

**LESSON**  
**80**

LAB

# Bearly Alive

## Solution Concentration

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### Purpose

To explore solutions and the concentration of dissolved solids in solution.

### Materials

- sugar,  $C_{12}H_{22}O_{11}$ , ~60 g
- salt, NaCl, ~60 g
- water, 200 mL
- 250 mL beakers (2)
- balance
- stirring rod
- 2 spatulas or plastic spoons
- 2 green or red gummy bears

### Part I: Dissolving Solids

#### Procedure

1. Make predictions. How many grams of sugar do you think you can dissolve in 100 mL of water? (1 tsp = 4 g) How many grams of salt? (1 tsp = 6 g)
2. Determine how many grams of sugar will dissolve in 100 mL of water at room temperature. First, find the mass of the water and beaker together. Then keep adding sugar and stirring until you notice solid sugar in the beaker that will not dissolve. Enter your data in the table.
3. Repeat this process using table salt, NaCl, instead of sugar.

#### Calculations

1. Calculate the mass of dissolved solid per liter of solution. Record it in the table.
2. Calculate the number density, which is the number of moles of dissolved solid in each solution. Record it in the table.
3. Complete the table. Round all values to the nearest tenth.

Solid solute	Volume of water (mL)	Mass of water and beaker (g)	Mass of solution and beaker (g)	Volume of solution (mL)	Mass of solid added (g)	Mass of dissolved solid per liter of solution (g/L)	Moles of solid added (mol)	Moles of dissolved solid per liter of solution, (mol/L)
Sugar $C_{12}H_{22}O_{11}$								
Salt NaCl								

## Analysis

1. Explain why the sugar solution has the greater mass of dissolved solid per liter, but the salt solution has the greater number of moles of solid per liter.
  
2. Why is the volume of the solution different before and after dissolving the sugar and the salt?

## Part 2: Gummy Bears

Five gummy bears were placed overnight in aqueous sugar solutions A through E.

1. Describe what happens to the bears in the solutions compared to the bears that are not in a solution. Which solution had the greatest effect on the gummy bears? Why do you think this is so?
  
2. What evidence do you have that it is water and not sugar that is moving into and out of the bears?
  
3. Place a gummy bear in the saturated sugar solution you created in class. Label your group's beaker with your names. Predict what your gummy bear will look like tomorrow. Explain your reasoning.
  
4. **Making Sense** Explain how you would determine the number density of 500 mL of solution that contains 20 g of dissolved NaCl.
  
5. **If You Finish Early** A gummy bear has a mass of about 2.3 g and a volume of about 1 mL. About 12% of the mass of the gummy bear is sugar. Estimate the sugar concentration in a gummy bear.