possible answers: Information about real people and events. Sections organized under subheads. Graphics like photos, charts, time lines, and maps.) Tell students to use what they know about other social studies articles to better understand the story.

## After Reading

- **Categorize:** Distribute the work sheet (next page). Read aloud the directions and the words at the top of each kite. Explain that students should give an example of each way people used kites. Model giving an example of a celebration on the first kite. When students have completed the work sheet, have them sum up what they learned.
- **Hands-on Science:** Form several groups. Give each group a kite and have students take turns flying it. Then have them write a description of what they observed, focusing on how the kite flew and moved through the air.
- **Creative Writing:** Have students think of words that rhyme with *kite*. Then challenge them to use the words in a poem.

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Name: \_\_\_\_\_

# Take Flight With Kites

Read "Take Flight With Kites" in NATIONAL GEOGRAPHIC EXPLORER.

Then give examples under each of the ways that people used kites.

To Celebrate  
and Have Fun

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To Understand  
the World

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To Get Food

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

To Fight Wars

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## COMPREHENSION CHECK

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

- What is a **larva**?
  - the place an animal lives
  - an animal that no longer exists
  - the shell around a young animal
  - the stage between egg and adult
- Which of these can make an animal's body start to change?
  - the animal's age
  - the animal's size
  - a hard time finding food
  - all of the above
- What is a **fossil**?
  - damage from an earthquake
  - remains of a plant or animal that lived long ago
  - an animal that hatches from an egg
  - a type of rock
- What can fossils tell us?
  - how big an animal was
  - how fast an animal was
  - when an animal lived
  - all of the above
- In what country have people flown kites for 2,000 years?
  - China
  - India
  - Japan
  - United States
- Flying kites helped the Wright brothers build \_\_\_\_\_.
  - airplanes
  - bicycles
  - cars
  - toys
- When is Earth Day?
  - April 1
  - April 15
  - April 22
  - April 30
- Which of these is **not** a way to help the environment?
  - turning off lights when you leave a room
  - shutting off the water while you brush your teeth
  - using recycled paper
  - throwing trash in the street

