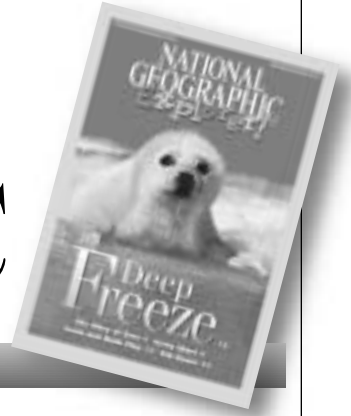


November-
December 2002
Teacher's Guide
Vol. 2 No. 3

"FOR THE INCREASE
AND DIFFUSION OF
GEOGRAPHIC
KNOWLEDGE."

NATIONAL GEOGRAPHIC Explorer!™



Dear Teacher:

"The object of your mission is to explore the Missouri River [to] the Pacific Ocean. . . ."
Thomas Jefferson
July 4, 1803

Upon receiving this presidential instruction, Meriwether Lewis and William Clark led a group of explorers called the Corps of Discovery up the Missouri River, through the Rocky Mountains, to the Pacific Ocean. This 8,000-mile journey was probably one of the greatest camping trips in history! It certainly was one of the greatest scientific and geographic expeditions. Throughout the two-and-a-half-year journey, Lewis and Clark drew maps and kept journals to document the terrain, weather, Indian peoples, flora, and fauna they encountered.

Your students might enjoy celebrating the bicentennial of Lewis and Clark's expedition (2003-2006) by staging, or simply reading aloud, the **Tale from the Trail** play, page 16. Using expedition journals as its main source, the play re-creates the corps's first contact with the Shoshone Indians, which took place near the Montana-Idaho border. During this meeting, Lewis and Clark's Indian interpreter, Sacagawea, discovers that the Shoshone leader is her brother, Cameahwait, whom she hasn't seen in four years. What did Sacagawea and Cameahwait say to each other upon this chance reunion? No one knows for sure, but the **Writing Workshop**, page 21, helps students create a conversation the siblings might have had.

This issue of NATIONAL GEOGRAPHIC EXPLORER is a lot like a great expedition. After leaving the trails of Lewis and Clark, the magazine leads young readers north to the icy Arctic tundra. **Life in a Deep Freeze**, page 10, describes the harsh environment of the North Polar region and tells how native animals, such as the muskox, polar bear, and snowy owl, have adapted to these surroundings.

Students will find warmer terrain to explore in America's cornfields. Domesticated more than 6,000 years ago from a Mexican grass, corn sustained pre-Columbian civilizations from Aztec to Zuni. In **A-maize-ing Grain**, page 4, students read about those early days of corn and learn how we depend on the plant today to make soda, toothpaste, and even fuel for your car.

If Jefferson were alive today, he'd probably agree with our expedition metaphor. He might even tell NATIONAL GEOGRAPHIC EXPLORER subscribers:

"The object of your mission is to explore the world—through reading."

Sincerely,

National Geographic Society

NATIONAL GEOGRAPHIC EXPLORER is a publication of the
NATIONAL GEOGRAPHIC SOCIETY brought to you in cooperation with the
INTERNATIONAL PAPER COMPANY FOUNDATION
and NATIONAL GEOGRAPHIC SOCIETY EDUCATION FOUNDATION

A-maize-ing Grain

Background

Corn is an a-maize-ing crop. This nutritious food provides nearly one-fifth of the world's food energy. Corn is an important ingredient in a wide range of everyday products, from processed foods to crayons to ethanol in the gas tank of your car. Corn is also an amazing plant. It can grow in almost any kind of soil, and its yield is greater per acre than any other grain plant. Scientists trace the origins of corn as far back as 6,000 years to a wild grass called teosinte. At first the native people of Mexico ate the ears of the wild teosinte. Over the years they developed many different types of corn plants. Some plants produced sweet corn; others produced corn used to feed animals or to make flour. After European explorers set foot in the Americas, the corn seed made its way to Europe, Asia, and Africa. Since the 1600s, when Native Americans showed the Pilgrims how to plant corn, the crop has been an integral part of the American diet as well as our cultural heritage.

Discussion Questions

- What is another name for corn? (*Maize*)
- What does the illustration on pages 4-5 show? (*Ears of corn and products containing corn.*)
- What features make corn such an efficient plant? (*Corn can grow in almost any type of soil and yields more per acre than other grain.*)
- How does today's corn plant compare with wild teosinte, grown more than 6,000 years ago? (*Today's corn has 16 rows of plump, rounded kernels; wild teosinte had only one or two rows of small, pointed kernels.*)
- Who actually developed corn? (*Native people of Mexico*)
- How did corn start growing in Europe, Asia, and Africa? (*Explorers brought corn seeds back from the Americas.*)
- How did Native Americans help the Pilgrims survive the brutal New England winter? (*They showed them how to plant corn.*)
- In what way was corn part of the cultural life of the Americas? (*Native Americans created legends about corn. They used corn as decorations for special occasions.*)
- After corn is harvested, what happens to the parts of the plant that are not used as food? (*Dried corn kernels are used as animal feed. The germ inside a kernel supplies oil for making*

- *foods, paint, and varnish. The starchy outside of the kernel becomes cornstarch or corn syrup.)*
- What are some ways you and your family depend on corn and corn products? (*Answers will vary.*)
- Why do you think the writer describes corn as "an a-maize-ing grain"? (*Possible answers: It is an important crop with many uses. It has become part of our history and cultural heritage.*)

Book Links

1621: A New Look at Thanksgiving by Catherine O'Neill Grace and Margaret M. Bruchac with Plimoth Plantation (National Geographic, 2001; 48 pages). The Wampanoag people reveal the true story of the first Thanksgiving.

Two Cultures Meet: Native American and European by Ann Rossi (National Geographic Reading Expeditions, 2002; 40 pages). The exchange of ideas (including the planting of corn) between the two cultures changed life on both sides of the Atlantic.



Web Links

Find other kernels of knowledge at www.nationalgeographic.com/ngexplorer/teachers.

King Corn: See corn mazes and learn some corny culture.

Answers

"Corn Words Puzzle," Page TG 3

Across	Down
1. Teosinte	1. Tassel
3. Maize	2. Stalk
5. Kernel	4. Oil
7. Roots	6. Ear

"Cool Riddle," Page TG 8

1. Arctic	6. Blubber
2. Sacagawea	7. Seal
3. Tundra	8. Roosevelt
4. Robot	9. Ethanol
5. Lewis	

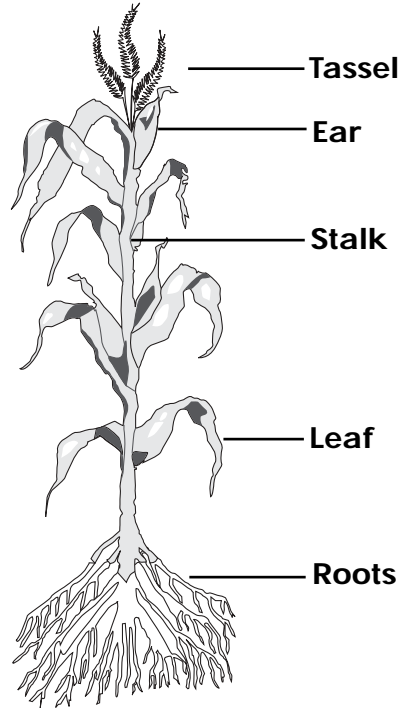
Riddle Answer:

A Snow Ball

Name: _____

Corn Words Puzzle

Use the diagram of the corn plant and the article "A-maize-ing Grain" on pages 4-9 to complete the puzzle.









1			2				
		3					4
			5	6			
				7			

Across







- 1. Wild grass that may be the ancestor of corn
- 3. Another name for corn
- 5. Seed of corn
- 7. Parts of corn plant that suck up water and nutrients

Down

- 1. Top part of corn plant containing pollen-producing flowers
- 2. Stem of corn plant
- 4. Corn ____, used for making potato chips and salad dressing
- 6. Spike-like fruit of corn plant

ARTICLE/ DEPARTMENT	Reading	Writing	Science	Social Studies	CONTENT OVERVIEW <ul style="list-style-type: none"> Ⓛ Literacy Skills Ⓣ Topics
 <p>Geo News pp. 2–3</p>	■		■	■	<ul style="list-style-type: none"> Ⓛ Reading for information Ⓛ Reading a bar graph Ⓣ Teddy bears Ⓣ Birds Ⓣ Robots Ⓣ Snow accumulation
 <p>Feature Article “A-maize-ing Grain” pp. 4–7</p>	■		■	■	<ul style="list-style-type: none"> Ⓛ Reading for information Ⓛ Developing vocabulary Ⓣ Corn cultivation and products Ⓣ Native American cultures Ⓣ Origins and new varieties of corn
 <p>Big Picture “A Corny Story” pp. 8–9</p>	■		■	■	<ul style="list-style-type: none"> Ⓛ Reading a diagram Ⓛ Sequencing Ⓣ Corn cultivation, manufacturing, and distribution
 <p>Teaching Unit “Life in a Deep Freeze” pp. 10–15 ■ Feature Article ■ Hands-on Science</p>	■		■	■	<ul style="list-style-type: none"> Ⓛ Reading for information Ⓛ Reading picture labels Ⓛ Developing vocabulary Ⓣ Adaptations of Arctic animals Ⓣ Geography of Arctic region
 <p>Teaching Unit “Tale From the Trail” pp. 16–21 ■ Play ■ Writing Workshop</p>	■	■		■	<ul style="list-style-type: none"> Ⓛ Reading for information Ⓛ Reading a play aloud Ⓛ Developing vocabulary Ⓛ Writing dialogue Ⓣ Lewis and Clark expedition Ⓣ Sacagawea
 <p>Kid Power “Saving the Rain Forest” pp. 22–23</p>	■		■	■	<ul style="list-style-type: none"> Ⓛ Reading for information Ⓣ Costa Rica Ⓣ Animal care Ⓣ Rain forest preservation

Issue at a Glance

DIRECTED ACTIVITY	SMALL GROUP ACTIVITY	INDEPENDENT ACTIVITY
<ul style="list-style-type: none"> ■ Read and discuss the items on pp. 2–3. <p>20 minutes</p> 		
<ul style="list-style-type: none"> ■ Read the article. ■ Discuss the questions on p. TG 2. <p>60 minutes</p> 	<ul style="list-style-type: none"> ■ Show examples of corn mazes at www.campsilos.org/mod3/students/mazes.shtml. Have pairs draw and solve their own mazes. <p>75 minutes</p>	<ul style="list-style-type: none"> ■ Complete the “Corn Words Puzzle,” p. TG 3.
<ul style="list-style-type: none"> ■ Review and discuss the diagram on pp. 8–9. <p>20 minutes</p> 		<ul style="list-style-type: none"> ■ View a graph that shows what we make with the nine billion bushels of corn produced each year at www.nationalgeographic.com/ngexplorer/articles.
<ul style="list-style-type: none"> ■ Read the article. ■ Discuss the questions on p. TG 6. <p>60 minutes</p> 	<ul style="list-style-type: none"> ■ Have student pairs complete the “Chill Out” science activity, p. 15. <p>40 minutes</p> 	<ul style="list-style-type: none"> ■ Watch a cartoon about tundra at www.nationalgeographic.com/ngexplorer/quickflicks. ■ Play the “Cool Creatures” game at www.nationalgeographic.com/ngexplorer/games/.
<ul style="list-style-type: none"> ■ Read the play aloud. ■ Discuss the questions on p. TG 7. <p>60 minutes</p> 	<ul style="list-style-type: none"> ■ Have student pairs perform the scenes they created for the Writing Workshop, p. 21. <p>Time will vary.</p>	<ul style="list-style-type: none"> ■ Complete the “What Can I Say?” Writing Workshop, p. 15. ■ “Go West Across America With Lewis and Clark” at www.nationalgeographic.com/ngexplorer/adventures.
		<ul style="list-style-type: none"> ■ Read the article, “Saving the Rain Forest,” pp. 22–23. ■ Learn more about how to save the rain forest at www.nationalgeographic.com/ngexplorer/articles.

Life in a Deep Freeze



Background

The northern polar region, or Arctic, consists of the Arctic Ocean and the lands encircling it. Much of the landscape is tundra, a treeless, windswept area where part of the ground is permanently frozen subsoil called permafrost. Limited shelter and food make the Arctic a harsh environment. Winter adds even more challenges—long periods of darkness and temperatures that average minus 34°F.

Diverse animals have developed special habits and body features to survive in these inhospitable conditions. These adaptations help them stay warm, obtain food, escape predators, and survive. Arctic foxes, muskoxen, and hares have thick fur to insulate them from frigid temperatures, while the snowy owl and ptarmigan are protected by layers of snow-white feathers. A thick layer of blubber helps the walrus and harp seal survive life in the icy ocean waters. With its thick fur, blubber, and padded feet, the polar bear is especially well suited for survival in the Arctic.

Discussion Questions

- Where is the Arctic region? (*Area surrounding the North Pole; consists of the Arctic Circle and the lands bordering it*)
- What makes the Arctic such a harsh environment? (*Possible answers: Long winters without sunlight, frigid temperatures, land covered with snow and ice, little or no vegetation*)
- How does a white fur coat protect the arctic fox in winter? (*It keeps the fox hidden from predators in its snow-white environment.*)
- How do small ears protect the arctic hare? (*Less skin is exposed to the cold, and less body heat is lost.*)
- Why does the snowy owl try not to fly when temperatures plunge? (*Flying uses up energy.*)
- What two features keep the walrus warm during deep-sea dives? (*A thick layer of blubber and the shifting of warm blood away from the surface to inside the body*)

- What do the grizzly bear and the collared lemming have in common? (*Both try to escape Arctic winters—the bear by sleeping and the lemming by living in a tunnel under the snow.*)
- Why do some Arctic animals such as the fox and the hare replace their white coats with brown or gray ones as summer approaches? (*To blend in with their environment, which is no longer snow-white*)

Answer to Hands-on Science

“Chill Out,” p. 15

Like a layer of blubber, the shortening helped the covered hand stay warmer in icy water.

Book Link

Destination: Polar Regions by Jonathan Grupper (National Geographic, 1999; 32 pages).



Web Links

Explore the Arctic at

www.nationalgeographic.com/ngexplorer/teachers.

Arctic Adventure: Journey through the Arctic Wildlife Refuge in Alaska.

Home, Sweet Arctic: Meet the native people who live in the Arctic region.

Answer to Photo Finish (page 24)

In November adult red crabs migrate from the forests of Christmas Island, where they live, to the shore of the Indian Ocean to mate. The females release their eggs into the water. After about 25 days, the baby crabs make their way inland to join the adults.

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Tale From the Trail

Background

In 1803 the United States purchased the Louisiana Territory from France, doubling the size of the country. President Thomas Jefferson asked his assistant, Meriwether Lewis, to lead an expedition of discovery from the Mississippi River to the Pacific Ocean by way of the Missouri and Columbia river systems. Lewis, a U.S. Army officer, asked William Clark, a fellow officer and friend, to join him. Their mission was to map the unexplored lands, meet with the native peoples, and record everything they saw.

Sacagawea, a young Shoshone woman, joined the expedition as a translator along with her husband, a French fur trader. The play re-creates the chance meeting between Sacagawea and her brother, a Shoshone chief. The two had not seen each other since Sacagawea was kidnapped from her village several years earlier.

The detailed journals of Lewis and Clark are the main source for this play. The events and characters are real. The playwright read journals, then imagined what the people might have said to one another. In reality, the Shoshone did not speak English. Sign language and interpreters helped the explorers and Native Americans talk to one another.

Discussion Questions

- Who were Meriwether Lewis and William Clark? (*Two explorers who led an expedition west of the Mississippi River to the Pacific Ocean*)
- When and where does this play take place? (*In August 1805 near the Bitterroot Mountains*)
- Why was it so important for Lewis and his men to find Indians? (*They needed to get horses to carry their gear across the mountains.*)
- Why did Lewis show the Shoshone women beads and a flag? (*He wanted them to know that he was not their enemy and that he wanted to trade with them.*)
- Why did Sacagawea smile when she came ashore from the canoe? (*She recognized her people, the Shoshone, from whom she had been kidnapped several years earlier.*)



- Who was Jumping Fish? Why was she so excited to see Sacagawea? (*She had been kidnapped along with Sacagawea, but had escaped by jumping into the river.*)
- What did Chief Cameahwait mean when he said, “Sorrow has become joy”? (*He had been sad that his sister was kidnapped, but now he was happy that she had returned home.*)
- What parts of this play are historically true? (*The people and the places*) Which part was made up? (*The actual dialogue*)
- If you had written this play, what title would you have given it? Why? (*Answers will vary.*)

Book Link

How We Crossed the West: The Adventures of Lewis & Clark by Rosalyn Schanzer (National Geographic, 1997; 48 pages).

National Geographic’s Guide to the Lewis & Clark Trail by Thomas Schmidt (1998; 160 pages).

Web Links

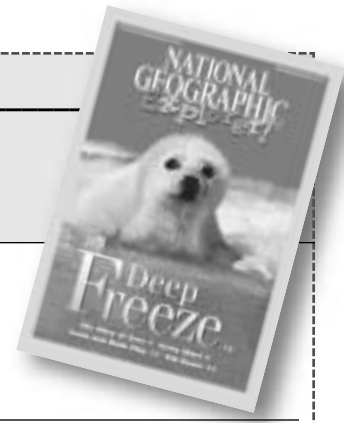


Hit the trail with Lewis and Clark at www.nationalgeographic.com/ngexplorer/teachers.

PBS: Read journal entries, meet expedition members, and discover more about the expedition at the companion site to Ken Burns’s documentary. **Lewis & Clark Bicentennial:** Relive the adventure on a virtual tour and learn about events and powwows in states along the trail.

Name: _____

Cool Riddle



Use what you learned in the most recent issue of NATIONAL GEOGRAPHIC EXPLORER to fill in the missing words. The letters in the starred boxes will answer the riddle below.

1. The region that includes the North Pole is called the *

2. * was a famous Indian interpreter.

3. * has a layer of soil that stays frozen all year.

4. A delivery droid is a hospital *

5. Meriwether * and William Clark led an expedition across North America.

6. Another word for "fat" is *

7. The animal on this month's NATIONAL GEOGRAPHIC EXPLORER cover is a *

8. The teddy bear was named after President Theodore *

9. Corn-based * may be part of the fuel in the family car.

Question:

Where do polar bears go to dance?

Answer: