Modeling Petrified Wood

Texas Memorial Museum

Grades
4-8

Objectives
Students will learn about the process of fossil formation by modeling the process of petrification.

Materials
Small pieces of wood, such as 4 cm long sections of small dowels, or similarly sized fresh twigs
5-10 lbs of playground sand
Food coloring (at least two colors)
Plastic wrap
6 small clear plastic cups
6 rubber bands
1 stirring rod or 1 Popsicle stick
Water (at room temperature)

What is happening
Certain conditions are necessary for wood to become petrified in Nature, but it is not as uncommon as we might think. First, a tree must be sealed from oxygen to prevent decay. If it is not sealed, bacteria will usually decompose the wood.

This seal may be created in a variety of ways. A flood which deposits sand and silt may suddenly bury a tree that has fallen to the forest floor. It may also be buried by volcanic ash from a nearby volcanic explosion or a lava flow. Next, there must be minerals present that will cause petrification. Examples include calcite, pyrite or "fool's gold," marcasite, and silica, which is the most common. These minerals dissolve in groundwater, seep through the sediment covering the wood, and replace the organic material in the wood. Through chemical processes, the minerals move from the water and into the individual plant cells. In good examples of petrification, you can still see the cell walls if you look closely enough.

This experiment will model the process of petrification. While performing the experiment, try to think of the natural processes that the experiment imitates. Before performing the experiment, read the “what to do” and predict what you think your results will be. Record your thoughts before and after the experiment in a *Scientist Notebook*.

What to do
1. If necessary, cut the wood into small enough pieces to fit into the small cups.
2. Fill one cup 1/4 full with sand.
3. Place one or two pieces of wood in the cup on top of the sand.
4. Pour sand over the wood until it is completely covered. Your cup will probably be about 1/2 full (maybe even more).
5. In another cup, fill it 1/2 full with water. Choose a color from the food coloring. Put 6 drops of food coloring in the water and stir with the stirring rod. Add drops of food coloring until the desired shade is reached. 10 drops are recommended.

(Remember, the food coloring represents silica, or any of the other replacement minerals mentioned above. It can only be carried in water.)

6. Slowly pour the colored water into the cup with the sand and wood pieces. Pour just a little at a time, and watch it seep to the bottom each time.
7. Continue to add colored water until the sand is completely and evenly saturated and a little water covers the sand. It is best to have only about 1/2 cm of water on the surface of the sand. You do not have to use all of the colored water. Only use what you need.

8. Be sure that the wood is still buried after you pour the water in the cup. If not, push the wood under the surface of the sand with the stirring rod or a Popsicle stick.
9. Cover the cup with plastic wrap and place a rubber band around the outside. The rubber band and plastic wrap should fit tightly around the cup.
10. Repeat the above steps with a different color of food coloring, in a different cup.
11. Lastly, repeat the above steps without using food coloring, in a different cup. This will be the control of the experiment.
12. After 1 week, uncover the experiment and observe changes that have taken place in the various pieces of wood.

Your *Scientist Notebook*

Before the experiment

Write down your *hypothesis*, or what you think will happen.

After the experiment

What physical characteristics of the wood have changed? How did these changes occur?

What part of natural petrification does the food coloring represent in this experiment?

Why were the cups covered with plastic wrap and a rubber band?

How would real petrified wood be different from the petrified wood that you created in the experiment? Why?

Explain the importance of the presence of water for petrification to occur.

What else?

What happens if you try it again, and you change the some of the materials or the "to do" in the experiment? These are called variables. Try introducing new variables into the experiment and observe the changes, if any.

Here are some examples of variables you could change for a new try at the experiment:

- time of burial
- clay instead of sand
- temperature of water
- old chicken bone instead of wood
- salinity of water
- piece of plastic instead of wood

For example, try using a different kind of sand or dirt. Does this change your results? If so, what might this tell you about the best environments for petrification?