energy connections

Coal Flowers

Social Studies Connections

Goal: To learn about crystal formation and traditions surrounding coal mining families.

Time: 30 minutes, plus additional time for observation of crystal formation

Materials Needed Per Student

- Shallow glass or plastic bowl
- Pieces of coal* or charcoal briquettes
- Cup or small bowl
- Spoons or stirring stick
- 6 tablespoons salt
- 6 tablespoons laundry bluing**
- 6 tablespoons water
- 1 tablespoon ammonia
- Optional items
  - Glue
  - Twigs or toothpicks
  - Paper or pieces of cloth
  - Food coloring

** Contact the American Coal Foundation for free coal samples at www.teachcoal.org*
*** Found at grocery or hardware stores, or www.mrsstewart.com*

Procedure

1. Explain to the class that making coal flowers is a historic craft from the late 1800s. Mining families with little money to decorate or purchase toys for holidays used common household items and coal to make crystal flowers. Since they resemble snowflakes, coal flowers made without food coloring are great winter decorations, and were often used by mining families throughout their homes.
2. Explain to the students that the coal plays no chemical role in the formation of the crystals. The coal provides a location for the crystals to grow and it was readily available to mining families.
3. Provide the students with the following instructions for growing coal flowers:
   a. Place several small lumps of coal in the shallow bowl.
   b. If desired, glue twigs, toothpicks, paper or pieces of cloth onto the coal.
   c. In a separate cup, mix together the salt, laundry bluing, water, and ammonia.
   d. Pour the mixture over the coal.
   e. Drop dots of food coloring over the coal for a colored effect, if desired.
   f. Place mixture in a safe location. Crystals should begin to form quickly but could take several hours (depending on room temperature and mixture concentration).

Science Extensions

- Repeat the crystallization process with one mixture at room temperature, one under heat lamps (or outside on a warm, sunny day) and one in a refrigerator. Determine what affect temperature has on crystal formation.
- Repeat the crystallization process with different concentrations of the mixture. Determine what affect solution concentration has on crystal formation.