Rock Candy
4th Grade

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References:

- Rock candy recipe and lesson found online: www.exploratorium.edu/cooking/candy/recipe-rockcandy.html

Benchmarks:

SLC/GLI #: PS-1

Objectives:

The objective of this lesson is to demonstrate the physical change of dissolving something (sugar in water) and evaporating the water to show that only a physical change has occurred and that the original materials can be recovered. This lesson is a fun example of this type of physical change because the students get to make rock candy in the process.

Materials:

- Sugar and water in a 2:1 solution (two parts sugar, one part water)
- Measuring cups
- Popsicle sticks
- String
- Saucepan
- Jar or glass to hold solution

Initial Demonstration:

Introduce physical changes and solutions. Use salt mixed with water and sugar mixed with water. Have the students taste both the water and sugar and/or salt before and after you mix them. Ask them if the final solution tastes like a combination of the initial ingredients or something completely different. This is one characteristic of a physical change – the constituents themselves did not change. Next tell them how physical changes are reversible and see if they can figure out how you can recover the salt or sugar from the water solution. Then tell them that they are going to discover how this works by making candy.

Target Observations:

- Dissolving a solute in a solution is an example of a physical change.
- Physical changes can by reversed, and this type of physical change can be reversed by evaporating the solvent so that you are left with the solute again.

Procedure:

1.) Heat the water in the saucepan over medium-high heat until it comes to a boil.
2.) Completely dissolve the sugar in the boiling water, stirring continuously with the wooden spoon until the solution grows clear and it reaches a rolling boil.
3.) Remove the solution from the heat, and then carefully pour it into the jar. Cover the jar with a small piece of waxed paper.
4.) Tie the weight to one end of the string, and then tie the other end to the middle of the popsicle stick. The string should be about two-thirds as long as the jar is deep. Dip the string into the sugar solution, remove it, lay it on a piece of waxed paper, straighten it out, and let it dry for a few days.
5.) Gently suspend the prepared string in the solution and let it sit at room temperature, undisturbed, for several days. You can check each day to see how much your crystals have grown. It's tempting, but don't touch the jar until the experiment is finished – it usually takes about seven days.

Target Observations:

- Students should see that the sugar dissolved in the water, and they should expect that after they come back from winter break (we did this the last class before break), they will observe the sugar that was recovered after the water evaporated because they know that this is a physical change.

Target Revised Model:

- Students should conclude that dissolving sugar in water is a physical change because after the water evaporates after several days, they're left with the sugar again, a characteristic of a physical change

Summary:

The objective of this lesson was to teach physical changes while making something fun, like candy before the students leave for winter break. They learned what a physical change is, and that dissolving a solute in a solvent is an example of this because the solute can be recovered if the solvent is evaporated. To show this, we made rock candy by supersaturating water with sugar, coloring it with Kool-aid, and leaving the solution to evaporate while they're away from school during winter break. When they come back, they should see evidence of the physical change because they will have recovered the sugar when the water evaporates over those two weeks.