

Making Maple Syrup at Home

Name: _____

Maple syrup is a solution that comes from Maple trees in Northern areas where the sugar maple tree grows well. Sap has been harvested for hundreds of years. It starts out as a **dilute solution** from the tree and is collected and made into a **concentrated solution** or syrup by the process of removing the **solvent** (water) through evaporation. The **solute** is sugar and other **dissolved particles** from the tree and this is what gives Maple Syrup its sweetness and distinctive flavour. If we take out all of the solvent (water), the sap solution will become just solute or Maple Sugar.

Using this scientific understanding, we can reverse the process to make a concentrated solution of sugar and flavouring that would resemble Maple Syrup!

Materials:

Brown Sugar	2 cups (475 mL)
Water	$\frac{3}{4}$ cup (180 mL)
Maple Extract	$\frac{1}{2}$ teaspoon (~2 $\frac{1}{2}$ mL)

Pot, hotplate, stirring spoon, measuring cups.

Method:

1. Measure water and brown sugar into pot and heat to near boiling
2. Remove from heat and stir in maple extract (vanilla extract also works)
3. Let cool and enjoy
4. Store in a closed container in a refrigerator

Questions:

Why do we heat the solution?

It increases the rate of dissolving and it also increases the solubility of sugar in water.

What can you say about the solubility of sugar in water?

Sugar is highly soluble in water (you can dissolve a lot of it in water).

Do you think that salt would dissolve as easily? Why?

Answers may vary (Fact: salt has a much lower solubility than sugar).

The amount of solute in the solvent is a measure of the CONCENTRATION of the solution. When there is only a little solute in the solvent, we call the solution DILUTE and when there is a lot, we call the solution CONCENTRATED.

When the solution has as much of the solute that it can dissolve, we call the solution SATURATED.

There is a given amount of solute that can dissolve in a given solution at a given temperature and pressure. This is known as the SATURATION POINT.

In special circumstances, when a substance has more solute in the solution, the solution is known as SUPER SATURATED. The solute then comes out of solution through PRECIPITATION or CRYSTAL growth.

When a substance does not dissolve in a solvent, we call this INSOLUBLE.

In making Maple syrup

- This sweet product is a solution.
- The solvent is water
- The solute is Sugar and flavour chemicals
- Initially, when tapped, it is Dilute
- When much of the water is boiled off (1/40), the maple sugar is Concentrated and becomes sweeter.
- If all the water is carefully boiled off you get Hard Candy or crystals

