Kitchen Crystals: Rock Candy

DISCOVERY WORLD @HOME

Introduction

Crystals are usually shiny minerals like quartz and amethyst, but table salt, white sugar, and even the ice that forms on the sides of the freezer are also crystals. In this experiment, use granulated sugar to grow crystals that you can eat!

Think About This

How do crystals form?

Materials

- ☐ A tall glass, cup, or jar, such as a water glass or washed-out sauce jar
- ☐ A stove or hot plate
  - Requires adult supervision and assistance
- ☐ A sauce pan
- ☐ Something to stir with
- ☐ A wooden skewer
  - Alternatives: popsicle stick, string, or thread
- ☐ A clothespin or other large clip
- ☐ 3 cups of white, granulated sugar
- ☐ 1 cup of water
- ☐ Food coloring (optional)
- ☐ Sheet of paper
- ☐ Pencil

Do Ahead of Time

- Dip the skewer or string in water and roll it in sugar—this will form seed crystals. Let it dry for at least an hour. If using string instead of a skewer, let it dry for at least a day.
- Divide a piece of paper into 4 columns to make a data sheet to record your crystal growth observations. Each day, record where you observe crystal growth or changes. Look at the skewer, on the sides and bottom of the of the jar, and on the surface of the liquid.

Crystal Growth	On skewer or string?	On sides and bottom of jar?	On surface of the liquid?
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
Day 7			

Directions

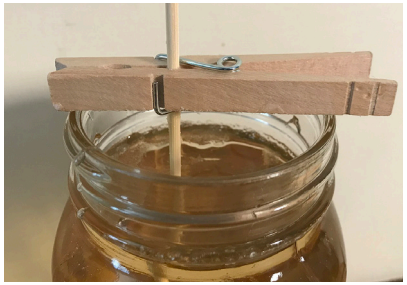
Use a stick or string coated in seed crystals to grow your own rock candy from a concentrated sugar solution.

Adult assistance required.

1. Pour one cup of water into a saucepan, place on a burner, and turn the stove on to medium high.
2. Add sugar one cup at a time, stirring until it is totally dissolved before adding the next cup.
3. Continue stirring the sugar on the stove until the solution is boiling and all of the sugar is dissolved. As soon as the solution hits a rolling boil, remove it from heat and turn off the burner.
   - **a.** Now is the time to add food coloring, if desired. Add a few drops while stirring.

Kitchen Crystals: Rock Candy Continued

4. Move the saucepan to the side and allow to cool for 10-20 minutes.
5. Pour the thick sugar solution into a jar or cup and wait for it to cool to room temperature (around an hour).
6. Suspend the sugary skewer in the jar using the clothespin or clip so that it does not touch the bottom or sides. If using string instead of a skewer, tie the top of the string to a pencil and lay the pencil across the top of the jar.



7. Allow the solution to sit for 7 days. Check on the crystal growth once a day and record your observations on your data sheet.
8. After 7 days, remove the rock candy. You may need to use a knife or spoon to crack open a layer of solidified sugar at the top of the jar. After removing the rock candy from the sugar solution, let it hang upside down over a bowl, glass, or the sink to drip dry.
9. Enjoy your edible experiment!

Troubleshooting

If your seed crystals fall off when the skewer is placed in the sugar solution...

The skewer either wasn't dry enough or the solution was still too hot when the skewer went in. Make another skewer by wetting it and rolling in sugar and allow it to dry completely. Make sure the sugar solution is close to room temperature when the skewer is inserted.

If there is no sign of crystal growth after 24 hours...

There might not have been quite enough sugar—granulated sugar can differ slightly by brand. Pour the solution back into the sauce pan, add another half cup of sugar, stir until sugar is dissolved and bring to a boil, and repeat steps 3-7.

If the whole jar solidified...

The sugar solution boiled for too long! To remove the solidified sugar from the jar, run it under hot water in the sink and chip away at it with a fork. If the solution has solidified the activity will need to be restarted.

What's Happening?

A crystal is any solid with an ordered pattern to its atoms and molecules. Sugar is an example of a crystalline solid.

To force the crystals to grow, you created a supersaturated solution, a liquid that holds more dissolved stuff than it normally does. Hot water can dissolve and hold more sugar than cold water can. As the solution cooled, the water lost its ability to hold all of that sugar. As the sugar left the solution, it gathered onto the seed crystals, forming more and larger crystals. Some sugar crystalized on the sides and bottom of the jar because of microscopic scratches that give the crystals a place to form.

Over time, water begins to evaporate from the jar, causing more sugar to leave the solution, and the crystals to continue to grow. Evaporating the water away from what is dissolved inside is the way that sea salt is harvested for us to use.

Take it Further

You can grow large crystals with other crystalline solids in your kitchen! Repeat the experiment using 1 cup of salt instead of 3 cups of sugar to grow salt crystals. How are they similar to the sugar crystals? How are they different?