

Illinois State Museum

School Program

Changes: Dynamic Illinois Environments



Focus on Fossils

Grades 2-5

Developed with support from a Learning Opportunities Grant from the Institute of Museum and Library Services

Dear Educator:

Thank you for reserving the *Focus on Fossils* program for your students. This packet is designed to help you prepare your group for the program and make the most of your field trip time at the Museum. For your convenience we've included:

General background materials for your use;
Pre and post trip activities;
Suggested books and Web sites; and
State Learning Standards for this program.

We are eager for your feedback on this packet, especially what is useful and what is not. Please feel free to contact Nina Walthall, Associate Curator of Education, at walthall@museum.state.il.us with comments or suggestions.

Sincerely,

ISM Education Section

Changes: Dynamic Illinois Environments

Focus on Fossils Grades 2-5

Preparing for Your Visit

Getting Here

The Illinois State Museum is located on the corner of Spring and Edwards Streets in the Capitol Complex. Routes into Springfield and to the Museum are well marked. Buses may unload and load directly in front of the Museum on Edwards Street westbound. Bus parking is available at the State of Illinois Visitor Center Parking Area. When you arrive at the Museum, please register your group at the Front Desk in the Lobby.

Visit Guidelines

Please bring one adult for every ten students. Backpacks, food, beverages, gum, and candy are not allowed in the building. Adult chaperones are required to be with students in the Museum Store and *A Place for Discovery*.

Accessibility

The Museum is accessible to visitors with special needs. Wheelchairs are available at the Front Desk. Please let us know if you have a student with special needs.

Food Service

Food service and vending machines are not available at the Museum. There is a picnic area at the State of Illinois Visitor's Center, one block away. There are a number of fast-food restaurants within one mile of the Museum.

Photographs

Visitors are welcome to take photographs in all areas of the Museum except the Art Gallery (depending on the exhibition).

Program Introduction

Focus on Fossils uses the *Changes* exhibit at the Illinois State Museum to teach students about fossils, their importance, the various ways in which they form, and how scientists use fossils to learn about extinct organisms and past environments. Students will also learn how fossils are collected and how scientists determine the age of fossils. The program features fossils found in Illinois and uses much of the *Changes* exhibit.

This program includes two activities. Your class may do one or both activities:

Guided Program: A 30 or 45 minute interactive presentation by a Museum educator. The 30 minute program is recommended for grades 2-3. The 45 minute version is recommended for grades 4-5.

Independent Activity: An unguided activity in the *Changes* exhibit, where students search

for answers to questions about fossils found in the exhibit. The Museum will provide activity sheets, clipboards, and pencils for your group.

After taking part in the *Focus on Fossils* program, students should be able to:

- Define fossil and give examples of various fossils
- Describe different types of fossils and how they formed
- Describe how fossils are collected
- Explain how scientists use fossils
- Describe how scientists determine the age of fossils (Grades 4-5)
- Describe briefly how fossils are named. (Grades 4-5)

Focus on Fossils can serve as either an introductory lesson or as a summative review for your students.

IL State Goals for Learning

Focus on Fossils addresses the following Illinois State Goals for Learning:

Skills: Listening, drawing conclusions, speculating, observing, gathering data, synthesizing

State Goals, Early Elementary:

- **4.A.1b** Ask questions and respond to questions from the teacher and from group members to improve comprehension.
- **5.C.1a** Write letters, reports and stories based on acquired information.
- **11.A.1a** Describe an observed event.
- **11.A.1e** Arrange data into logical patterns and describe the patterns.
- **11.B.1a** Given a simple design problem, formulate possible solutions.
- **12.A.1a** Identify and describe the component parts of living things (e.g., birds have feathers; people have bones, blood, hair, skin) and their major functions.
- **12.A.1b** Categorize living organisms using a variety of observable features (e.g., size, color, shape, backbone).
- **12.B.1a** Describe and compare characteristics of living things in relationship to their environments.
- **13.A.1b** Explain why similar results are expected when procedures are done the same way.
- **13.A.1c** Explain how knowledge can be gained by careful observation.
- **13.B.1a** Explain the uses of common scientific instruments (e.g., ruler, thermometer, balance, probe, computer).
- **13.B.1c** Describe contributions men and women have made to science and technology.

State Goals, Late Elementary:

- **4.A.2b** Ask and respond to questions related to oral presentations and messages in small and large group settings.
- **5.C.2b** Prepare and deliver oral presentations based on inquiry or research.
- **11.A.2a** Formulate questions on a specific science topic and choose the steps needed to answer the questions.
- **11.A.2d** Use data to produce reasonable explanations.
- **11.A.2e** Report and display the results of individual and group investigations.

- **12.A.2a** Describe simple life cycles of plants and animals and the similarities and differences in their offspring.
- **12.B.2a** Describe relationships among various organisms in their environments (e.g., predator/prey, parasite/host, food chains and food webs).
- **12.B.2b** Identify physical features of plants and animals that help them live in different environments (e.g., specialized teeth for eating certain foods, thorns for protection, insulation for cold temperature).
- **13.B.2a** Explain how technology is used in science for a variety of purposes (e.g., sample collection, storage and treatment; measurement; data collection, storage and retrieval; communication of information).
- **13.B.2c** Identify and explain ways that science and technology influence the lives and careers of people.

Educator’s Background Information

Fossils are the primary evidence of past life on our planet. They show the succession of life forms over millions of years. Fossils occur at predictable points in rock layers, forming a “fossil record.” This record helps geologists determine the relative ages of rocks and the position of past continents and seaways. The scientists who study fossils are specialized geologists called paleontologists.

Fossils can form from plants, animals, or even microorganisms. Although it is possible for entire plants and animals to be preserved as fossils, finding a fossil of an entire organism, especially a large one, is extremely rare. More often, parts of plants and animals are preserved. During the process of becoming a fossil, groundwater gradually dissolves the plant or animal and replaces it with a mineral.

In the Museum, fossils can be found dating back millions of years while others are only thousands of years old. The age of fossils can be determined using two methods. Relative dating uses the relative position of a fossil in relation to other objects (called index fossils). This only tells if a fossil is older or younger than the index fossil. To gain a more precise age of a fossil, scientists use a method called radiometric dating. Radiometric dating uses the measurements of certain radioactive isotopes to determine the age of a specimen.

Fossils can be formed in several ways. Replacement occurs when the organic material within an animal or plant is gradually replaced with mineral matter. Other fossils are formed from the molds left behind as an organism decays. These molds make casts, which are identical replicas of the original organism. Sometimes, organisms leave imprints after they die, much like a photograph. Finally, other organisms are preserved in amber or leave tracks behind.

Fossils are collected using various tools, such as a rock pick or dental scraper. Fossils commonly are found in limestone formed from shallow sea beds, but recently, a tooth and tusk from a woolly mammoth were found in a creek bed near Lincoln, IL. The presence of fossils in certain areas can tell us a great deal. For example, if a fossil of a plant found in warm climates is found in Illinois, then we know that the climate of Illinois was once warmer than it is today. Similarly, if we find an ocean-dwelling creature in modern-day Illinois, we can infer that Illinois was once underwater. We can also use fossils to learn about extinct plants and animals. An example, the Tully monster, has only been found in Illinois. It is the state fossil of Illinois. Others, such as the trilobite, have been found over widespread areas.

Like all discovered living things, fossils are given scientific names. The scientific name of an

organism is typically written in Greek or Latin. Scientific names are sometimes descriptive, although some fossils are named after people or places.

After Your Visit

Here are some activities that you can do with your students after the *Focus on Fossils* program:

- Review concepts related to fossils presented at the Museum and discuss student questions.
- Ask students to bring in fossils from home. Many families have fossils that they have collected or bought.
- Create a Fossil Dig for your students using lessons found on the following Web page:
<http://fossils-facts-and-finds.com/fossilization.html>
- Fossil coloring pages can be found at:
http://www.fossils-facts-and-finds.com/coloring_pages.html
- Have students create a haiku or other poem about a fossil they enjoyed seeing at the Museum.
- Have students research the Internet to find pictures of fossils they saw at the Museum. Print them out and make a bulletin board of your visit.
- Take students to an outdoor place (like your school grounds or a nearby park) where a large number of living things are present. Have them imagine, then draw, what this place would look like millions of years ago, and millions of years in the future.
- Show students a living plant or animal (it can also be a photograph). Have them imagine, then draw, what they think its fossil would look like.

Suggested Trade and Reference Books

Aliki. 1972. *Fossils Tell of Long Ago*. New York: Crowell. 33 pp. ISBN 0690313780.

Altkins, Jeannine. 1999. *Mary Anning and the Sea Dragon*. New York: Farrar Straus Giroux. 32 pp. ISBN 0374348405.

Anderson, Bridget. 2002. *What Fossils Tell Us: The History of Life*. West Palm Beach, FL: Bank Street College of Education in Association with the American Museum of Natural History for Lickle Pub. 47 pp. ISBN 1890674133.

Baylor, Byrd. 1980. *If You Are a Hunter of Fossils*. New York: Scribner. 32 pp. ISBN 0684164191.

Bonner, Hannah. 2003. *When Bugs Were Big, Plants Were Strange, and Terapods Stalked the Earth: A Cartoon Prehistory of Life Before Dinosaurs*. Washington, DC: National Geographic. 44 pp. ISBN 079226326X.

Brown, Don. 1999. *Rare Treasure: Mary Anning and Her Remarkable Discoveries*. Boston: Houghton Mifflin. 32 pp. ISBN 0395922860.

Collinson, Charles. 2002. *Guide for Beginning Fossil Hunters: Illinois State Geological Survey, Geoscience Education Series 15*. Champaign, IL: Illinois State Geological Survey. 48 pp.

- Diffily, Deborah. 2004. *Jurassic Shark*. New York: Harper Collins. 32 pp. ISBN 0060082496.
- Erickson, Jon. 2001. *An Introduction to Fossils and Minerals: Seeking Clues to the Earth's Past*. New York: Facts on File. 272 pp. ISBN 0816042373.
- Ewart, Claire. 2004. *Fossil*. New York: Walker. 32 pp. ISBN 0802788904.
- Gallant, Jonathan R. 2001. *The Tales Fossils Tell (The Story of Science)*. New York : Benchmark Books. 80 pp. ISBN 0761411534.
- Gish, Melissa, and Nancy Shaw. 2001. *Fossils*. Manato, MN: Creative Paperbacks. 31 pp. ISBN 0898123194.
- *Janssen, Raymond. 1979. *Leaves and Stems from Fossil Plants*. Springfield, IL: The Museum. 190 pp. ISBN 0897920775.
- Jennings, James. 1990. *Guide to Pennsylvanian Fossil Plants of Illinois: Illinois State Geological Survey, Educational Series 13*. Champaign, IL: Illinois State Geological Survey. 75 pp.
- Palmer, Douglas. 1996. *Fossils (Dk Pockets)*. New York: DK Pub. 160 pp. ISBN 0789406063.
- Parker, Gary. 1979. *Dry Bones and Other Fossils*. San Diego, CA: Creation Life Publishers. 71 pp. ISBN 0890510393.
- *Parker, Steve. 1997. *Collecting Fossils: Hold Prehistory in the Palm of Your Hand*. New York: Sterling Pub. 80 pp. ISBN0806997621.
- Perrault, Chris. 2000. *The Best Book of Fossils, Rocks, and Minerals*. Edisto Island, SC: Kingfisher. 32 pp. ISBN 075345274X.
- Stewart, Melissa. 2003. *Fossils*. Minneapolis, MN: Compass Point Books. 32 pp. ISBN 0756504422.
- Squire, Ann. 2002. *Fossils: A True Book*. New York: Children's Press. 47 pp. ISBN 0516225049.
- Taylor, Paul D. 1990. *Eyewitness: Fossil*. New York: Knopf. 63 pp. ISBN 0789458403.
- Thompson, Ida. 1998. *National Audubon Society Field Guide to Fossils*. New York: Alfred A. Knopf. 846 pp. ISBN 0394524128.
- Troll, Ray. 1996. *Raptors, Fossils, Fins & Fangs: A Prehistoric Creature Feature*. Berkeley, CA: Tricycle Press. 31 pp. ISBN 1883672414.
- Trueit, Trudi Strain. 2003. *Fossils (Watts Library: Earth Science)*. New York: Franklin Watts. 63 pp. ISBN 0531121968.
- Walker, Cyril. 2002. *Smithsonian Handbooks: Fossils*. New York: DK Adult. 64 pp. ISBN 0789489848.

Walker, Sally M. 2002. *Fossil Fish Found Alive: Discovering the Coelacanth*. Minneapolis, MN: Carolrhoda Books. 72 pp. ISBN 1575055368.

*Indicates books available in the Museum store.

Other Teaching Resources

Illinois State Geological Survey. To order materials call 217-333-4747.
<http://www.isgs.uiuc.edu/isgshome/isgshome.html>

Illinois Department of Natural Resources. Illinois Fossils Trunk. For information about borrowing, visit <http://www.dnr.state.il.us/lands/education/fossiltrunk.htm>

Illinois Department of Natural Resources. Poster on Illinois Rocks, Minerals & Fossils. Kids for Conservation (Fall 2000).
<http://www.dnr.state.il.us/lands/education/kids/KIDSCONS/Fall2000/rockminfos.htm>

Illinois State Geological Survey. *Geo.Activities Series*. Activities and resources for teaching geology, Grades 4-12. Ordering information: <http://www.isgs.uiuc.edu/servs/pubs/order-pubs.html>

Illinois State Geological Survey. Great information on Illinois fossils.
<http://www.isgs.uiuc.edu/isgshome/fossils.htm>

Illinois State Museum. Mazon Creek Fossil Exhibit.
http://www.museum.state.il.us/exhibits/mazon_creek/

Illinois State Museum. The Midwestern United States 16,000 Years Ago.
<http://www.museum.state.il.us/exhibits/larson/>

The Science Spot. Teacher-created Web site with great activities. <http://sciencespot.net>

University of California - Berkeley Museum of Paleontology. This is a great resource on paleontology. <http://www.ucmp.berkeley.edu>

University of California - Berkeley Museum of Paleontology. Lesson on fossilization and adaptation.
<http://www.ucmp.berkeley.edu/fosrec/Breithaupt2.html>

