ACTIVITY 4: MAKE SIMPLE SYRUP

The purpose of this experiment is for students to model the process by which sap is turned into syrup by making simple syrup, which is a common sweetener that is often used in desserts or beverages.

Materials:

- A 500mL beaker or a 1qt saucepan
- A hotplate or other heat source
- Measuring cups or an electronic balance
- 1 cup of granulated sugar (approx. 200g)
- 1 cup of water (approx. 240mL)

First, inform students that they will be working with a group to model model the process by which sap is made into syrup.

You may wish to explain the science behind it first. It's a process known in cooking as reduction, or in science as concentration, whereby a solution of sugar and water has some of the water removed by boiling it off, leaving behind the sugar and less water. The process eventually reduces the amount of water, but maintains the same amount of sugar, which increases the density of the solution thickening it until it reaches a desired concentration and consistency more like syrup.

Procedure:

1. In the beaker or a small saucepan, combine the sugar and water.
2. Mix the solution until the sugar is mostly dissolved. It won't all dissolve.
3. Heat the mixture over medium heat, stirring occasionally, until the sugar is completely dissolved.
4. Bring the mixture to a boil and let it boil for 1 minute.
5. Remove from the heat and let it cool completely.
6. Once the simple syrup has cooled, it is ready to use.

It's important to consider what's happening at the smallest possible level here: heating the water transfers energy to the molecules, making the water molecules faster and move farther away from each other. With more space in between them, more sugar molecules can be dissolved than would happen at room temperature (e.g., a saturated solution). This addition of extra dissolved sugar by heating is called a super-saturated solution. As the temperature increases water begins to boil off, but the sugars also begin themselves to change. Larger sugar molecules like sucrose get broken down into smaller ones, such as fructose or glucose. The result is more sugar in less water, which gives a thicker sweeter-tasting solution that we call syrup.

Teaching Tip:

Celebrate the completion of this experiment by enjoying the simple syrup over a dessert like fresh fruit, angel food cake, or on sorbet.