Please mute your microphones.
You may keep your video on if you wish.
We will begin shortly.

Thank you.

FYS

Rock Candy

Chemistry

Materials

***Need access to a stove**

Sugar (approx. 2-3 cups)

Water (approx 1 cup)

Skewers/popsicle

Jar/Glass

Saucepan

Clothespins

Food coloring

Candy flavoring

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Let's Think:

Two classes ago, we talked about homogeneous mixtures. Do you remember what they are?

Solutions

- Solutions are one type of homogeneous mixture.
- Solutions contain two substances: a **solute** and a **solvent**.
- The **solute** is the **substance that is dissolved** in the solvent.
- *If we have salt in water, which is the solute? Which is the solvent?*

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Let’s Think:

When it’s raining outside, what happens to the dirt?

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Let’s Think:

But when it rains really heavily and the ground can’t hold any more water, what happens?

Saturation

- If you mix salt in water, it dissolves. *But what if you put a lot of salt?*
- There is a **limit** to how much salt the water can hold, just like the mud we talked about.
- So, after a point, the water **cannot dissolve any more salt**, and the extra salt will not dissolve.

Saturated Solutions

- The point at which the water can’t dissolve any more salt is called its **saturation point**.
- After this, when you add extra salt, we call it a **supersaturated solution**.
- Solvents can hold a greater amount of solute when they’re hot.
- So if we have really hot water, we can dissolve a lot of sugar in it.
- But then what happens when the water cools down? The sugar will **crystallize**!


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Questions?

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Let's Think:

How can we model what we just learned in order to make some yummy rock candy?

Materials

***Need access to a stove**

Sugar (approx. 2-3 cups)

Water (approx 1 cup)

Skewers/popsicle

Jar/Glass

Saucepan

Clothespins

Food coloring

Candy flavoring

Procedure

1. Combine equal parts of sugar and water in a saucepan and heat until all of the sugar is dissolved (can start with 1 cup of each).
2. Then, **slowly** add more sugar (remaining 2 cups) and mix, slowly adding more sugar and mixing until the sugar will no longer dissolve in the water.
3. The water should start to look a little cloudy. That is when you know that no more sugar is dissolving and the perfect sugar-saturation has been reached.
4. The amount of sugar vs. water used should be roughly 3:1 now.
5. Add candy flavoring and food coloring if desired, and then continue to heat the water until it comes to a simmer.
6. Remove the sugar-water from the heat and allow it to cool.
7. While its cooling, let’s prepare the candy sticks and the jars.

Preparing the Candy Sticks

1. Cut the skewers to a desirable size for the jar(s) that you are using. Then, dip the sticks in water and roll them in sugar.
2. Set the sugar-coated sticks aside and allow them to dry.

The process that is about to happen is called **crystallization**. Can you think of any other examples we see in our lives that seems similar?

Crystallization

Crystallization is a process where molecules of a substance come together to form a solid, organized structure called a crystal.

For our rock candy, the sugar dissolves in the water, creating a sweet solution. When the water cools down, it can no longer hold all the sugar (due to saturation!), and some of the sugar molecules start to come together and stick to each other.

Crystallization (cont.)

The sugar molecules will then form tiny seed crystals on the stick that we place in the sugar-water solution.

These seed crystals act as a starting point for more sugar molecules that were in the solution to join and grow the crystal structure.

If you leave a cup of water out, in a few days, will the amount of water remain the same?

No, with the right temperature, it will evaporate! So as the water goes up into the air, more sugar molecules will attach to the crystals on the stick, making the crystals bigger and more visible.

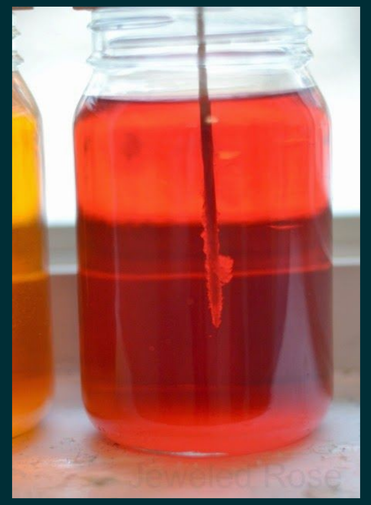
Preparing the Jars

1. Once your sugar-water is cool enough pour it into a jar.
2. **Once the sticks are dry**, put a clothespin on top and carefully place them into the jar(s). An example of what this should look like will be on the next slide.

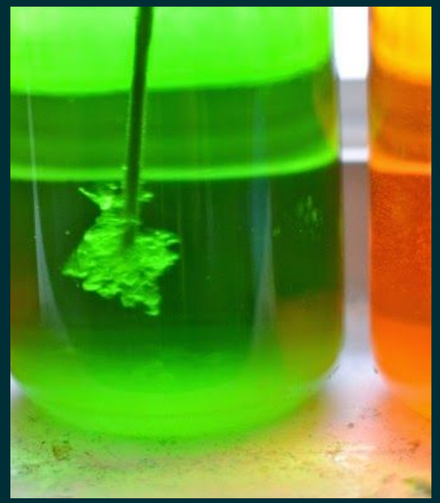

Jeweled Rose

The Experiment!

Now's the tough part: waiting! We have to sit back and observe these jars. Here are a few sample pictures of what it should look like. Don't take it out of the jars, just let it sit. Wait all 7 days to get the most candy!



1 day



3 days

5 days

7 days

Since our next class is in a week, you can show us the progress of your rock candy before you take it out!

Let’s move on to some reflection questions!

Reflection Questions

1. Were there any factors that might have influenced the crystal growth, such as temperature or stirring? How can we find out?
2. If you were to conduct this experiment again, what changes or improvements would you make?
3. How does this experiment help us understand the concept of saturation in a solution?
4. Even though you have to wait a week, did you have fun learning today?

See you all next week!

Visit our website, **futureforyoungscientists.org**.

If you have any photos from this week, please share these with us by email (futureforyoungscientists@gmail.com) or Facebook, as we would like to be able to share everyone's experience.