

Clues to the Past

Teacher Guide

Grade Levels: 6 – 8

Program overview

The students will use the inquiry method to study fossils, both plant and animal, then map their past distribution. The way the fossils are grouped across the land will allow the students to draw conclusions about the different plant and animal communities of the past and to develop an understanding of paleoecology, or ancient interrelationships.

Objectives/Student Learning Outcomes

After participating in this program, students will be able to:

- Discuss characteristics of fossil plants and animals that have been discovered in Oklahoma.
- Determine how a community of fossil plants and animals can be used to suggest a particular environment.
- Develop an understanding of paleoecology, or ancient interrelationships.

Background

When first learning about paleontology, the average person tends to think of scientists excavating a single large animal, such as a dinosaur. While discovering and describing a large specimen can be very exciting, more can be learned by discovering a group, or community of fossil plants and animals from a particular location. A population of various types of fossils allows the paleontologist to re-create communities of plants and animals. These communities in-turn aid the paleontologists in understanding the paleoecology, or ancient interrelationships, among its diverse inhabitants.

Interesting ecosystems developed during the Pennsylvanian Period, which lasted from 323 to 290 million years ago. Continents that make up modern North America and Europe had collided with the southern continent of Gondwana to form the western half of the super-continent Pangea. Oklahoma was located near the equator experiencing sub-tropical climates and widespread swamps laid down the thick beds of dead plant material that today constitute most of the world's coal.

P.A.S.S.

GRADE 6

Science Process - 2.1, 2.2
Life Science - 3.2, 4.1, 4.2

GRADE 7

Science Process - 2.1, 2.2
Life Science - 4.2

GRADE 8

Science Process - 2.1, 2.2
Life Science - 3.1, 3.2

The bark of the one hundred foot tall Lycopod tree was the major source of matter in making coal. Ferns reached to heights of 30 feet with leaves over 2 feet long. The horsetail or Calamite, which can be found along streams in modern day Oklahoma, then was as large as a tree. These plants were very different than today's, relying on spores instead of seeds to reproduce.

At the Museum

Have students examine the various murals in the Ancient Life Gallery taking note of:

- Types of Animals
 - Aquatic
 - Terrestrial
 - Aerial
- Types of Plants
 - Aquatic
 - Terrestrial
- Interrelationships among all of the above

Supplementary/Enrichment Activities

Language Arts

1. Have teams of students write a "Help Wanted" ad for a paleoecologist emphasizing skills and educational requirements needed for this position. Use the "Help Wanted" sheet provided, or students can design their own advertisement.

Additional Resources

For Junior High Students

Ecology and Environment by Sally Morgan, Oxford University Press, 1995

Life Through Time by Harold L. Levin, Wm. C. Brown Company, 1975

VOCABULARY

Amphibian: are cold-blooded vertebrates that spend part of their lives under water, breathing with gills, and the remainder on land, breathing with lungs. They must lay their eggs in water. Some modern examples are: toads and newts.

Brachiopod: are extinct marine animals that, upon first glance look like clams, but are not closely related to mollusks.

Crinoid: or "sea lilies" lived attached to the sea bottom, and filtered food particles from currents flowing past them.

Ecosystem: a natural unit consisting of all plants and animals in an area functioning together with all the non-living physical factors of the environment.

Fern: fossil plants similar in appearance to modern ferns, but reproduced via spores.

Fossil: Evidence of prehistoric animals and plants. Many fossils are formed when hard minerals replace the air spaces and original material in bones and shells.

Food Chain: The transfer of energy from one kind of living thing to another.

For Teachers

The Diversity of Life by Edward O. Wilson, W. W. Norton & Company, 1992

The Ecology of Fossils: an illustrated guide
edit by W. S. McKerrow, 1978

Ecology: Theories and Applications 2nd edition, by Peter D. Stiling, Prentice Hall, 1992

A History of the Ecosystem Concept in Ecology by Frank B. Golley. Yale Press, 1996

Horsetail: a plant whose name is derived from the fact that the branched species somewhat resembles a horse's tail. Spores instead of seed are the means of reproduction.

Lycopod: a group of plants who became especially successful and important during the late Carboniferous period, when they were part of huge swamp forests, with some reaching over 100 feet in height.

Trace Fossil: are non-body remains indicating activity of an extinct organism. They can represent plants or animals, for example: footprints, tracks, and burrows.

Trilobite: extinct arthropods who are very important in estimating the rate of speciation. They are also widely used in biostratigraphy and plate tectonic research.

