Program Description

Where Did They Go? A Dinosaur Update — Sixty-five million years have passed since the last dinosaurs roamed the Earth, yet they fascinate us as much as when humans first discovered a dinosaur bone. This program, produced in cooperation with the Academy of Natural Sciences in Philadelphia, explores the wonder and scientific controversy surrounding these amazing extinct animals. Students visit one of the world’s best dinosaur exhibits to learn about the different types of dinosaurs, how dinosaurs raised their young, and how they defended themselves. The students also go along on a dinosaur dig at the site of a historic dinosaur discovery—the place where, for the first time, scientists learned that dinosaurs stood erect.

Discussion Questions

- When did the last dinosaurs live on the Earth?
- Did humans and dinosaurs ever live at the same time?
- How do scientists learn about animals that have been gone for millions of years?
- What caused the dinosaurs to disappear?

Lesson Plan

Student Objectives

- Describe basic characteristics of dinosaurs and their environment.
- Identify ways that specific kinds of dinosaurs were adapted to their environment.
- Summarize how scientists use fossil evidence to learn about dinosaurs and their environment.
- Create a dinosaur poster.

Materials

- Where Did They Go? A Dinosaur Update video
- Computer with Internet access; copier or printer, if available
- Print resources about dinosaurs
Where Did They Go? A Dinosaur Update
Teacher’s Guide

- Construction paper and markers, pencils, crayons or other writing and drawing instruments, other materials as needed to make dinosaur posters

**Procedures**

1. Review information from the video with the class.
   - What is a paleontologist? (a scientist who digs up and studies bones, teeth, and other fossils from ancient plants and animals)
   - What do paleontologists learn about dinosaurs by studying fossils? (They learn what the dinosaurs looked like, how large they were, how long they lived, what they ate, and how they raised their young.)
   - When did the first dinosaurs live and when did the last dinosaurs vanish? (The first dinosaurs lived about 225 million years ago; the last dinosaurs vanished 65 million years ago. Dinosaurs inhabited the Earth for about 116 million years.)
   - How do we learn about dinosaurs and about the Earth at the time that they lived here? (from the clues provided by bones and other fossils)
   - Did humans and dinosaurs ever live on the Earth at the same time? (No. The first humans appeared long after dinosaurs had become extinct.)
   - What was the Earth like when the dinosaurs lived? (The climate was much warmer all over the planet. Winter did not occur anywhere at any time of year.)
   - Why have scientists found dinosaur bones almost everywhere on the Earth? (Dinosaurs lived on the Earth when all of the continents we know today were together in one place, as one giant land mass. When the continents drifted apart, they took the dinosaur bones and fossils with them.)
   - Are the giant sea reptiles and flying reptiles that lived during the time of the dinosaurs also considered dinosaurs? (no)
   - What does the word *dinosaur* mean? (“terrible lizard”)
   - What important discovery followed the unearthing of dinosaur leg and hip bones near Haddonfield, New Jersey, in 1858? (that dinosaurs were capable of standing erect)
   - What are the two major classifications of dinosaurs? On what are these classifications based? (Dinosaurs are classified as saurischians, lizard-hipped dinosaurs, with hips resembling those of modern lizards; or ornithischians, bird-hipped dinosaurs, with hips resembling those of modern birds.)
   - How do scientists believe the dinosaurs became extinct? (Scientists disagree, but most believe one of two theories. One says that a meteor or comet from outer space hit the Earth and caused the sudden extinction of the dinosaurs by raising a tremendous dust cloud that circled the globe, blackened out the sun for months, and cooled the Earth so much the dinosaurs couldn’t survive. The other theory says that the dinosaurs died out slowly and gradually as changes in the Earth took place over millions of years.)
2. Remind students that over 500 different kinds of dinosaurs have been identified and they vary from each other in many ways. Each dinosaur appears to have some special feature that helped it hunt for food, defend itself, or otherwise survive. Ask students to recall a dinosaur from the video and to share something specific they remember about it. Record their responses and add to the list any below not offered by students:

- **Tyrannosaurus rex**, a large flesh eater with long teeth for tearing meat
- **Stegosaurus**, spike-tailed with blood-vessel-filled plates for cooling off
- **Apatosaurus**, one of the largest animals that ever lived
- **Ankylosaurus**, a plant eater with armor-type plates and spikes for defense
- **Compsognathus**, the size of a rooster but a vicious meat eater
- **Ornithomimosaurs**, the “ostrich dinosaur,” galloped 60 miles an hour to avoid attackers
- **Ceratops**, similar in appearance to a rhinoceros, with thick skin and horns
- **Corythosaurus**, with a long crest on its head, used to communicate
- **Maiasaurus**, the “good mother “dinosaur, guarded its nest and babies

3. Challenge students to learn more about different kinds of dinosaurs. Tell them they will choose one kind of dinosaur about which they will design a dinosaur poster. As they conduct their research, ask them to consider these questions: What is the name of the dinosaur? How is the name pronounced? What does the name mean? What did the dinosaur eat? How large did it grow? How much did it weigh? Where have scientists found its bones and fossils? Did it have special features that helped it survive? How long ago and in what prehistoric age did it live?

4. Have students use print and Web resources to research dinosaurs. The following Web sites are good starting points:

- Dinosaur Illustrations and Data Files
  [http://www.cbv.ns.ca/marigold/history/dinosaurs/dinosaurs.html](http://www.cbv.ns.ca/marigold/history/dinosaurs/dinosaurs.html)
- BBC Dinosaur Files
  [http://www.bbc.co.uk/dinosaurs/fact_files/](http://www.bbc.co.uk/dinosaurs/fact_files/)
- Dino World
- Dino Dictionary
- Dino Directory
  [http://internt.nhm.ac.uk/jdsm/dino/about-teachers.dsml](http://internt.nhm.ac.uk/jdsm/dino/about-teachers.dsml)
- Yahooligans: Dinosaurs A to Z
  [http://yahooligans.yahoo.com/content/science/dinosaurs/glossary/glossarya.html](http://yahooligans.yahoo.com/content/science/dinosaurs/glossary/glossarya.html)
5. When students have completed their initial research, ask them to choose the most interesting dinosaur they found, about which they will create a dinosaur poster. Show them a sample poster (which you have created in advance) or draw this template on the board for them to copy:

<table>
<thead>
<tr>
<th>Dinosaur’s name:</th>
<th>Diet:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What the name means:</td>
<td>Where it lived/where fossils found:</td>
</tr>
<tr>
<td>Largest size and weight:</td>
<td>Special features that helped it survive:</td>
</tr>
<tr>
<td>Prehistoric age in which it lived (OPTIONAL):</td>
<td>Interesting fact:</td>
</tr>
</tbody>
</table>

**DRAW YOUR DINOSAUR SKETCH OR PASTE ITS PRINTED PICTURE HERE**

6. For the illustration on their poster, ask students to draw a picture of their chosen dinosaur, copy one from a book, or print one from the Internet. Tell them to record the facts they’ve learned about the dinosaur on their poster, as you have illustrated with your sample or chalkboard template.

7. When students have completed their dinosaur posters, have them display their work for the class and present at least three interesting facts about their chosen dinosaur.
Assessment

Use the following three-point rubric to evaluate students’ work during this lesson.

- 3 points: Students were highly engaged in class discussions; produced a complete dinosaur poster, including all of the requested information; made an interesting presentation of their dinosaur poster to the class and cited three interesting facts about their chosen dinosaur.

- 2 points: Students participated in class discussions; produced an adequate dinosaur poster, including most of the requested information; presented their dinosaur poster to the class and cited two interesting facts about their chosen dinosaur.

- 1 point: Students participated minimally in class discussions; created an incomplete dinosaur poster with little or none of the requested information; were not able to make a full presentation of their dinosaur poster to the class or recall any interesting facts about their chosen dinosaur.

Vocabulary

bipedal
Definition: Walking mostly on two legs
Context: By studying dinosaur hipbones, scientists have learned that many dinosaurs were bipedal.

catastrophic
Definition: Happening suddenly as part of an extreme and violent change
Context: Some scientists believe the extinction of the dinosaurs happened slowly and gradually, while other scientists believe the extinction was sudden and catastrophic.

continents
Definition: The Earth’s large landmasses, including Africa, Antarctica, Asia, Australia, Europe, North America, and South America
Context: When the dinosaurs lived, all of the continents were connected, forming one gigantic and continuous continent.

extinction
Definition: The state of having died out and no longer existing
Context: The extinction of the last dinosaurs happened about 65 million years ago.

fossils
Definition: The preserved remains of plants or animals from a prehistoric age, such as skeleton or leaf imprints, embedded and preserved in the Earth’s crust
Context: By reading fossils, scientists can learn much about extinct animals like dinosaurs.
ornithischians
Definition: The group of dinosaurs with hip bone that resemble those of modern birds
Context: Ornithischians include Stegosaurus, Ankylosaurus, and the ceratopsian dinosaurs.

paleontologist
Definition: A scientist who searches for, collects, and studies the fossils of plants or animals that existed in prehistoric times
Context: A paleontologist reads bone and teeth fossils the way you might read a book.

saurischians
Definition: The group of dinosaurs with hipbones that resemble those of modern lizards
Context: Both the meat-eating Tyrannosaurus rex and plant eaters like the Apatosaurus belong to the saurischians.

species
Definition: A kind or type of plant or animal the reproduction of which results in the same kind of plant or animal
Context: Scientists have discovered about 500 different species of dinosaurs.

Academic Standards

National Academy of Sciences
The National Academy of Sciences provides guidelines for teaching science in grades K–12 to promote scientific literacy. To view the standards, visit this Web site: http://books.nap.edu/html/nses/html/overview.html#content.
This lesson plan addresses the following national standards:

- Life Science: The characteristics of organisms; Organisms and environments; Structure and function in living systems; Diversity and adaptations of organisms
- Earth and Space Science: Properties of Earth materials; Changes in Earth and sky; Structure of the Earth system; Earth’s history

Mid-continent Research for Education and Learning (McREL)
McREL’s Content Knowledge: A Compendium of Standards and Benchmarks for K–12 Education addresses 14 content areas. To view the standards and benchmarks, visit: http://www.mcrel.org/compendium/browse.asp.
This lesson plan addresses the following national standards:

- Science — Life Sciences: Understands relationships among organisms and their physical environment; Understands biological evolution and the diversity of life
- Science — Earth and Space Sciences: Understands Earth’s composition and structure
• Science—Nature of Science: Understands the nature of scientific knowledge; Understands the nature of scientific inquiry; Understands the scientific enterprise
• Geography—The World in Spatial Terms: Understands the characteristics and uses of spatial organization of Earth’s surface
• Geography—Physical Systems: Knows the physical processes that shape patterns on Earth’s surface; Understands the characteristics of ecosystems on Earth’s surface
• Geography—Uses of Geography: Understands how geography is used to interpret the past
• Language Arts—Viewing: Uses viewing skills and strategies to understand and interpret visual media

National Council for Geographic Education
The National Council for Geographic Education (NCGE) provides 18 national geography standards that the geographically informed person knows and understands. To view the standards online, go to http://www.ncge.org/publications/tutorial/standards/.

This lesson plan addresses the following NCGE standards:
• The World in Spatial Terms: How to analyze the spatial organization of people, places, and environments on Earth’s surface
• Physical Systems: The physical processes that shape the patterns of Earth’s surface; The characteristics and spatial distribution of ecosystems on Earth’s surface
• The Uses of Geography: How to apply geography to interpret the past

Support Materials
Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the DiscoverySchool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit http://school.discovery.com/teachingtools/teachingtools.html.

Credit
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