

SOLUTIONS

NAME: _____

PURPOSE:

The purpose of this activity is to make a solution and then determine what information is needed to calculate the concentration using different methods. (% by mass, molality, molarity, density, ppm)

Procedure:

You are given sucrose, a beaker, a spoon, water, and a graduated cylinder.

1. Measure 8.55 grams sucrose ($C_{12}H_{22}O_{11}$) into a 150 mL beaker.
2. Measure out 45.0 mL of tap water into a graduated cylinder. Add water to the beaker containing the sucrose. Stir with a spoon until all of the sugar goes into solution. Assume the mass of the water used is 45.0 g as the density of water = 1.00 g/mL at 273 K.
3. Collect additional data to determine the different ways to express concentration.

Additional Data:

CALCULATIONS:

1. Calculate the **percent by mass** of your sugar solution.
(% sucrose = mass of sucrose /mass of solution:)

2. Calculate the **molality** of your solution. This solution was sucrose dissolved in water.
 - a. Convert 8.55 g $C_{12}H_{22}O_{11}$ into moles. (1 mole sucrose = 342 g)

b. Molality = moles solute/kg of solvent

3. Calculate the **molarity** of your solution.
(molarity = moles of solute/liters of solution)

4. Calculate the **density** of your solution:
(Density = mass of solution/volume of solution)

5. Calculate the parts per million (ppm)
(mass of part/mass of solution $\times 10^6$)

6. Calculate the BRIX (mass sugar/100 g solution)

Questions:

1. Which of the six expressions of concentration are dependent on the temperature?

2. Which of the six expressions of concentration are the same?