

Prehistoric Earth: Teacher's Guide

Grade Level: 1-2

Curriculum Focus: Earth Science

Lesson Duration: Two class periods

Program Description

How do geologists know what happened on Earth billions of years ago? Segments cover the nature and divisions of geologic time, a variety of prehistoric life-forms, and how fossils reveal clues to Earth's distant past. *Geologic Time* – Explains the system used by scientists to describe and organize prehistoric time periods. *Prehistoric Life* – Discusses what modern scientists study to uncover facts about the past. *Events in Earth's Past* – Chronicles events in the four major periods within the geologic time scale: Precambrian and the Paleozoic, Mesozoic Era, and Cenozoic eras. *Dinosaurs and Fossils* – Points out that each time period is marked by a significant change in the number or type of fossils found, and explores what fossils reveal about Earth's history.

- Geologic Time (6 min.)
 - Prehistoric Life (4 min.)
 - Events in Earth's Past (5 min.)
 - Dinosaurs and Fossils (5 min.)
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Onscreen Questions

- Why do you think it is important to measure prehistoric periods of time?
 - What two scales do geologists use to measure time?
 - How do rocks help geologists determine time periods?
 - What clues do scientists use to learn about prehistoric life?
 - What is a fossil?
 - How do fossils form?
 - What kinds of events can change Earth's geology?
 - Describe an organism from each of the four time periods on the geologic scale.
 - How do scientists study plants and animals that lived millions of years ago?
 - What can fossils teach us about the Earth?
 - What have scientists learned about dinosaurs by studying fossils?
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Lesson Plan

Student Objectives

- Describe a fossil.
- Make two types of fossils.
- Explain how fossils are formed.

Materials

- *Prehistoric Earth* video and VCR, or DVD and DVD player
- White paper
- Crayons
- Feathers, bones, twigs, leaves, shells or other fossil-making materials
- Small plastic containers (1 per student, margarine or soft cream cheese containers work well)
- Mud (enough to fill a plastic container for each student)
- Toothpicks
- Small paintbrushes
- Paint (optional)

Procedures

1. Begin the lesson by introducing the term “fossil” and the science of paleontology.
2. After watching *Prehistoric Earth*, discuss paleontology. Ask students: What do paleontologists do? How do we know about the dinosaurs and other extinct animals? What are fossils? What can they tell us?
3. Tell students that they are going to pretend to be paleontologists studying fossils. Give each student a fossil-making object, such as a small bone, twig, feather, leaf, or shell. Ask: What is the object you have been given? Do you think it comes from a plant or an animal? What kind of plant or animal might it have come from?
4. Give students white paper and crayons. Have them place their fossil-making object beneath the piece of paper and then color the paper with a crayon to create a tracing. Tell students that some fossils look like their tracings—slight imprints of decayed animals or plants left behind in old rocks. They are called trace fossils.
5. When students have finished making their trace fossils, take them outside with their fossil-making materials, plastic containers, and the mud. Have students fill their containers about halfway with mud and then gently place their fossil-making object in the mud. Have them then



cover the object with enough mud to fill the container. Have students write their names on the plastic containers and put them in the sun to dry.

6. The following day, bring students outside to “excavate” their fossils. Give them toothpicks, small paintbrushes, and other useful tools to carefully chip away the top layer of mud from the fossil. Have students remove the object and observe the fossil imprint the object made in the mud. Ask: What does the imprint look like? Tell students that fossils sometimes occur when animals or plants have died and been quickly covered by layers of sediment or rock. Over time, the animal or plant decays, leaving a sort of “shell” in the rock, similar to what they see in their dried mud. Allow students to paint their mud fossils.
7. End the lesson by talking about fossils. Ask students: What is a fossil? How do paleontologists find fossils? Why do they have to be so careful when excavating fossils?.

Assessment

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

- **3 points:** Students actively participated in class discussions; used the mud and other materials wisely; made both trace and mud fossils; were able to demonstrate an exact understanding of what a fossil is and how fossils are formed.
- **2 points:** Students somewhat participated in class discussions; used the mud and other materials with little teacher assistance; made at least one trace or mud fossil; were able to demonstrate an adequate understanding of what a fossil is and how fossils are formed.
- **1 point:** Students did not participate in class discussions; were unable to use mud and other materials without assistance; did not make a trace or mud fossil; were unable to explain what a fossil is or how fossils are formed.

Vocabulary

excavation

Definition: The act of digging; the site of an archeological exploration

Context: They use shovels, picks, and sometimes brushes to unearth preserved fossils. This process is called excavation.

extinction

Definition: No longer in existence; the death of an entire species

Context: The meteorite that hit Earth 65 million years ago, at the end of the Mesozoic Period, caused another great extinction – the eradication of many large animals, including the dinosaurs.

fossils

Definition: Remains or impressions of plants or animals that existed in a past geological age that have been excavated from the soil



Context: Fossils—bones, shells, or preserved imprints—are the best evidence scientists have to study dinosaurs.

geologic time

Definition: The succession of eras, periods, and epochs as considered in historical geology

Context: To describe and organize events in Earth's past, scientists use what's known as geologic time.

paleontologist

Definition: A person who specializes in paleontology, the scientific study of extinct organisms through the examination of fossils

Context: Scientists who study the fossils of prehistoric plants and animals are called paleontologists.

Academic Standards

National Academy of Sciences

The National Science Education Standards provide guidelines for teaching science as well as a coherent vision of what it means to be scientifically literate for students in grades K-12. To view the standards, visit <http://books.nap.edu>.

This lesson plan addresses the following science standards:

- History and Nature of Science: Science as a human endeavor
- Earth and Space Science: Properties of earth materials

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/>.

This lesson plan addresses the following national standards:

- Science—Earth and Space Sciences: Understands Earth's composition and structure
- Language Arts—Viewing: Uses viewing skills and strategies to understand and interpret visual media

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>



DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

How To Use the DVD

The DVD starting screen has the following options:

Play Video – This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

Video Index – Here the video is divided into four parts (see below), indicated by video thumbnail icons. Watching all parts in sequence is similar to watching the video from start to finish. Brief descriptions and total running times are noted for each part. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.

Curriculum Units – These are specially edited video segments pulled from different sections of the video (see below). These nonlinear segments align with key ideas in the unit of instruction. They include onscreen pre- and post-viewing questions, reproduced below in this Teacher's Guide. Total running times for these segments are noted. To play a particular segment, press Enter on the TV remote or click once on the Curriculum Unit title on a computer.

Standards Link – Selecting this option displays a single screen that lists the national academic standards the video addresses.

Teacher Resources – This screen gives the technical support number and Web site address.

Video Index

I. Geologic Time (6 min.)

Learn how absolute and relative times help scientists examine Earth's age, as well as its prehistoric life forms.

II. Prehistoric Life (4 min.)

Discover how fossils are formed, and see the clues they give scientists to learn details about prehistoric life and the history of our planet.

III. Events in Earth's Past (5 min.)

Take a close look at the geological changes Earth has undergone since its birth more than 4 billion years ago.

IV. Dinosaurs and Fossils (5 min.)

See what scientists have learned about dinosaurs by studying fossils and rocks.



Curriculum Units

1. Relative Time

Pre-viewing question

Q: Why is the concept of time important?

A: Answers will vary.

Post-viewing question

Q: What is relative time?

A: Relative time puts events in sequence and provides a chronology, instead of describing when an event occurred.

2. Fossils and Absolute Time

Pre-viewing question

Q: Do you think it is necessary to understand Earth's history?

A: Answers will vary.

Post-viewing question

Q: How do scientists establish absolute time?

A: Scientists use carbon dating, which measures the amount of the radioactive isotope carbon 14 in a fossil, and they examine a varve's layers of sediment; those deposited in winter differ from those deposited in summer. This helps geologists determine the time period in which an animal or plant fossil was created.

3. Clues to Extinction

Pre-viewing question

Q: What can scientists learn by studying the prehistoric past?

A: Answers will vary.

Post-viewing question

Q: What kinds of fossils do you think humans may leave behind?

A: Answers will vary.

4. The Geologic Time Scale

Pre-viewing question

Q: What do you think Earth was like 4 billion years ago?

A: Answers will vary.

Post-viewing question

Q: What is the Geologic Time Scale table?

A: The Geologic Time Scale table includes four major time periods: Precambrian time and the Paleozoic, Mesozoic, and Cenozoic eras. It helps scientists describe the changes in fossils found during those times.



5. The Age of Dinosaurs

Pre-viewing question

Q: What major geologic events have occurred in your lifetime?

A: Answers will vary.

Post-viewing question

Q: Describe the life forms of the Mesozoic era.

A: During the Mesozoic, often called the Age of the Dinosaurs, reptiles were the dominant life form, and birds and mammals appeared on Earth for the first time.

6. Learning About Fossils

Pre-viewing question

Q: Which dinosaur was well adapted to Earth, and why?

A: Answers will vary.

Post-viewing question

Q: Why do you think the dinosaurs became extinct?

A: Answers will vary.

