

Name _____

Rock Candy Crystals

Purpose:

1. Collect data by observing and measuring

Background Information: A crystal is a body that is formed by the solidification of a chemical element and has a regular repeating sequence of atoms. It has flat surfaces and is often transparent. Crystals can grow larger in microgravity because they are not crushed by their own weight. They are very fragile and break easily on Earth. Crystals of all kinds show regular patterns in their shapes. A small version of a crystal has the same shape as a large crystal of the same substance. Until they run out of space or materials to continue growing, crystals keep a constant shape.

One way crystals form is out of solutions that contain dissolved material. Crystals cannot grow unless the liquid is **supersaturated**.

Hot water holds more crystals than cold water. That's because heated water molecules move farther apart, making room for more of the crystals to dissolve. When no more of the solution can be dissolved, you have reached saturation. As this solution cools, the water molecules move closer together again. There's less room for the solution to hold onto as much of the dissolved sugar. Crystals begin to form and build on one another as the water lets go of the excess and evaporates.

Rock candy is a very simple hard candy made by allowing a **supersaturated** sugar syrup to **evaporate** slowly (sometimes for up to a week), during which time the sugar **crystallizes** into chunks. The crystals can be formed around any rough surface; strings or small sticks are most commonly used. Food color can be added to create a wide variety of interesting crystals.

Crystal Formation occurs when the sugar can no longer stay dissolved - this occurs when the solution cools. Crystals need a site for formation and any rough surface will do: string, wooden sticks, just about anything (including the sides of the container). As the crystal forms, imperfections can be taken up and incorporated into the crystal lattice structure. Food coloring can get into the cracks and is used to make colored crystals.

Materials:

Hot plate	Sauce pan	Water
Sugar	String	Large cup
Spoon	Food coloring	Flavoring
Craft stick	Marker	Hand lens

Procedure:

1. Use a hand lens to observe crystals of sugar. Draw what you observe in the data section.
2. Use a marker to put your name on the cup.
3. Tie one end of the piece of string around the middle of the craft stick.
4. Cut the string, if necessary, so that it is a little shorter than your cup.
5. Moisten the string with a little water and roll it in the sugar.
6. Tie a knot in the end of the string to help it hang straight down.
7. Lay the stick over the top of the cup so that the string hangs down inside the cup. The end of the string should not touch the bottom of the cup.
8. Put on your goggles.
9. Put 1 cup water into the sauce pan and heat until it boils.
10. Add 2 cups of sugar to the boiling water while stirring. Keep stirring until the sugar dissolves.
11. Keep adding sugar until no more will dissolve.
12. Remove pan from heat. If you want to add flavoring or color, stir it in now.
13. Pour the hot mixture into the cup.
14. Let the sugar water sit for a few days where no one will bother it.
15. After the crystals have formed, observe them with a hand lens.
16. Record your observations with a diagram.

Data:

<i>Diagram Sugar Crystals</i>	<i>Diagram Rock Candy Crystals</i>

Conclusion:

Read the article "*Building Blocks of Life.*" Answer the following questions:

1. What are proteins? Describe them.
2. Why are scientists studying protein crystals; what can they do with the information?
3. What are crystals being grown in space?
4. How are these experiments useful?