

# **overnight permineralization:** *Hey Ty Rexy, why are your bones so Heavy, man?*

## **Introduction**

What makes a dinosaur bone so heavy? Is anything left of the original animal or plant in fossils? How are bones preserved in the geologic record? Create your own permineralized fossil.

## **Materials**

- Plaster of Paris
- Open cell sponge
- Water
- Disposable plastic container
- Hacksaw blade with taped end

## **Assembly**

Plaster of Paris Permineralization process:

To ensure the plaster seeps into the pores of the sponge, mix a watered down mixture of Plaster of Paris and water (approx. a 1 to 1 mix of water and plaster) in your disposable container. Add the sponge, squeeze and stir to ensure the sponge is soaking in the Plaster mixture. Leave the sponge in the wet plaster overnight to allow the sponge to harden inside the mixture.

Once the sponge and plaster are dry, use a hacksaw blade to cut the sponge in half to expose the inside of your sponge.

## **To do and notice**

Is there a difference between the sponge before and after the “permineralization” process? Is the original sponge still there? Has it changed?

Try weighting the sponge before and after. When the sponge hardens remove the excess plaster matrix from your sponge. Is there a difference in weight? If so, why?

Compare side cuts of a “permineralized” sponge to that of a regular sponge. What differences and similarities do you see? Where did the plaster deposit?

Compare the “permineralized” sponge to fossil collections.

## **What’s going on?**

Death is for certain, but fossilization is not. Fossils are evidence of past life preserved in the geologic record. After an organism dies, a rare series of events needs to occur to be preserved in the geologic record.

Permineralization is a fossilization process where the bone is flooded or soaked with ground water containing dissolved minerals – calcium carbonate or silica. Over time these minerals fill in the empty pores inside the bones. The hard parts of an organism like bone, teeth, and shell remain behind. Bones are heavier as fossils because of this process.

## **Etcetera**

### Types of fossilization

There are several other ways fossilization occurs.

- The ideal and least likely is **frozen** in time; freeze-dried mammoths are examples of fossils in this case.
- Another type is **carbonization** where a residue carbon film preserves the outline and detail of the organism in the rock.
- An organism can be **petrified**. Petrification is similar to permineralization but in addition to filling in the pores with minerals, the bone structure itself is replaced with minerals.
- Finally, a **natural cast** can occur when flowing water removes all the original bone, leaving an impression of its outside.

In addition to preserving organisms' bodies, evidence of their *activity* can also be preserved in the form of a trace fossil. Trace fossils are casts of footprints, burrows, tail drags, leaf impression, etc. Trace fossils are very different than body fossils, but just as important to piece together the story of past life.

### Fossilization and fossil discovery

The process of fossilization and fossil discovery moves through the following stages: death; burial; fossilization (permineralization occurs here); erosion; exposure; and finally discovery.