



## Curiosity Guide #308

### Candy Science

Accompanies Curious Crew, Season 3, Episode 8 (#308)

#### Making Sugar Stained Glass

STEM Challenge

#### Description

Use candy chemistry to create sugar glass!

#### Materials

- Imperial sugar
- Dixie Crystals sugar
- Hot plate
- Food coloring
- Cream of Tartar
- Candy thermometer
- Light corn syrup
- Disposable aluminum pan with 2-inch sides
- Water
- Measuring cup
- One-eighth teaspoon measure
- Spoon
- Hot mitts
- Non-stick spray

#### Procedure

- 1) Measure 1 and  $\frac{3}{4}$  cups of Dixie Crystals sugar. Pour into the metal pan.
- 2) Measure 1 cup of water. Add water to the pan.
- 3) Measure  $\frac{1}{2}$  cup of corn syrup. Add the corn syrup to the pan.

- 4) Measure one-eighth teaspoon of Cream of Tartar. Add to the pan.
- 5) Stir the ingredients together with a spoon.
- 6) Place the metal pan on the hot plate.
- 7) While stirring the solution, slowly raise the temperature of the hot plate to a low boil.
- 8) Continue to stir.
- 9) While slowly boiling, place the candy thermometer in the solution.
- 10) Adjust the hot plate to bring the temperature of the solution to a range of 300 to 310 degrees Fahrenheit.
- 11) Spray the aluminum pan with a non-stick spray so that the dried glass comes out when cool.
- 12) Pour the syrup solution into the aluminum pan.
- 13) Add drops of different colors of food coloring at different places in the solution.
- 14) Gently paint the food coloring throughout the solution with the back of the spoon.
- 15) Allow the solution to cool.
- 16) Remove the cooled solution from the aluminum pan by tipping the pan over carefully.

## My Results

## Explanation

When the sugar solution has reached a temperature of 300 to 310 degrees Fahrenheit, much of the water has been boiled out, leaving a high sugar concentration. This stage is called the "hard crack" phase in the candy-making process. The corn syrup in the solution prevents the sugar from crystalizing when the solution cools. The Cream of Tartar separates the complex sugar into fructose and glucose. The food coloring spreads throughout the liquid solution, and the colors solidify in place when cooled. The final stained glass will let light through in a lovely manner, as well as serve as a tasty treat.

If heated too high, all of the water would be gone and the sugar would caramelize and change color. This happens at 338 degrees Fahrenheit, when the sugar breaks down as well.

**Extend your learning:** Making sugar glass is an interesting challenge. Even though sugar glass resembles real glass, it is much easier to make and tastes a lot better, too! Sugar glass is also much more fragile than real glass. Have you ever seen a movie where someone breaks a glass bottle? Those bottles are usually made from sugar glass! The movie bottles break very easily. When each bottle is made, a sugar-glass solution is poured into a mold so that the dried glass looks like a real bottle. I wonder what molds you could shape to make your own sugar glass. Try it!

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