

## Mineral Mystery (Grades 2-4) Post-Visit Activities

We hope that you enjoyed your visit to the Children's Science Explorium!

To help reinforce the concepts covered during today's field trip, we have prepared the following activities for you to incorporate into the classroom.

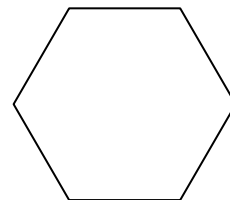
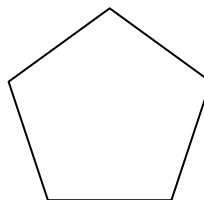
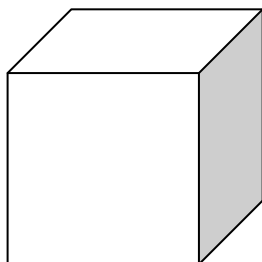
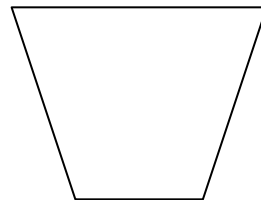
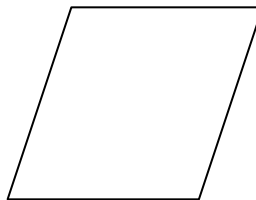
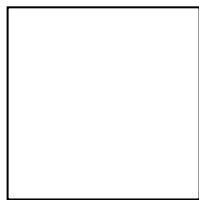
### Vocabulary List and Student Definitions (elementary level):

- **Mineral:** a natural, non-living, solid material found in rocks.
- **Rock:** natural, non-living, solid material made of more than one mineral.
- **Earth:** third planet from the sun that is home to humans and other living things.
- **Crust:** the solid, outermost layer of the Earth
- **Physical Properties:** characteristics that can be observed using the senses
- **Natural:** produced by nature, not made by humans
- **Inorganic:** not alive; non-living
- **Sand:** loose grains of rock or minerals found on beaches, in deserts and in soil.
- **Pebble:** a small round stone that has been worn smooth by wind or water.
- **Soil:** the top layer or the Earth's land surface.
- **Layer:** flat covering over or between others.

### Investigating Crystal Structures:

#### 1. Crystal Formation

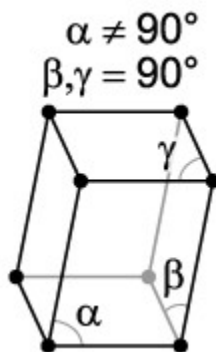
- a. During the program, *Mineral Mystery*, your students investigated the definition of minerals. This activity will help to gain a better understanding of crystal structures in mineral and rock formation.
- b. Using the recipe provided on the following pages investigate how crystals form in a fun and tasty way by making rock candy.
  - i. Crystals form in geometric patterns. These patterns repeat over and over as crystals form.



- ii. Sugar crystals in granulated sugar display a monoclinic form, which means a crystal has three unequal axes (represented below), with one pair not at right angles.

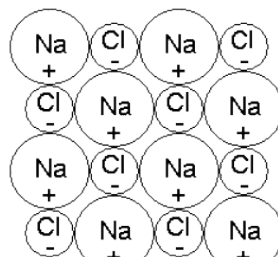
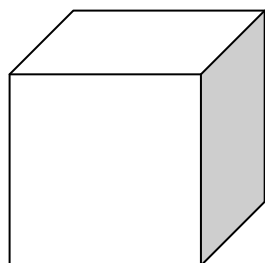


Magnified crystals of sucrose, or table sugar.



Geometric pattern of sucrose crystals.

- iii. The shape can be seen much better in the homegrown large crystals of the candy.
- vi. You will begin your recipe by creating a supersaturated sugar solution, which means you will add as much sugar to dissolve as possible.
- v. As the solution cools, the liquid will begin to evaporate. The solid crystals will remain and begin to grow. Allow at least 24 hours before you see any results. The longer you let the crystals set, the more that will grow.
- c. Epsom Salt Crystals are another fun way to investigate crystal formation. Using the method on the following pages will allow further exploration.
- i. You should allow at least two weeks for this experiment. Again, the longer the salt sets the more crystals that will grow.
  - ii. Salt crystals have a cube shape.



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## **Making Rock Candy**

**Objective:** To explore how crystals form in a fun and tasty way.

### **Rock Candy Materials:**

- 3 cups sugar
- 1 cup water
- Clean glass jar (mason jar)
- Cotton string
- Craft stick or straw
- 3 drops Food coloring (optional)
- ½ teaspoon to 1 teaspoon flavor extract (optional)
- Pan
- Stove or microwave
- Candy thermometer
- Lifesaver candy

### **Rock Candy Method:**

1. Pour the sugar and water into a pan (pour only the water into a microwave-safe dish if using a microwave).
2. Heat the mixture to a boil, stirring constantly. (If heated in a microwave, add sugar to boiling water).
3. Stir the solution until all the sugar has dissolved. The liquid will be clear or straw-colored.
4. Add food coloring and/or flavoring to the solution.
5. Set the pot of sugar syrup in the refrigerator to cool. You want the liquid to cool to about 50 degrees Fahrenheit (slightly cooler than room temperature).
6. While the sugar solution is cooling, tie a string to a craft stick or straw. Lay the stick or straw across the top of a clear, glass jar so that it can rest on the top while the string hangs into the jar, but not touch the sides or bottom.
7. Tie a lifesaver candy to the bottom end of the string so that it serves as a weight.
8. Next, you must “seed” the string with crystals. Simply dampen the string with the sugar solution and then dip in sugar. Or, soak the string in the sugar solution and hang to dry naturally (this method produces “chunkier” crystals).
9. Once the sugar solution has cooled, pour it into the clear jar. Suspend the seeded string in the liquid. Set the jar somewhere secure and dry. Allow at least 24 hours of evaporation to occur. The longer the jar sits, the more crystals that will grow.
10. Allow the crystals to grow for about 3-7 days. Check occasionally, but do not disturb.
11. Carefully, remove any sugar “crust” that forms on the top of the liquid to help the crystals grow.

## Epsom Salt Crystals

**Objective:** To explore how Epsom salt crystals form over an extended period of time.

### Epsom Salt Crystal Materials:

- $\frac{1}{4}$  cup Epsom salt (magnesium sulfate) *This can be purchased in the laundry or pharmacy sections of most stores.*
- $\frac{1}{2}$  cup water
- Shallow bowl or dish
- Sponge (optional)
- Food coloring (optional)

### Making Salt Crystals:

1. Boil the water in a microwave or on the stove.
2. Make observations of the Epsom salt crystals to compare to later results. Use a hand lens or microscope to view the salt crystals in detail.
3. Remove the water from heat and add the Epsom salt. Stir the mixture until the salt is fully dissolved. If desired, add food coloring.
4. Pour the mixture over a piece of sponge (optional) or into a shallow container (The sponge provides an extra surface area to allow the crystals to form). You need just enough liquid to cover the bottom of the container.

Or

Tie a string to a craft stick or straw. Lay the stick or straw across the top of a clear, glass jar so that it can rest on the top while the string hangs into the jar, but not touch the sides or bottom. Dip the string into the solution.

5. Place the container in a warm or sunny location, such as a windowsill. Crystals will form as the water evaporates. This will take a few days. The longer the solution sits the more crystals that will form.



Day 1



Day 7