

Mineral Replacement in Fossil Formation

Summary

Plaster of paris is used to demonstrate two ways fossils are formed.

Main Core Tie

Science - 4th Grade

[Standard 4 Objective 1](#)

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

For each group of 2-4 students:

Plaster of paris

Water

Mixing bowl

Spoon

Plastic sponge

2 aluminum pie plates or foam meat trays

Small plastic toy with legs (human or animal)

Vegetable oil

Background for Teachers

Fossils are evidence of living organisms from the past and are usually preserved in sedimentary rocks. A fossil may be an impression left in sediments, the preserved remains of an organism, or a trace mark showing that an organism once existed. Fossils are usually made from the hard parts of an organism because soft parts decay quickly. Fossils provide clues to Earth's history. They provide evidence that can be used to make inferences about past environments. Fossils can be compared to one another, to living organisms, and to organisms that lived long ago.

Permineralization is a fossilizing process in which hard substances of animals, such as bone, teeth, or shell are buried in sediment. Groundwater seeps into the sediment. Minerals in the groundwater replace minerals in the hard animal parts or are deposited in the pore spaces of the organism. This replacement of organic materials hardens the animal part and preserves it as stone. This process takes a very, very long time. In this demonstration, the students will be able to see how minerals can displace air in a sponge and make it harder. The sponge represents the animal material, the plaster and water are much like the actual mineral- laden water that would fossilize a bone. This demonstration will work much faster than natural processes.

Some fossils are molds of tracks and trails made by animals as they walked through soft mud or sediment. The mud or sediment later turned to stone, thus preserving the tracks or trails.

Intended Learning Outcomes

Compare things and events.

Explain science concepts and principles.

Use science language.

Instructional Procedures

Tell the students they will be participating in an activity that simulates two ways that fossils are made. Instruct them to try and figure out how the activity is like a natural event where fossils are made.

Cut the sponge in half. Put one piece in the pie plate and set the other half aside.

In the mixing bowl, mix 1 part water with 1 part plaster. Pour the thin plaster mixture over the sponge.

Ask the students what they think will happen.

Let the sponge sit, undisturbed for a least 2 hours.

While the sponge is drying, mix 2 parts plaster in 1 part water in a small bowl. Stir until smooth.

Pour the plaster into a pie pan or tray.

Coat the legs of the toy with vegetable oil. Lightly "walk" the toy person or animal across the tray. Rinse the legs of the toy or animal to remove any plaster or oil. Let plaster harden undisturbed (an hour or so).

Discuss how fossilization of these tracks can occur. Ask the students to compare the toy-walking-in-plaster activity to how fossils are formed in real life. Help them see how tracks in a mud flat could become preserved in stone as the mud dried and baked in the sun.

Return to the sponge. Examine the sponge in the pie pan and compare it to the half that has been set aside.

How was the plaster mixture absorbed?

Is the sponge in the pie pan harder than the one that was set aside?

Ask the students to relate what happened to the sponge to what happens to when fossils are made. Help them see that the sponge is like hard plant or animal part that has been buried.

When a hard animal part (shell, bone, tooth) is buried, minerals in the water replace the once living parts of the bone, shell or tooth with minerals, making it as hard as stone. In the activity, minerals replaced the air in the sponge, making it hard.

Explain that the processes that the students observed are two ways that fossils are formed.

Have the students describe the processes they observed in their own words, perhaps in a science journal.

Briefly discuss other ways that fossils are formed for the sake of comparison (insects in amber for example).

Assessment Plan

Use the rubric below to assess their science journal entry.

Rubrics

[Science Writing Rubric](#)

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