

Name: \_\_\_\_\_

Period: \_\_\_\_\_

Seat#: \_\_\_\_\_

**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 is the correct concentration. You will make 150mL of a 1.0M STOCK solution that you will then use to prepare 100 ml or 0.1 L of each of the following Kool-Aid solutions: 0.7 M, 0.4 M, and 0.1 M. You will also use the dilution equation to prepare the lower concentrated solutions  $\rightarrow M_1V_1 = M_2V_2$ , solve for  $V_2$ .

**Materials:**

Kool-Aid Powder  
Balance

Wood sticks (to stir solutions)  
Paper cups

Water (Tap Water)  
New disposable pipette

**Procedure:** Show all calculations neatly and clearly! Box each answer!

- 1) Calculate how much solid Kool-Aid you will need to make your stock 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 and concentration.

The “molar mass” of Kool-Aid (*show calculation*):

*Molar mass of Kool-Aid*

Mass of Kool-Aid needed for 150ml of STOCK 1.0 M solution:

*Grams solid Kool-Aid for Stock Sol'n*

- 2) Make 150 mL of the STOCK solution that you calculated in Step 1.
- Mass out the correct amount of solid Kool-Aid for the STOCK solution in the cup by putting your cup on the balance, setting the mass to zero, and putting the correct mass of Kool-Aid in the cup.
  - Then add water to the cup until you have 0.15 L of solution.
  - Stir with a stir stick.

- 3) Using your STOCK solution, and using the dilution equation to calculate how many mL of Stock solution you will need to prepare 0.7M, 0.4M, and 0.1M Kool-Aid solution.

**Hint:**  $V_1$  will be 100ml,  $M_1$  is the [ ] you want,  $M_2 = [\text{Stock}]$ ,  $V_2$  you are solving for.

- a. mL of Stock solution needed to make 100mL of 0.7 M solution

*mL of Stock needed to make 0.7M*

- b. mL of Stock solution needed to make 100mL of 0.4 M solution

*mL of Stock needed to make 0.4M*

- c. mL of Stock solution needed to make 100mL of 0.1 M solution

*mL of Stock needed to make 0.1M*

**Dougherty Valley HS Chemistry**  
**Solutions – Concentration of Kool Aid**

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- 4) Make all three of your dilutions. Once you have the calculated volume of STOCK needed for each solution, add that volume to each your cups, fill with tap water to 100 ml total volume. Stir. **Hint: You only have a scale, cups, and a new pipette, but you know the density of water. If you know how many mL of stock you used, you can figure out how many mL of water to add to get to 100mL total volume, and you can add that many grams of water to the cup.**
- 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:

<i>Observations of the 1.0 M solution:</i>	<i>Observations of the 0.7 M solution:</i>
<i>Observations of the 0.4 M solution:</i>	<i>Observations of the 0.1 M solution:</i>

- 6) Compare the solutions, and decide which one is closest to the correct concentration that your teacher made. If you have extra time, you can try to make one more solution with the exactly perfect concentration based upon your observations.
- 7) Dump leftovers in the sink and throw away used cups.

**Questions:** - Be as detailed as possible in the space below.

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?
  
  
  
  
  
  
  
  
  
  
3. Convert each of the solutions above to parts per million.