

"FOR THE INCREASE
AND DIFFUSION OF
GEOGRAPHIC KNOWLEDGE."

NATIONAL GEOGRAPHIC for Kids!



Dear Educator:

Imagine a crocodile almost as long as *Tyrannosaurus rex* and just as fierce! That's SuperCroc, one of the largest crocodile-like reptiles ever to walk—and swim—on Earth.

Our cover illustration of this awesome predator is based on skeletal fossils excavated by National Geographic Explorer-in-Residence Paul Sereno and his team while on expedition to Niger in 1997 and 2000. The actual bones were buried in rock laid down during the Cretaceous period, at least 110 million years ago, when rivers coursed across the area's lush plains. Today the site is desert land.

What did this creature of ancient rivers and plains eat? What was the big hole for in the front of its head? And why did such a super reptile become extinct? Sereno shares his latest thoughts on these and other crocodylian mysteries in **SuperCroc**, pages 4–9.

As you and your class unearth this amazing topic, check out the **double-sided poster** in the Teacher's Guide. One side provides a full-color illustration of what SuperCroc may have looked like in its prehistoric surroundings. The flip side examines several of SuperCroc's distant relatives—the crocodiles, alligators, and gharials of today.

Don't let your class exploration end with SuperCroc, however. Dig into other fascinating features in this issue of NATIONAL GEOGRAPHIC FOR KIDS.

- **Geo News** (pages 2–3): See how teamwork helps meerkats survive, get the latest report on a T-shirt that gives you a daily dose of vitamin C, and meet a world champion hiker.
- **Sneakers** (pages 10–17): Discover how sneakers got a foothold in sports and fashion history.
- **Visions of Mars** (pages 18–23): Learn how technology-based information has changed scientists' theories about the red planet.

Every page of this issue of NATIONAL GEOGRAPHIC FOR KIDS is jam-packed with fascinating exploration and learning. So let the reading begin!

Sincerely,

Mary Dalheim
Editor, NATIONAL GEOGRAPHIC FOR KIDS

P.S. Renew your
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Turn to page TG 7
for details.

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AND NATIONAL GEOGRAPHIC SOCIETY
EDUCATION FOUNDATION

SuperCroc

Background

Exploring the Sahara by camel in the 1940s, paleontologist Albert-Félix de Lapparent found large, ancient teeth and scutes (plates of bony armor). They belonged, he theorized, to a distant cousin of today's crocodilians. (The order Crocodylia includes crocodiles, alligators, caimans, and gharials.)

Additional SuperCroc fossils, notably skulls, emerged over the next two decades. In 1966, scientists France de Broin and Phillipe Taquet named the animal *Sarcosuchus imperator*, which means "flesh crocodile emperor." As the name suggests, the prehistoric behemoth pretty much ruled its ecosystem.

In 2000, paleontologist Paul Sereno (a National Geographic explorer-in-residence) led a team of scientists to Gadoufaoua, a remote and arid part of Niger. He believes the region holds "the richest dinosaur beds on the African continent."

The expedition required painstaking logistics and almost superhuman stamina. A convoy of Land Rovers carried four months' worth of supplies—including 600 pounds of pasta, 4,000 gallons of water, and 5 tons of plaster (for protecting fossils). At Gadoufaoua (a name meaning "the place where camels fear to tread"), Sereno and his team worked 12-hour days in temperatures that soared to 125°F by day, then plunged to 50°F at night.

Hardship and hard work paid off. Sereno and his team collected 20 tons of fossils from about 110 million years ago. The scientists identified five previously unknown dinosaurs, and they found far more SuperCroc fossils than ever before.

Discussion Questions

- What is SuperCroc? (*A huge prehistoric reptile*)
- When did it live? (*About 110 million years ago*)
- Where did it live? (*Possible answers: Africa, Niger, Gadoufaoua, in what is now the Sahara desert*)
- What is SuperCroc's scientific name? (*Sarcosuchus imperator*)
- What does *Sarcosuchus imperator* mean? (*"flesh crocodile emperor"*)
- Why is that a good name for this reptile? (*It "ruled" its ecosystem.*)
- What makes SuperCroc so special? (*Possible answers: It was huge. It could eat dinosaurs. It was one of the largest crocs ever. It had a unique snout.*)
- How long could SuperCroc grow? (*About 40 feet*)
- How do scientists know that? Did they go to the zoo and measure a live SuperCroc? (*No*) Did they find a complete SuperCroc skeleton? (*No*)
- So how did they figure out how long it was?



(They looked at crocodiles that live today. They compared the animals' head and body sizes.)

- The scientists calculated something they couldn't measure directly. What is that skill called? (*Estimating*)
- Can anyone think of other questions that scientists might answer by estimating? (*Possible answers: How many stars are in the sky? How big is the sun? How much water is in the Great Lakes? How many whales live in the Atlantic Ocean? How many people will live on Earth in 2100?*)
- How might we estimate the number of students in our school? (*Count the students in this class, then multiply by the number of classes.*)

Book Link

SuperCroc and the Origin of Crocodiles by Christopher Sloan (National Geographic, 2002; 56 pages). Filled with photos and illustrations, this book identifies and discusses traits that have helped crocodilians endure for millions of centuries. It will be available in April 2002. For ordering information, go to www.nationalgeographic.com/ngforkids/teachers.



Web Links

Bite into these resources at www.nationalgeographic.com/ngforkids/teachers.

SuperCroc's Home Page: Check out Paul Sereno's official site for this huge discovery.

SuperCroc at National Geographic: Check out our coverage of Sereno and his work.

World of the Crocodilians: Encounter SuperCroc's modern cousins via this interactive map.

Project Exploration: Paul Sereno invites students to join scientific expeditions.

Explorers-in-Residence: Meet eight extraordinary people who live and work at the frontiers of science—from anthropology to zoology.

Background

How were sneakers invented? What are they made of? And why are they called “sneakers” anyway? “Sneakers: The All Stars of Footwear” answers these questions as it traces the history of this popular shoe.

About 500 years ago, Native Americans introduced European explorers to latex extracted from the *cahuchu* tree. The explorers took samples back to Europe, where scientists experimented with various uses for latex. In the process, one scientist discovered that hardened latex could rub out pencil marks, so the material was dubbed “rubber.” Eventually, manufacturers teamed the waterproof stuff with canvas to make shoes. The shoes’ soft soles were quieter than the hard soles that were common at the time. It was easy to sneak around in the new footwear, so people called the shoes “sneakers.”

The article tracks sneakers’ rise to popularity in the United States, where by 2000 the shoes were a \$15 billion industry.

Discussion Questions

- What is latex? (*A milky, white liquid that comes from certain trees, such as the cahuchu*)
- How did Native Americans use latex? (*Answers include: They played with a ball made out of it; they dipped their feet in it to make waterproof “shoes”; they made waterproof bottles.*)
- How did “rubber” get its name? (*In 1770, English chemist Joseph Priestley discovered that hardened latex could rub out pencil marks. So people started calling it “rubber.”*)
- What is vulcanized rubber? (*Rubber that has been mixed with sulfur, then heated*)
- How is vulcanized rubber different from regular rubber? (*Regular rubber gets brittle when it’s cold and sticky when it’s hot. Vulcanized rubber stays firm and stretchy in any temperature.*)
- How did sneakers get their name? (*Compared to hard-sole shoes, sneakers are very quiet. That lets you sneak up on someone.*)
- What is synthetic rubber? (*Human-made rubber that’s created from chemicals*)
- Why is rubber a good material for sneaker soles?



(*Answers include: It’s flexible; it’s bouncy, so it cushions your feet when you walk; it grips the ground, giving you good traction; it’s light; it’s waterproof.*)

- Why do you think sneakers first became popular? (*Answers include: They were comfortable; they were lighter than leather shoes; they gave better traction than leather soles when playing sports.*)
- What happened in the 1970s that made Americans get serious about sneakers? (*A fitness craze started.*)
- What was Bill Bowerman’s big breakfast breakthrough? (*He realized that using a waffle pattern on sneaker soles would make them lighter and give the wearer better traction.*)
- How much money did people spend on sneakers in the United States in 2000? (*\$15 billion*)
- Why do you think sneakers are popular today? (*Answers include: They’re comfortable; they help prevent injuries when you play sports in them; they don’t need polishing; celebrities endorse them; they’re advertised well; they fit in with today’s casual fashions.*)
- What would you do to improve sneakers? (*Answers will vary.*)

Book Links

Sneakers: The Shoes We Choose by Robert Young (Dillon Press, 1991; 64 pages). Students can read about the history, design, manufacturing, and increasing popularity of sneakers.

Sneakers: From Start to Finish by Samuel G. Woods (Blackbirch Press, 1999; 32 pages). Gives a behind-the-scenes look at how they’re made.

Web Links





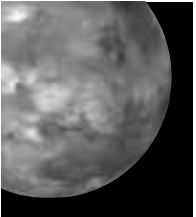



Run to www.nationalgeographic.com/ngforkids/articles for links to these sneaker sites.









Sneaker Science: Discover the science behind sneaker design.

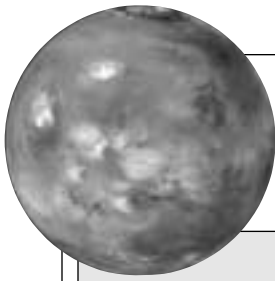
Charlie’s Sneaker Pages: Jump into Charlie’s collection of sneaker information and images.

NATIONAL GEOGRAPHIC *for* Kids!

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 map Ⓣ Meerkat behavior Ⓣ Muslim populations Ⓣ Vitamin C absorption Ⓣ World-record hiker
 <p>Teaching Unit "SuperCroc" pp. 4-9 ■ Feature Article ■ Writing Workshop</p>	■	■	■	■	<ul style="list-style-type: none"> ● Reading for information ● Developing vocabulary ● Writing a report Ⓣ Crocodile adaptations Ⓣ Fossils Ⓣ Estimating Ⓣ Scientific fieldwork
 <p>Feature Article "Sneakers: The All Stars of Footwear" pp. 10-15</p>	■		■	■	<ul style="list-style-type: none"> ● Reading for information ● Developing vocabulary Ⓣ Properties of latex and rubber Ⓣ Sneaker history and technology Ⓣ Sneakers and culture
 <p>Diagram of the Month "Design Feat" pp. 16-17</p>	■		■		<ul style="list-style-type: none"> ● Reading a diagram Ⓣ Parts of a sneaker Ⓣ Foot motion: increasing traction, maintaining stability, cushioning impact
 <p>Teaching Unit "Visions of Mars" pp. 18-23 ■ Feature Article ■ Think Science</p>	■	■	■	■	<ul style="list-style-type: none"> ● Reading for information ● Developing vocabulary ● Writing explanations Ⓣ Physical geography of Mars Ⓣ Earth and Mars comparisons Ⓣ Space technology
 <p>Photo Finish "Big Gulp" p. 24</p>	■		■		<ul style="list-style-type: none"> ● Reading for information ● Developing visual literacy Ⓣ Pelican adaptations

Issue at a Glance

DIRECTED ACTIVITY	SMALL GROUP ACTIVITY	INDEPENDENT ACTIVITY
<ul style="list-style-type: none"> ■ Read and discuss the news 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"> ■ Complete the "Bite Into Reporting" writing activity, p. 9. ■ Visit the SuperCroc website at www.nationalgeographic.com/ngforkids/articles.
<ul style="list-style-type: none"> ■ Read the article. ■ Discuss the questions on p. TG 3. <p>60 minutes</p> 		<ul style="list-style-type: none"> ■ Learn more about sneaker recycling at www.nationalgeographic.com/ngforkids/articles.
<ul style="list-style-type: none"> ■ Review and discuss the diagram on pp. 16-17. <p>15 minutes</p> 	<ul style="list-style-type: none"> ■ Have student groups choose other sports sneakers (besides running sneakers) to diagram. Use the diagram on pp. 16-17 as a model. <p>60 minutes</p> 	<ul style="list-style-type: none"> ■ Learn more about sneaker design at www.nationalgeographic.com/ngforkids/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 chart information on two neighboring planets other than Mars and Earth. Use the chart on p. 21 as a model. <p>60 minutes</p> 	<ul style="list-style-type: none"> ■ Complete the "Why Is Mars Smiling?" science activity on p. 23. ■ View an online cartoon about Mars at www.nationalgeographic.com/ngforkids/quickflicks.
<ul style="list-style-type: none"> ■ Read and discuss the article on p. 24. <p>5 minutes</p> 		



Visions of Mars

Background

Is Mars the home of creepy aliens? Did the planet once have exotic plant life and water-filled canals? “Visions of Mars” begins by examining these and other early questions about Earth’s next-door neighbor.

The article then describes recent spacecraft used to explore Mars. Included in this lineup is *Odyssey*, a craft now orbiting the planet. *Odyssey* can detect signs of water and other chemicals near Mars’s surface. This state-of-the-art orbiter could lead scientists to more accurate descriptions of the red planet’s activities.

The article also covers prospects for developing research stations and colonies on Mars.

Discussion Questions

- In the 1800s, an astronomer thought he saw lines crisscrossing Mars. What did he think the lines were? (*Canals*)
- Years later, NASA sent spacecraft near enough to Mars to take good photographs. What did the “canals” turn out to be? (*Natural peaks and valleys*)
- Long ago, Mars watchers noticed that the red planet sometimes faded to brown, then grew red again. How did they explain this? (*They thought they were looking at Martian plants blooming and dying as the seasons changed.*)
- What did these color changes actually turn out to be? (*Dust storms*)
- What’s an extraterrestrial? (*An organism that doesn’t live on Earth*)
- Do you think there have ever been extraterrestrials on Mars? Why or why not? (*Answers will vary.*)
- Look at the Next-Door Neighbors chart on page 21. How much bigger in diameter is Earth than Mars? (*3,703 miles or almost twice as large.*)
- Which of the two planets has more moons? (*Mars; it has two.*)
- How does Earth’s surface compare to Mars’s surface? (*Earth is mostly warm and wet. Mars is frozen and dry.*)
- Could you breathe on Mars without using special equipment? Why or why not? (*No. You need oxygen to breathe, and Mars’s atmosphere is mostly carbon dioxide.*)
- Earth has another next-door neighbor. What planet is that? (*Venus*)

- If scientists find evidence that water existed a million or so years ago on Mars, what would it prove? (*That some sort of life may have existed on Mars, or perhaps still does*)
- What spacecraft is currently orbiting Mars? (*Odyssey*)
- What is its mission? (*To detect signs of water and other chemicals near the surface of Mars*)
- When will humans reach Mars? (*It’s anyone’s guess; some scientists think it may happen within the next 15 years.*)
- Describe what a research station on Mars might be like. (*Astronauts would live in inflatable houses and grow food in greenhouses. They would wear airtight suits and explore the planet in rovers.*)
- Do you think you will ever be able to buy a ticket to Mars? (*Answers will vary.*)
- If you do get to vacation on Mars someday, what would you want to do there? (*Answers will vary.*)

Book Link

Discover Mars by Gloria Skurzynski (National Geographic, 1998; 48 pages). Aimed at children eight and older, the book comes with 3-D glasses and contains several 3-D images of Mars. For purchasing information, go to www.nationalgeographic.com/ngforkids/teachers.



Web Links

Explore these Mars resources at nationalgeographic.com/ngforkids/teachers.

Odyssey in Orbit: See *Odyssey*’s latest photos.

Space Toon: Learn more about Mars through this zany cartoon.

Kids’ Space: Send your students to this far-out site where they can make things, solve puzzles, watch cartoons, and learn amazing facts—all about space.

Answers


“Why Is Mars Smiling?” page 15

1. Answers will vary. Explanations may recognize that tornadoes, volcanoes, and dust storms on Mars could produce landforms that look like facial features from millions of miles away.
2. Answers will vary.

Review Answers: "Crocodile Cross-Out"
(Teacher's Guide p. 8)

1. Africa, 2. red planet, 3. vulcanized, 4. 2, 5. fossil,
6. Odyssey, 7. traction, 8. 120, 9. Sarchosuchus
imperator, 10. waffle

Hidden Message: SuperCroc gobbled fish as long
as 12 feet.



the Shape of Life

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and Sea Studios Foundation
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COMING UP

April-May Issue:

Wild Ponies
King Tut's Tomb
American Flag

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Crocodile Cross-Out



What's this armored reptile trying to tell you? Cross out the words and numbers in the crocodile that match the descriptions below. You'll get the message!

Cross Out:

1. Where SuperCroc lived
2. Mars's nickname
3. Type of rubber
4. Number of moons Mars has
5. Remains from an ancient plant or animal
6. Spacecraft designed to detect signs of water on Mars
7. The "grip" that shoe soles give your feet
8. Approximate number of teeth in SuperCroc's jaws
9. Scientific name for one of the world's largest crocodiles
10. Sole design

Croc Message:



vulcanized Africa 120 waffle gobbled
 2 fossil 12 red planet
 Odyssey as long as Sarchosuchus imperator
 SuperCroc traction
 fish feet



NATIONAL GEOGRAPHIC FOR KIDS

MARCH 2002 - SCAVENGER HUNT ANSWER KEY

STUDENT FORM:

www.nationalgeographic.com/ngforkids/adventures

SOURCE FOR ANSWERS: www.nationalgeographic.com/dinorama

1. The <i>Tyrannosaurus rex</i> nicknamed “Sue” had a skull that weighed <u>2,000</u> pounds.	6. Scientists use <u>COMPUTER MODELS</u> to study how dinosaurs may have moved.
2. <i>Tyrannosaurus rex</i> ’s strongest sense was probably <u>SMELL</u> .	7. In 1997 scientist Paul Sereno discovered the most complete <u>SPINOSAUR</u> skeleton ever found.
3. Scientist Luis Chiappe and his team discovered thousands of dinosaur <u>EGGS</u> in Argentina.	8. The largest known dinosaur eggs were <u>18</u> inches long.
4. Like most animals, a dinosaur began life with a fairly large <u>HEAD</u> .	9. Scientists believe one Rocky Mountain dinosaur guarded and fed its young. So they named it <i>Maiasaura</i> , which means “ <u>GOOD MOTHER LIZARD</u> .”
5. Earth’s <u>LARGEST</u> inhabitants were sauropods, or plant-eating dinosaurs.	10. Many scientists think that <u>BIRDS</u> are the modern cousins of dinosaurs.