

Modeling the Fossilization Process

Suggested Grade Levels: **K-4**

Description: **Students model one way fossils are formed by creating their own external molds.**

Standards Targeted:

- **Fossils provide evidence about living things that inhabited Earth long ago. [LS4.A]**

Skills Targeted: **Observe, Model, and Infer**

Goals:

- 1. To demonstrate how fossils can form**
- 2. To show some limitations of the fossil preservation process**
- 3. To illustrate how details of an ancient organism's anatomy may be inferred from its fossilized remains**

Objectives—By the end of this activity, students will be able to:

- 1. Explain one way fossils can form**
- 2. Describe why a fossil may only preserve a portion of an organism's anatomy**
- 3. Infer details about an organism's anatomy from its fossilized remains**

Time Needed: **15-45 minutes**

Materials:

- **Enough small objects to serve as fossils for each student (small shells, leaves, branching twigs work well)**
- **Wax paper**
- **Modeling clay**
- **(Optional) Petroleum jelly or vegetable oil**
- **(Optional) Small magnifying glasses or 10x hand lenses**

Step-By-Step Instructions:

- 1. Ask students to think about fossil animals, like dinosaurs—how can people study them if we can't see them alive today?**
- 2. Guide them toward the idea of fossils as the remains of ancient life that are preserved inside rocks.**
- 3. Ask students to think of ways that a dead animal or plant might end up inside a rock. Repeat out loud some of their ideas.**



4. Reinforce the concept that most fossils form when some part of a dead animal or plant gets buried in sediment. This might happen, for instance, when an animal or plant dies near the edge of a river, lake, or ocean. The sand or mud that is deposited in the river, lake, or ocean covers up the body. Parts of the body may decay away, but other parts—especially hard parts like bones and shells—will stay in the sediment until it turns into rock.
5. If you have web access and a computer, you can show students photos of various fossils and ask them to react to them – what parts of the animal or plant have been preserved as a fossil, and what parts have been lost to decay?
6. Tell students that in this activity they will be modeling the process of making of fossil—fossilization. They will use objects (shells, leaves, twigs, etc.) to represent the once-living animals and plants, and clay to represent the sediment. The type of fossil they will make is called a mold.
7. If necessary, divide students into pairs or groups. Each student/pair/group will need a small lump of modeling clay (about a golf ball size’s worth), a sheet of wax paper at least 4” square, and at least one object to serve as the organism to be fossilized. A small dab of petroleum jelly or oil will help prevent the object from sticking to the clay and can be distributed on the wax paper, but is not strictly necessary. A magnifying glass or small hand lens can be helpful for seeing “preserved” fine detail.
8. Students should be instructed to divide their clay into two balls and flatten each into a pancake on the wax paper.
9. Students should next examine their object. What shape is it? What sorts of detail can they see (*e.g.*, textures, bumps, leaf veins, etc.)? Do they think all these details will be fossilized? Which parts do they predict are more likely to be preserved, and why?
10. If using petroleum jelly or vegetable oil, students should coat their object with a little of the jelly or oil to prevent it from sticking to the clay.
11. Instruct students to press their object into one of the clay pancakes, then carefully remove it. Ask them to compare the original object to the impression it left in the clay—how are they similar? How are they different?
12. Next, ask students to carefully place the object back into the impression they made in the clay. Cover up the object with the second clay pancake and press down enough for the clay to completely cover the object.
13. Finally, have students carefully peel apart the two clay pancakes and examine both sides of the impression the object left. Again, ask them to compare the original object to the impression it left. If the object itself were to decay away after it was buried, how much of its shape and detail would still be preserved in the rock as a mold?



14. **Variation A:** Students can be asked to experiment with making molds of different parts of the object or inserting the object at different angles into the clay—how well could they reconstruct the object’s shape and does this depend on the angle at which the mold was made?
15. **Variation B:** If different students/groups worked with different objects, they can swap molds with each other and then be asked to reconstruct the unfamiliar object preserved in as much detail as they can. What aspects of the object can they directly observe from the mold? What other aspects of its shape, ornament, etc. are not preserved but could reasonably be inferred, either from what they can see or what they already know about similar objects?
16. **Variation C:** More permanent molds can be made with plaster of Paris. Mix plaster and water in aluminum pie plates to a thick consistency and set the “fossil” object (lubricated with petroleum jelly or oil) into the top of the plaster. The plaster must then be set aside to harden, but once it is set and the object is removed, the plaster can be painted to produce a more realistic looking “fossil”. If the objects are small enough, several students could make molds of their objects in the same pie plate, both to conserve resources and to make multi-fossil “rock slabs”.
17. **Variation D:** Students can make casts from their molds with plaster. Mix up some plaster and water to a thick consistency. Coat the clay “fossil” molds with a little vegetable oil to prevent sticking and then fill the mold with the plaster. Once the plaster is set, the casts can be removed. Students can then compare the original object to both the mold and the cast, noting differences in how well various parts were preserved.

Resources:

The Paleontology Portal: <http://www.paleoportal.org/>

Website with vetted educational materials, including nearly 1,000 photographs of fossils

University of California Museum of Paleontology Online Exhibits:

<http://www.ucmp.berkeley.edu/exhibits/index.php>

Extensive website with many images and background information for every major fossil group; also has extensive K-12 educational resources, online activities, modules, etc.

Royal Ontario Museum Image Database: <http://images.rom.on.ca/public/>

Searchable database from the ROM in Toronto; search for “dinosaur” to bring up many good images of dinosaurs from Canada



Friends of the University of Michigan Museum of Paleontology Specimen Database:

<http://strata.geology.wisc.edu/mibasin/>

Website with lots of photographs of fossils, many of which can be found in Northwest Ohio

Aliki. 1990. *Fossils Tell of Long Ago*. HarperCollins Publishers, New York.

Eldredge, Niles, Gregory Eldredge, and Douglas Eldredge. 1989. *The Fossil Factory: A Kid's Guide to Digging Up Dinosaurs, Exploring Evolution, and Finding Fossils*. Roberts Rinehart, Lanham, MD.

Katz Cooper, Sharon. 2007. *Learning from Fossils*. Heinemann Library, Chicago.

Squire, Ann O. 2002. *Fossils: A True Book*. Children's Press (Scholastic Inc.), New York.

Strain Trueit, Trudi. 2003. *Fossils*. Franklin Watts (Scholastic Inc.), New York.

Taylor, Paul D. 2004. *Eyewitness Fossil*. DK Publishing, Inc., New York.

