

# Laundry Soap Crystals

**Overview:** Crystals are formed when atoms line up in patterns and solidify. There are crystals everywhere — in the form of salt, sugar, sand, diamonds, quartz, and many more!

**What to Learn:** To make crystals, you need to make a very special kind of solution called a supersaturated solid solution. Here's what that means: If you add salt by the spoonful to a cup of water, you'll reach a point where the salt doesn't disappear (dissolve) anymore and forms a lump at the bottom of the glass. The point at which it begins to form a lump is just past the point of saturation. If you heat up the saltwater, the lump disappears. You can now add more and more salt, until it can't take any more (you'll see another lump starting to form at the bottom). This is now a supersaturated solid solution. Mix in a bit of water to make the lump disappear. Your solution is ready for making crystals.

## Materials

- pipe cleaners (or string or skewer)
- cleaned-out pickle, jam, or mayo jar
- water
- borax (*AKA sodium tetraborate*)
- adult help, stove, pan, and stirring spoon

## Lab Time

1. Cut a length of string and tie it to your pipe cleaner shape; tie the other end around a pencil or wooden skewer. You want the shape suspended in the jar, not touching the bottom or sides.
2. Bring enough water to fill the jar (at least 2 cups) to a boil on the stove (food coloring is fun, but entirely optional).
3. Add 1 cup of borax (aka sodium tetraborate or sodium borate) to the solution, stirring to dissolve. If there are no bits settling to the bottom, add another spoonful and stir until you cannot dissolve any more borax into the solution. When you see bits of undissolved borax at the bottom, the solution is ready. You have made a supersaturated solution. Make sure your solution is saturated, or your crystals will not grow.

Note: You'll be adding in a lot of borax, which is why you got a full box.

4. Wait until your solution has cooled to about 130°F (hot to the touch, but not so hot that you yank your hand away).
5. Pour this solution (just the liquid, not the solid bits) into the jar with the shape. Put the jar in a place where the crystals can grow undisturbed overnight, or even for a few days. Warmer locations (such as upstairs or on top shelves) is best.
6. This is probably obvious, but don't eat these! Keep them away from small children and pets, because they look a lot like sugar crystals or rock candy.

# Laundry Soap Crystals Observations

Time	Estimated Number of Crystals	Drawing
1 day		
2 days		
5 days		

## Exercises

- What is the point at which no more solids can be dissolved in a liquid?
  - Solid
  - Supersaturated
  - Soluble
  - Liquefied
- Which mineral do we see forming a crystal in today's experiment?
  - Table salt
  - Sugar
  - Sodium Tetraborate
  - We did not use a mineral

**Answers to Exercises: Laundry Soap Crystals**

1. What is the point at which no more solids can be dissolved in a liquid? (supersaturated)
2. Which mineral do we see forming a crystal in today's experiment? (sodium tetraborate)