



Division Of Geological Survey

HANDS ON

EARTH SCIENCE

No. 3

EVERYONE LOVES FOSSILS

by Sherry L. Weisgarber

What exactly are fossils? Fossils are the remains of past life. This definition includes anything that is a clue to past life, such as the bones of dinosaurs and mammoths, the tiny shells of one-celled animals, trails and footprints, worm burrows, leaves, tree trunks, seeds, and microscopic spores of fungi.

Fossils occur in sedimentary rocks such as limestone, shale, and sandstone. Because Ohio is covered with sedimentary rocks, fossil collecting is a popular hobby for many Ohioans.

How do fossils form? Some of the plants and animals that died in the geologic past were buried by sediments before they could decompose. After burial, the soft tissue of the organism slowly decomposed, but the harder parts of the plant or animal remained intact. The sediments eventually were hardened into rocks, preserving the harder parts of the organisms, such as bones, shells, teeth, leaves, and stems, that we find as fossils today.

Fossils are preserved in a variety of ways. The hard parts of some organisms are permeated by minerals in a process called permineralization. Petrified wood is an example of permineralization. Many plants are preserved as compressions. In this process, the remains of the organism are squeezed by the rocks that surround it until all of its liquids and gases are removed, leaving only a thin film on the surface of the rock. The hard parts of many Ohio fossils were dissolved by ground water moving through the sediment or rock and replaced with minerals in the water. This process is called replacement. In Ohio, common replacement minerals are pyrite and silica. Ground water also may dissolve the original material without replacing it with other minerals. If the sediment hardened into rock before the fossil was dissolved, the rock retains the imprint of the fossil, which is called a mold. A mold may later be filled with other sediment or minerals precipitated from ground water, making a cast of the fossil. A cast is a replica of the original fossil in a different material.

The following classic activity illustrates the concepts of molds and casts.

Each student will need the following materials:

sea shell, twig, or other small object	plastic fork	petroleum jelly
1/4 to 1/2 cup plaster of paris	1/4 to 1/2 cup water	paper cup
small plastic margarine dish		

Cover the small object, representing a dead organism, with a thin layer of petroleum jelly to keep it from sticking in the plaster of paris when it hardens. Put the plaster of paris into the margarine dish. Add water gradually to the plaster of paris, stirring gently with the fork until the plaster is thick and creamy. Gently tap the bottom of the dish onto the table to force out any air bubbles in the plaster. This layer represents the soft sediment that the organism fell into when it died. Let the plaster harden for about 1 minute so the object won't sink to the bottom of the container. Press the small, petroleum-covered object into the plaster and allow it to dry thoroughly, preferably overnight. Remove the object from the plaster. You now have a mold of your object. Leave the mold in the container and coat the entire surface of the dry plaster with a thin layer of petroleum jelly. Mix another batch of plaster of paris in the paper cup. Pour this mixture over the mold and allow it to dry. This layer represents the overlying sediments or the minerals precipitated from ground water that fill in the mold, making a cast of the original object. When the plaster is dry, separate the cast from the mold. It should separate easily along the layer of petroleum jelly. You now have a fossil cast and a fossil mold of your original object.

SOURCE: *Ohio fossils*, ODNR, Division of Geological Survey; *Water, stones, & fossil bones*, National Science Teachers Association; and *The earth science book*, Dinah Zike.