COAL FLOWERS

PURPOSE: To acquaint your students with a quick way of crystal growing. Be sure all students practice good safety habits including wearing goggles and protective (rubber or latex) gloves if handling ammonia.

MATERIALS:

- Shallow glass bowls
- Salt
- Laundry bluing
- Water
- Household Ammonia
- Food Coloring
- Coal Samples (or other substrate if coal is not available)
- Glue
- Twigs or Toothpicks
- Paper Towels
- String/small pieces of cloth
- Paper cups

SAFETY
Household ammonia is a strong and concentrated base, so it is particularly dangerous to the eyes. Wear goggles and protective gloves when handling the household ammonia solution. In a class, the teacher should pour the household ammonia solution.

INSTRUCTIONS:

1. Have students place several small lumps of coal in the glass bowl.

2. Interwork twigs, toothpicks, paper and/or cloth with coal. You may select all or just some of the items available. Some items may require glue to hold in place.

3. In a separate cup mix:

   6 Tablespoons salt — 6 Tablespoons water
   6 Tablespoons laundry bluing — 1 Tablespoon household ammonia

4. After thorough mixing to dissolve all salt, carefully pour the mixture over the coal.

5. Sprinkle dots of food coloring randomly over the mound.

6. Set the bowl aside carefully where it can be watched but not disturbed as the crystals are extremely fragile.

Worksheet:

Have students follow the growth of their flowers on the worksheet.

Evaluation:

What did the crystals form on first? Why? Was there some item in the bowl that crystals did not form on? What effect does the temperature have on the crystal growth and formation?
After a couple of days of growth and students have completed the worksheet have them research the above questions to see if they can find the answers.

Tip: If your local grocery store does not carry bluing check with your local pharmacist.

COAL FLOWER WORKSHEET

Items placed in bowl along with coal:

_____ _____
_____ _____
_____ _____

Colors if any used: _____ _____ _____ _____

Date and Time Started:_____

Date and Time Ended:_____

Average Temperature _____

Where did crystals first appear? _____

Items crystals completely covered? _____
_____

Items no crystals formed on _____

What colors were most vivid? _____

What other items might be used? _____

What effect do you think the temperature of the area the bowl was located in had on the rate of the crystal growth? _____

Why? _____

Check bowl about every two hours to note observations.

INTERESTING NOTES: The red dye #40 breaks down faster than other colors, therefore the red crystals (flowers) are not as bright as say the blue.
This exercise does much better in warm weather than cold weather. The crystals form quicker and the colors are more vivid due to faster evaporation time.
For other information see Mrs. Stewart's website: www.mrsstewart.com