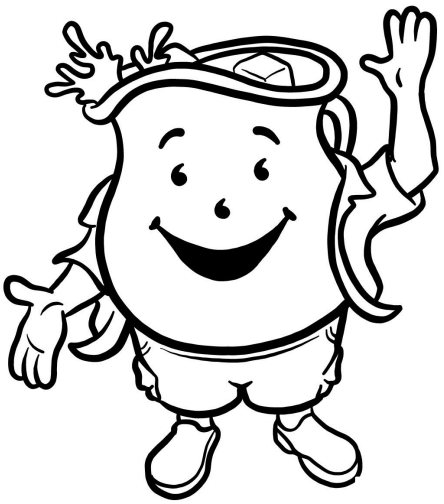
UNIT 9

ACTIVITY 1: WHAT IS CONCENTRATION?

WHAT'S THE PERFECT CONCENTRATION OF KOOL-AID?

PURPOSE:
Determine the concentration (molarity) of properly made
Kool-Aid.



METHOD:
Make three solutions of Kool-Aid with different concentrations and taste them to decide which the correct concentration is. You will prepare 0.1 L of each of the following Kool-Aid solutions: 0.1 M, 0.4 M, and 0.7 M.

MATERIALS:
- Kool-Aid Powder
- Water
- Plastic cups
- Popsicle sticks (to stir solutions)
- Electronic balance
- Ruler

PROCEDURE:
1. Calculate how much solid Kool-Aid you will need to make 0.1 L of each solution. (Hint 1: Kool-Aid is mostly sugar ($C_6H_{12}O_6$), so you can assume that the "molar mass" of Kool-Aid is the same as the molar mass of sugar.) (Hint 2: "What you know" is the volume – 0.1 L and known molarity)

Show all of your calculations below.

- The "molar mass" of Kool-Aid:

- Mass of Kool-Aid needed for 0.1 M solution:

- Mass of Kool-Aid needed for 0.4 M solution:

- Mass of Kool-Aid needed for 0.7 M solution:

2. Mark the 0.1 L mark on a plastic cup as demonstrated by the teacher. (Usually we would use more accurate measuring techniques, but we can't drink out of lab equipment.)

3. Mass out the correct amount of solid Kool-Aid in each cup by putting your cup on the balance, setting the mass to zero, and putting the correct mass of Kool-Aid in the cup.

4. Add water to the cup until you have 0.1 L of solution (fill it up to the line you drew). Stir with a spoon.

5. Observe and taste the solutions you have made. You can have one "designated taster" or you can pour a little into separate cups for each group member to taste. Record how each solution looked, smelled, and tasted:

- Observations of the 0.1 M solution:

- Observations of the 0.4 M solution:

- Observations of the 0.7 M solution:

6. Compare the solutions, and decide which one is closest to the correct concentration. Finally, you and your partner will create the "perfect" Kool-Aid solution based off you previous observations. Record your calculations below.

7. Dump leftovers in the sink and throw away used cups.

QUESTIONS:

1. Which concentration that you tested was closest to the ideal concentration of Kool-Aid? What was wrong with each of the other solutions that you made?

2. How is taste related to concentration? Why are they related in this way?