Fun with CRYSTALS

Grow glittering crystals from a saturated solution.

What do a big flashy diamond, a perfect snowflake, and a grain of sugar have in common? All three are examples of crystals, nature's most bedazzling creation. This experiment demonstrates how cooling and evaporation can force crystals out of a saturated solution. It takes some patience, but it's worth it. After all, you get to eat the results!

MATERIALS*

- Pint-size (or 12-ounce) mason jar
- 2 wooden skewers, sharp tips broken off
- Medium pot
- 1 cup water
- 3 cups white sugar
- Spoon or other stirrer
- Food coloring (optional)
- Spring clothespins

**This formula makes two skewers. To make more, just increase the amounts of water and sugar.*

SAFETY FIRST: This experiment requires using a hot stovetop. Be sure an adult is present.

INSTRUCTIONS

1. Heat the water in the pot until it starts to boil.
2. Slowly add the sugar to the boiling water, half a cup at a time, stirring between additions to dissolve the sugar. The syrup will be cloudy at first, but keep cooking and stirring until it turns clear. Once that happens, remove the pot from the heat and let the syrup cool for 15 to 20 minutes.
3. Prepare the skewers by soaking them in the hot syrup, then coating them with dry sugar and setting them on a plate to dry while the syrup cools. Using raw or turbinado sugar, which are both coarser than white sugar, may give a better result.
4. Carefully pour the cooled syrup into the jar, filling it at least halfway but leaving an inch or so at the top. Stir in several drops of food coloring, if you like.

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Crystallized sugar, or rock candy, has a long history, dating back more than a thousand years. It is believed to have originated in Iran, where the first candy makers grew their sugar crystals on twigs and colored them with natural dyes made from plants and insects.

5 Place the coated skewers in the jar, clipping them in place with a clothespin set across the mouth. The skewers should be about an inch from the bottom of the jar, and should not touch the sides.

6 Place the jars where they can sit undisturbed for at least a week.

What to Watch For

Crystals should begin to form on the skewers overnight, but it may take longer. Over the next few days, as the water in the solution evaporates, the crystals should continue to grow and solidify. If a crust forms on the surface of the syrup, carefully break it and remove the pieces. When the crystals are big enough, usually after a week or longer, remove the skewers and set them on a plate to dry.

What's Going On

Sucrose, or table sugar, is a crystal, which means its molecules fit together in an orderly pattern and it has a distinctive shape (grains of sugar, for example, are cubes with flat sides). Salt and diamonds are also crystals (for more, see String of Stalactites, page 46).

When you add sugar to water, the crystals dissolve to form a solution. Heating the solution lets you dissolve still more sugar, because hot water can hold more dissolved sugar than cold, but at a certain point the solution becomes saturated, meaning no more crystals will dissolve into it.

As the saturated solution cools and the water starts to evaporate over time, the crystals start to precipitate, or come out of the solution. They look for something to form onto (called a nucleation site), such as the sugar-coated skewer, and return to their original crystal shape.