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Dear Teacher:

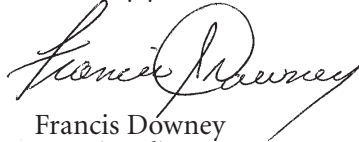
Thank you for making NATIONAL GEOGRAPHIC EXPLORER part of your school year! We hope the magazine has honed your students' reading skills, deepened their understanding of science and social studies, and spurred them to learn more about the world and its myriad wonders. We also hope you and your students had a lot of fun exploring together.

This month's issue will take students on an incredible adventure. In “Animal Athletes,” readers will see what would happen if the animal world held its own Olympic Games. “Hot Spots” will teach students how volcanoes form and how they shape our land and air. Finally, “Write On!” sketches the history of what many consider humankind's most important invention—writing.

Summer may be just around the corner, but we are not taking it off. We already have big plans for next year. First we've added a seventh issue. And we are lowering prices. So you will get more magazines for less money. You can renew your subscription now by calling 1-800-368-2728.

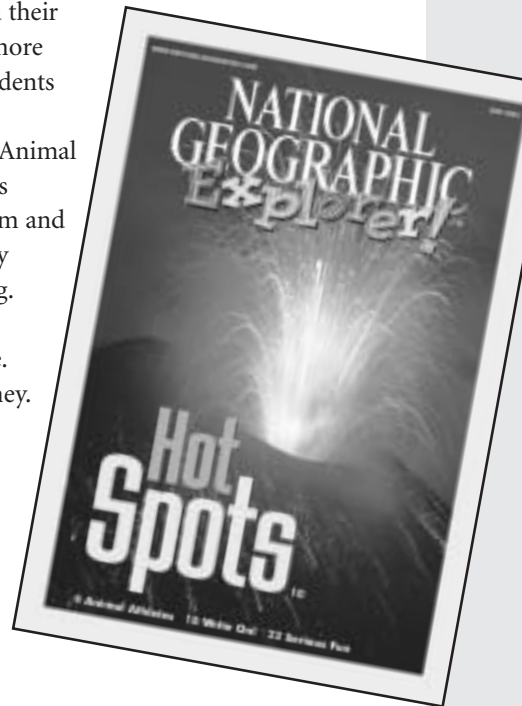
We will see you in the fall!

Sincerely yours,



Francis Downey
 Executive Editor

NATIONAL GEOGRAPHIC EXPLORER



Answer Key

TEACHER'S GUIDE

Medal Math Page 3

1. 20, 2. 3, 3. 8, 4. 6, 5. 2, 6. 25, 7. 10

Does Pressure Cause Heat? Page 5 (Possible Answers)

- The ice cube with the brick should melt faster.
- The brick exerts pressure on the ice cube.
- Rocks beneath Earth's surface are under pressure.
- Extreme pressure can melt rock, creating a volcano.

The Rosetta Stone Page 7

The Rosetta stone had the same words in hieroglyphics and in Greek.

Comprehension Review Page 8

TOP: 1. b, 2. c, 3. a, 4. e, 5. d

BOTTOM: 1. b, 2. c, 3. c, 4. a, 5. b, 6. a, 7. c, 8. b

Issue at a Glance

Teaching Unit	Reading	Writing	Science	Soc. Studies	Math	Curriculum Connections	
						Literacy Skills	Topics
Animal Athletes pp. 4-9	■	■	■		■	L Nonfiction text features L Understanding graphs T Animal behavior	
Hot Spots pp. 10-17	■	■	■			L Diagrams and sequences L Scientific vocabulary T Geology T Geography	
Write On! pp. 18-21	■	■	■			L Reading for information L Reading a narrative T World history T Communications	



Vocabulary

- Write the following sentences on the board.
 1. Cheetahs are the fastest sprinters.
 2. Alligators have the strongest bites.
 3. Kangaroos do the farthest jumps.
- Ask students to identify the adjective in each sentence. What do those adjectives have in common? (*Each is a **superlative**. It tells how the corresponding noun exceeds all others.*)

Before Reading

- Ask: What animal would you nominate to compete in a “Super Animal of the Universe” contest? Why would you pick that creature?

Fast Facts

The animal kingdom is full of superlatives. These appear in *Guinness World Records*.

- **Largest animal:** blue whale (nearly 150 tons)
- **Largest land animal:** African elephant (largest known specimen weighed 12 tons)
- **Largest rodent:** capybara (nearly 200 pounds)
- **Largest bird:** ostrich (nearly 350 pounds)
Ostriches cannot fly, but they can run 40 miles an hour for 30 minutes.
- **Fastest bird:** peregrine falcon (more than 200 miles an hour while diving after prey)
- **Longest snake:** reticulated python (20 feet)
- **Largest eyes:** Atlantic giant squid (20 inches in diameter)

NATIONAL GEOGRAPHIC EXPLORER (ISSN 1536-1101) is published six times during the school year—September, October, November–December, January–February, March–April, and May—by the National Geographic Society, 1145 17th Street NW, Washington, DC 20036.

Postmaster: Please send address changes to NATIONAL GEOGRAPHIC EXPLORER, P.O. Box 10597, Des Moines, IA 50340-0597. Periodical postage paid at Washington, D.C., and additional mailing offices.

U.S. Classroom Price: \$395 per student per year (10 to 199 subscriptions to same address). U.S. School Price: \$2.50 per student per year (200 or more subscriptions to same address). **To subscribe, call 1-800-368-2728.**

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Comprehension Check

- Ask students the following questions.
 1. How is a cheetah’s body “built for speed”? (*It has long legs, its claws dig into the ground as the cat runs, and its tail provides balance.*)
 2. How do the speeds of a cheetah and pronghorn antelope compare? (*A cheetah can sprint faster, but an antelope can run for a longer time.*)
 3. Which competitor is known as the king of the beasts? (*Lion*) How does it differ from other cats? (*It’s the only cat with a mane.*)
 4. Which fish earned medals for diving? (*None. The winners are all mammals.*)

Critical Thinking Questions

- **Synthesize:** After reading, ask students the same question you asked in the Before Reading section. Have students’ responses changed? If so, ask them why.

Extension Activities

- **Math:** Have students complete the work sheet on the facing page.
- **Graphing:** Ask: Which animal feats described in the article do you consider the most amazing? Why? Have students vote for the animal they think is most amazing. Create a graph similar to the ones in the article to display the voting results.
- **Language Arts:** Have students create a book called *The Animal Olympics*. Each student will create a page about a different “animal athlete.”



Book Links

Animal Athletes by Frans Lanting et al.
(Andrews McNeel, 1996)

Animal Olympics by Thane Maynard
(Franklin Watts, 1999)



Web Link

Sprint over to animal resources at
nationalgeographic.com/ngexplorer/teachers.

Name: _____

Medal Math



Use the bar graphs from "Animal Athletes" in the May 2004 issue of NATIONAL GEOGRAPHIC EXPLORER to complete this activity.

Part 1

Fill the blanks in the following sentences with whole numbers.

1. To tie with the cheetah for sprinting, a wildebeest would have to go _____ miles an hour faster.
2. An alligator's bite is roughly _____ times stronger than a lion's.
3. A kangaroo can jump _____ feet farther than an impala.
4. All together, _____ animals win bronze medals.
5. The lion is the only animal to compete in _____ events.
6. An animal half as fast as a gazelle would run _____ miles an hour.
7. Both the cheetah and the pronghorn antelope are _____ miles an hour faster than their closest competitors.

Part 2

Circle the numbers that you wrote in the blanks. Then connect the circles to light your Olympic torch!

- | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 15 | 26 | 53 | 45 | 6 | 49 | 57 | 70 | 41 |
| 61 | 4 | 16 | 27 | 97 | 75 | 68 | 79 | 40 | 82 |
| 56 | 62 | 5 | 17 | 28 | 91 | 86 | 39 | 25 | 96 |
| 48 | 73 | 3 | 7 | 18 | 29 | 38 | 92 | 99 | 50 |
| 44 | 81 | 78 | 63 | 9 | 19 | 30 | 87 | 72 | 42 |
| 52 | 67 | 90 | 0 | 37 | 11 | 21 | 31 | 58 | 46 |
| 60 | 95 | 85 | 36 | 74 | 64 | 12 | 22 | 32 | 54 |
| 89 | 71 | 35 | 8 | 93 | 84 | 65 | 13 | 23 | 33 |
| 77 | 34 | 98 | 69 | 88 | 59 | 76 | 2 | 14 | 24 |
| 20 | 94 | 80 | 55 | 47 | 43 | 51 | 66 | 83 | 10 |



HOT SPOTS

Vocabulary

- Write the word *volcanologist* on the board. Ask students to identify a root word (*volcano*) and suffix (*-ist*). Ask students to use those clues to help them define the word (*someone who studies volcanoes*).

Before Reading

- Ask: Why do some people study volcanoes? What might they want to learn about them?
- Invite students to pose their own questions about volcanoes. Write them on the board. After reading, discuss where students can find answers not provided by the article.

Fast Facts

- On average, 20 to 30 volcanoes erupt each year.
- Most U.S. volcanoes are in Alaska, Hawaii, and the Cascade Range of the Northwest.
- Mount St. Helens in Washington had been dormant for more than a century when it erupted in 1980.
- In 1963 a new volcanic island, Surtsey, rose above the waters off the coast of Iceland.
- Geothermal energy—from volcano steam—heats most homes in volcanic Iceland.
- The word *volcano* honors Vulcan, the Roman god of fire and volcanoes.
- According to *Guinness World Records*, Hawaii's Kilauea is the most active volcano on Earth. Erupting continually since 1983, it discharges 177 cubic feet of lava every second.
- Tambora, an Indonesian volcano, had a massive eruption in 1815. Ash filled the skies, and temperatures dropped worldwide. Snowstorms hit the U.S. the following June, July, and August.

Comprehension Check

- Read aloud each question.
 - How many volcanoes exist on Earth? (*1,500*)
 - Are more volcanoes on land or under the sea? (*Under the sea. Only about 600 are on land.*)
 - What is the difference between a shield volcano and a composite volcano? (*Shield volcanoes are usually formed by runny lava and have gradual slopes. Composite volcanoes are formed by thick lava and have steep slopes.*)
 - Which type of volcano is Mount St. Helens? (*Composite*)
 - Which type of volcano is Kilauea? (*Shield*)
 - Where are most of Earth's volcanoes found? (*The Ring of Fire surrounding the Pacific Ocean*)

Critical Thinking Questions

- Main Idea:** Which of the following statements best summarizes the main idea of this article?
 - Magma that bursts onto the Earth's surface is called lava.
 - Mount St. Helens erupted in 1980.
 - Volcanoes come in different shapes, sizes, and states of activity. (*Correct*)

Marine Field Trips

The National Geographic Society and the National Oceanic and Atmospheric Administration are sponsoring a program that allows teachers and students to visit and study important oceanic ecosystems.

To learn more about this exciting program, e-mail Melissa Goslin at mgoslin@ngs.org.

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Name: _____

Does Pressure Cause Heat?



Materials

- shallow baking pan (9 x 12 or larger)
- brick (refrigerated)
- two ice cubes (both of the same size)

Try It!

Step 1: Place the two ice cubes in the pan.

Step 2: Balance the brick atop one ice cube.

Step 3: Measure the time it takes each ice cube to melt.

Ice Cube With Brick

_____ minutes

Ice Cube Without Brick

_____ minutes

Think About It

1. Which ice cube melted more quickly?

2. Why do you think that happened?

3. How was the ice cube under the brick similar to rocks beneath Earth's surface?

4. What did this experiment teach you about volcanoes?

Write On!



Vocabulary

- Put these definitions on the board. Have students find the corresponding words in the story.
 1. person who writes (*Scribe*)
 2. writing used in ancient Egypt (*Hieroglyphs*)
 3. “paper” made from sheep skin (*Parchment*)
 4. ancient tool used for writing (*Stylus*)
 5. symbol based on a picture (*Pictogram*)

Before Reading

- Remind students that they use the alphabet each day. Ask if they have any ideas how it came about. Write their thoughts on a chart. After reading the article, revisit the chart. Were students’ initial ideas correct? What new things did they learn about the history of writing?

Fast Facts

- Paleography is the study of ancient writing. It can include how letter shapes change over time.
- Early farming societies developed pictograms to keep track of land, animals, and crops.
- Like letters in an alphabet, some 30 Egyptian hieroglyphs represented single sounds. Yet Egyptian scribes never warmed to phonetic writing. Instead they learned hundreds of symbols for words and ideas. Scholars don’t know why.
- The word *alphabet* comes from the first two letters of the Greek alphabet—alpha and beta.
- Spaces between words did not become common in Western writing until the seventh century.
- An 1874 Remington typewriter first used the key layout, nicknamed QWERTY, still widespread today. The arrangement aimed to slow typists down, thus preventing mechanical jams.
- The Chinese character for *sincerity* combines the symbols for *man* and *word*—literally a man standing by his word.

Comprehension Check

- Read aloud the following questions.
 1. What are pictograms? (*Symbols that use pictures to represent an idea or thing*)
 2. What ancient people are famous for their hieroglyphs? (*Egyptians*)
 3. Who invented cuneiform? (*The Sumerians*)
 4. What is papyrus made of? (*Reeds*)
 5. Whose printing press sparked an explosion of writing? (*Johannes Gutenberg*)

Critical Thinking Questions

- **Synthesize:** This article stated that writing might have been “the most important invention—ever.” Would you agree or disagree with that statement? If you agree, tell why. If you disagree, tell what you think was the most important invention and why.
- **Compare and Contrast:** How did the first books differ from today’s books?

Extension Activities

- **History:** Ask students to use the story to make a time line of key events in the history of writing.



Magazine Links

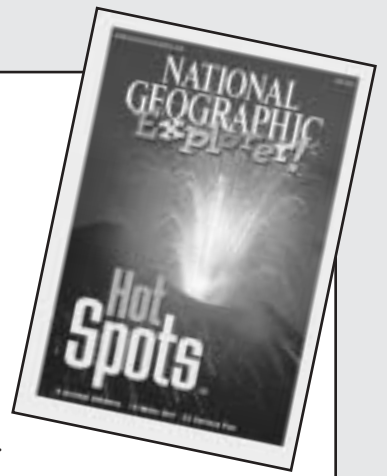
“The Power of Writing” in NATIONAL GEOGRAPHIC (August 1999, pages 110-132)

“The Magic of Paper” in NATIONAL GEOGRAPHIC (March 1997, pages 88-109)



Web Link

Learning more is as easy as ABC at nationalgeographic.com/ngexplorer/teachers.



Name: _____

The Rosetta Stone

For centuries, no one could read Egyptian hieroglyphs, or symbols. That changed after a French soldier found the Rosetta stone in 1799. What made the stone so important? Find out by cracking the code below. It's based on Egyptian hieroglyphs.

Hieroglyph	Letter	Object Shown	Hieroglyph	Letter	Object Shown	Hieroglyph	Letter	Object Shown
	A	vulture		H	shelter		Q	hill
	B	foot		I	reed leaf		R	mouth
	C/K	basket		J	snake		S	folded cloth
	C/S	folded cloth		K	basket		T	loaf of bread
	CH	rope		L	lion		U	quail chick
	D	hand		M	owl		V	horned viper
	E	reed leaf		N	water		W	quail chick
	F	horned viper		O	lasso		X	basket and folded cloth
	G	pot stand		P	stool		Y	two reed leaves
							Z	door bolt

Handwriting practice area with five rows of hieroglyphs on a dashed line background. The hieroglyphs are: Row 1: basket, shelter, reed leaf, mouth, lasso, hill, basket, folded cloth, vulture. Row 2: folded cloth, hand, owl, water, shelter, vulture, hand, pot stand, shelter, reed leaf. Row 3: folded cloth, vulture, owl, reed leaf, quail chick, lasso, mouth, hand, reed leaf, water. Row 4: shelter, reed leaf, reed leaf, mouth, lasso, pot stand, lion, stool, shelter, reed leaf, basket. Row 5: vulture, water, hand, reed leaf, water, pot stand, mouth, reed leaf, reed leaf, basket.

Name: _____



Word Match

Connect each word with its meaning.

Words

1. scribe
2. dormant
3. shield
4. competitor
5. stylus

Meanings

- a. volcano formed by fast-flowing lava
- b. person who writes
- c. sleeping, not active
- d. ancient tool for writing
- e. participant in an athletic event

Comprehension Check

Color the oval before the choice that best completes each statement.

1. In a race of animals, the fastest sprinter would be _____.
 a. an antelope b. a cheetah c. a gazelle
2. Chinese writing uses about _____ characters.
 a. 40 b. 400 c. 40,000
3. Most volcanoes are found along the rim of the _____ Ocean.
 a. Atlantic b. Indian c. Pacific
4. Mount St. Helens is _____ volcano.
 a. an active b. a dormat c. an extinct
5. Ancient _____ used a kind of writing called hieroglyphs.
 a. Chinese b. Egyptians c. Sumerians
6. The _____ has the strongest bite of any animal.
 a. alligator b. hyena c. lion
7. Scientist Joyce Poole studies how _____ communicate.
 a. chimpanzees b. dolphins c. elephants
8. More than six _____ people visit the nation's capital each year.
 a. thousand b. million c. billion

Creature Features

NATIONAL GEOGRAPHIC EXPLORER ■ Online Adventure Scavenger Hunt

Student Form: www.nationalgeographic.com/ngexplorer/0405/adventures

Source for Answers: www.nationalgeographic.com/kids/creature_feature/archive

1. In 1973, five countries signed an agreement to protect POLAR BEARS.
True.
2. Unlike many other animals, COYOTES are actually increasing in number.
True.
3. OTTERS can stay underwater for almost an hour.
False. Otters can stay underwater for four minutes, after which they must return to the surface to breathe.
4. The bumps that cover the head of a male WARTHOG may cushion blows from attackers.
True.
5. RED-EYED TREE FROGS use their huge peepers to attract mates.
False. The frogs' huge red eyes help scare predators away.
6. The GUANACO is a South American relative of the camel.
True.
7. ORCAS, also known as killer whales, sometimes hunt in groups.
True.
8. Pigeon blood is the only food of VAMPIRE BATS.
False. Vampire bats feed on the blood of cows, pigs, horses, and various birds. Attacks on humans are rare.
9. Like most reptiles, NILE CROCODILES never see their young. The mother lays eggs, then moves on.
False. Unlike many reptiles, Nile crocodiles guard their eggs and look after hatchlings for a year or two.
10. The home range of a MOUNTAIN GORILLA can be as large as 15 square miles.
True.