


Name _____

Geodes



Goggles & Aprons must be on for the entire investigation.
Alum may irritate your skin; wash your hands if you touch it.
Use extreme care around the boiling water.

Background Information: Minerals are solids that have a repeating pattern of atoms and can form crystals. One way crystals form is from a solution of water and dissolved minerals.

Many rocks and minerals contain crystals within their structure. Crystals usually form when rocks are heated then cool slowly. Crystals can also be grown from other crystals. No two crystals ever grow the same way.

A geode is a sphere shaped rock which contains a hollow cavity lined with crystals.

Geodes begin as bubbles in volcanic rock or as animal burrows, tree roots or mud balls in sedimentary rock. Over time, the outer shell of the spherical shape hardens, and water containing minerals forms on the inside walls of the hollow cavity within the geode. The most common mineral found in geodes is quartz, but amethyst and calcite are also found.

Purpose: To model the formation of crystals in a geode

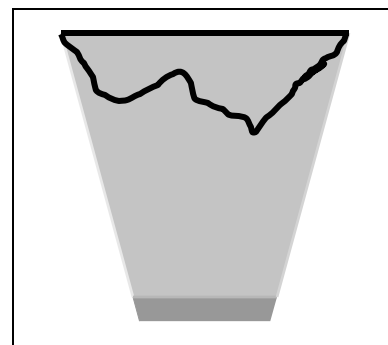
Materials:

Aluminum foil	Plastic cup	Graduated cylinder
50 mL alum	Boiling water	Scissors
Ruler	Stirring rod	Large beaker (250mL)
Hand lens		

Procedure:

1. Cut a piece of foil about 15 cm square.
2. Make dish out of the foil, being careful not to poke holes in the foil.

3. Place the foil "dish" on top of the cup as shown. The foil should form a hollow area in the cup.
4. Use the graduated cylinder to measure out 50mL of alum.
5. Use the hand lens to observe the alum. Record your observations.
6. Place the alum in a large beaker.
7. **CAREFULLY** pour 150 mL of boiling water into the beaker.
8. Stir for 3 minutes to dissolve most of the alum.
9. Pour about 100 mL of the alum and water solution in to the foil dish you made in step 1.
10. Leave about 50 mL of the alum and water solution and any un-dissolved alum in the beaker.
11. Place the beaker next to the cup and foil dish and allow both solutions to cool. Do not disturb the solutions while they are cooling.
12. After 15 minutes sprinkle a *small* amount of alum over the surfaces of both solutions.
13. Observe the containers. Record your observations.
14. Let the crystals sit overnight.
15. After the crystals have sat overnight, carefully pour out the remaining solution and let the crystals dry.
16. Draw the crystals. Describe the appearance of the crystals.

**Data:**

Observations		
Alum		
As crystals are forming		
After solutions have sat overnight	Drawing	Description

Conclusions:

1. What is the geometric shape of the alum crystals?
2. Use the graphic organizer below to compare and contrast the model geode and an actual geode.

