

Hands On Earth Science Activity No. 16

Rock Sculpture

This activity can be used to help teach the following Topics and Content Statements for the 2010 Ohio Revised Science Standards and Model Curriculum:

Grade	Content Standard	Topic	Content Statement/Subtopic
Grade 1	Physical Science	Motion and Materials	Properties of objects and materials can change.
Grade 3	Physical Science	Matter and Forms of Energy	Heat, electricity, light and sound are forms of energy.
Grade 4	Physical Science	Electricity, Heat and Matter	Energy can be transformed from one form to another or can be transferred from one location to another.
Grade 6	Physical Science	Matter and Motion	Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion.
Grade 7	Physical Science	Conservation of Mass and Energy	Energy can be transferred through a variety of ways.
Grades 9–12	Physical Science	Study of Matter	<i>Multiple connections</i>
Grades 9–12	Physical Science	Energy and Waves	<i>Multiple connections</i>
Grades 9–12	Chemistry	Interactions of Matter	<i>Multiple connections</i>



Division Of Geological Survey

HANDS ON

EARTH SCIENCE

No. 16

ROCK SCULPTURE

compiled by Merrienne Hackathorn

In this exercise, the students will make a sculpture out of plaster of paris.

Materials needed:

plaster of paris powder (available at building supply stores)
self-sealing plastic bag (quart or gallon size)
water
measuring cup and spoons
waxed paper

To make the rock sculpture:

Pour a cup of plaster of paris powder into the bag. Add a half cup of water. Put one hand in the bag and squeeze the powder and water to mix them. Add water a tablespoon at a time, mixing after each addition, until the mixture looks and feels like thick mashed potatoes. Take a handful of the material and form it into a shape. Simple shapes such as spheres or blocks or pyramids are best. Set the sculpture on a piece of waxed paper. Wait about a half hour. Touch the sculpture gently to see if it has hardened. Gradually, the soft plaster will become rock hard.

The students may think that the plaster hardened because it dried out. To test this hypothesis, make another sculpture but set this one underwater in a bowl or other container. The students will be surprised to see that this sculpture also hardens.

Explanation:

Plaster of paris is powdered rock made from the mineral gypsum, a calcium sulfate mineral whose crystals contain water. The chemical formula for gypsum is $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. If all the water is removed from the gypsum, another calcium sulfate mineral is produced, anhydrite, which means *without water*.

To make plaster of paris, the gypsum is ground up and heated at 190-200°C until about three-fourths of the water evaporates. The resulting material is then powdered and packaged. When water is added to the plaster of paris, the gypsum molecules absorb the water and recrystallize, and the material hardens or “sets.” Because it absorbs the water as part of its crystal structure, the plaster of paris doesn’t “dry out,” and thus still hardens underwater. As the crystals reform, heat is given off. The students may be able to feel this heat while their sculptures are drying.

Plaster of paris gets its name from Paris, France, where gypsum from the soils around the city was first used to make this type of plaster. Another form of gypsum is alabaster. This typically snowy white, translucent, massive variety is used for carving sculptures, especially vases and figurines. Other forms of gypsum of interest to rock and mineral collectors are selenite and satin spar.

Gypsum is produced right here in Ohio. A quarry in Ottawa County mines about 250,000 tons of gypsum per year. All of the gypsum mined in Ohio is used to make drywall.

SOURCES: *Icky squishy science*, by Sandra Markle (1996, Hyperion Paperbacks for Children); *Science activity book*, by Smithsonian Family Learning Project (1987, Galison Books, GMG Publishing); *Dana’s manual of mineralogy*, 14th edition, by Cornelius S. Hurlbut (1971, John Wiley & Sons, Inc.).