

# DIY SCI: Crystalline Chemistry

## What is it?

Looking for the perfect gift this holiday season? Why not give the gift of SCIENTIFIC DISCOVERY?! This festive activity will walk you through how to create mesmerizing crystal sculptures and ornaments out of simple materials you may already have around the house. With some creativity this chemistry experiment can make for a great STEM stocking stuffer!

## What you need

- Borax (can usually be found in the laundry detergent aisle)
- Distilled water
- Kettle or other method of boiling
- Glass jar
- Pipe cleaners
- Popsicle stick
- Food coloring (*optional*)
- Spray on clear coat enamel (*optional*)



## How to make it:

1. Create a simple outline or sculpture out of pipe cleaners- this will serve as the basic shape for our crystal creation. Ensure that your sculpture fits in the glass container (without touching the sides or bottom).
2. Use a string or additional pipe cleaner to form a hook/loop coming out of the top of the container. Suspend your pipe cleaners by hanging this loop from a pencil or popsicle stick sitting on top. Remove your sculpture for now.
3. Fill the (clean) glass container with distilled water, noting the amount required to do this. Using a separate (heatproof!) container, boil the water.
4. Remove the boiling water from the heating source and mix in 3tbsp Borax for each cup of water (for example: 2 cups of water \* 3tbsp per cup = 6 tbsp total). Stir the water until the Borax is mostly dissolved- there may be some left in powder form at the bottom of the container but the mixture should be on the verge of starting to be cloudy. Add food coloring if desired.
5. Pour your Borax and water solution into the glass container carefully. Lower your suspended pipe cleaner sculpture into the hot water until it is completely submerged.
6. Wait 18-24 hours, allowing the water to cool and crystals to form. If crystals don't form, try adding more borax and/or storing the solution in a different location (temperature, vibration can cause issues).
7. If desired, spray sculpture with a layer of clear coat on both the front and back to add durability. Apply additional decorations and string or a hook to hang as a holiday decoration!



**What do you notice?**

Borax, also known as sodium borate, sodium tetraborate, or disodium tetraborate, is a mineral that can be found naturally in crystal form. This compound is commonly used in cleaning products and detergents, which are sold in powder form. This powder can be easily dissolved in boiling water, which saturates the water with Borax and leaves the powder suspended. This new mixture is called a “saturated solution”.

As the water cools, the Borax deposits itself on the pipe cleaners while the impurities in the compound fall to the bottom of the glass. If cooled slowly, these crystals will have a strongly defined and uniform shape; if the process happens too quickly, you may find yourself with unstable and varying crystalline structures!

**Additional Questions**

- Why do you think some substances dissolve in water and others do not?
- Why does the solution separate? What changes over the course of the experiment?
- What makes a “crystal” a crystal? What do you think is the definition? Are there different types of crystals?

**Clean up instructions**

- If there is any hardened borax leftover from the experiment, boil water and pour it into the container that was used for the experiment. Using a stirring rod (ex: plastic spoon/fork) and stir to dissolve the remaining borax. Pour the waste away when it's a bit cooler and rinse the container to get rid of any toxins.

