**Borax Snow Crystals**



Materials:

* Beaker
* Pipe Cleaner
* String
* Borax powder (sodium borate)
* Water
* Hotplate
* Stirring Rod

Procedure:

* Put your name on the beaker with a sharpie
* Bring a beaker of water to a boil. For a 250 mL beaker, add 4-5 heaping spoons full of borax and stir until dissolved. Adjust amount of borax according to beaker size
* Shape the pipe cleaner into any desired form, such as a heart, star, or Christmas tree, taking care that it is small enough to not touch the sides of the beaker when immersed.
* Attach your design to a stirring rod with a string.
* Dip the pipe cleaner in the solution and let it sit overnight, suspended from the rod and string. In the morning, the pipe cleaner will be transformed into a unique ornament that looks great on gift boxes or the tree.

Concepts:

* Supersaturated solutions and seed crystals
  + By heating the water and dissolving the borax, you are able to dissolve more borax than what is normally possible at room temperature. As the solution cools, the solution is supersaturated until a seed crystal or other disturbance, such as your pipe cleaner, is added. Crystals of sodium borate will start to form on the pipe cleaner. The pipe cleaner is a great surface for crystal formation because it has so much surface area on each little fiber.
* Formation of crystal size (earth science)
  + Sodium borate forms a particularly shaped crystal but the crystal can vary in size based on the speed at which the solution cools. The faster the solution cools, the smaller the crystals because they don’t have as much time to organize themselves. Slow-cooling solutions will tend to have larger crystals. This is similar to when igneous rocks (rocks from volcanic activity) form. Rocks on the earth’s surface cool quickly and will have small crystals, like obsidian, whereas rocks that cool within the earth tend to have larger crystals, like granite, because they take longer to cool.

Comments:

This lab is great to use as a fun activity for younger students, and older students may appreciate the connection to the science classes. You can also vary the procedure and make it more inquiry by asking students to design a lab and vary one of the factors to see if they can make the BEST ornament. They could change the amount of sodium borate, the temperature of the water, the speed of the cooling, the type of pipe cleaner, etc.

You can change the color of the crystals by adding food coloring to the supersaturated mixture as well as using colored pipe cleaners.