



### How Do Bones Become Permineralized?

Adapted from *How do bones become permineralized?*  
From Bill Nye the Science Guy's Great Big Dinosaur Dig

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Grade Level: K-8

Preparation Time: 10-20 minutes

Activity Duration: several days

#### Concepts Addressed

- The process of fossilization occurs under specific conditions and in certain environments.
- Permineralization is fossilization where bone material remains and the spaces are filled in with minerals.
- Petrification is when organic materials are replaced by minerals.

#### Objectives

The student will:

- Observe a process that models the process of permineralization in fossils.
- Think about the difference between permineralization and petrification in fossils.

#### Materials Included

- Sponges

#### Materials Not Included

- Salt
- Glass
- Warm water
- Spoon
- Saucer

#### Background

Fossils can be formed in at least two different ways. One way is called **petrification**. When living material dies and petrifies, the material from the living object is actually *replaced* by minerals. The structure is maintained, but the material is entirely different. This is what happens to petrified wood. Most dinosaur and other animal bones become permineralized, instead.

**Permineralization** (per-min-ur-all-eye-zay-shun) is when some of the bone material remains and the *spaces are filled in* with minerals. Both the structure and the original bone material are

preserved. This activity models permineralization. The sponge represents the bone tissue and the spaces are filled in with salt crystals representing minerals in fossils.

#### Procedure

1. Add 50 milliliters (3 tablespoons) of salt to the glass of warm water. Stir until most of the salt disappears.
2. Soak your sponge in this salty, salty water. Squeeze and resoak the sponge to work the salty water all the way through.
3. Tip the glass and gently drain away the excess water.
4. Slide your permineralized salt sponge onto the plate and let it dry for a few days.
5. Pick up the sponge when it is dry—you can feel that it is solid and stiff. Look closely to observe the sparkly salt crystals that have filled in the spaces between the sponge. Your sponge has become permineralized.

#### Assessment

- After the experiment is complete, ask students to sketch the sponge and label the “bone” and “minerals”. Have students write a description of what happens to bones that undergo permineralization based on what they learned by observing the sponge.

#### Extensions

- Study histology—the branch of science that looks at the structure of the inside of bones. Paleo-histologists cut thin slices of bone and are able to study the internal bone structure through microscopes. Try this link for more information:  
<http://www.museumoftherockies.org/Home/EXPLORE/Paleontology/PaleoResearch/Paleohistology/tabid/196/Default.aspx>