Making Solutions Activity

Name: _____
Period: _____ Date: _____

PURPOSE: You will prepare four (4) solutions by two different methods.

Volume Conversion:
1 L = 1000 mL

Part I: Dissolving solute in solvent

Your task is to create 100 mL each of two simulated blood sugar solutions by calculating and measuring the correct amount of solute for each one.

Calculate the Concentration of Solutions

Molarity is one way to measure the concentration of a solution. The molarity of a solution is the number of moles of solute per liter of solution. The symbol for molarity is *M*. Thus a 3.0 molar solution of nitric acid, abbreviated 3.0 *M* HNO_3, contains 3.0 moles of HNO_3 per liter of solution.

$$Molarity = \frac{Moles\ Solute}{Liters\ Solution}$$

Symbols for molarity: M = *"molar"* = $\frac{mol}{L}$

Procedure

1. Dissolve 3.42 grams in ABOUT 75 mL of water in a 150-mL beaker. Pour into a 100-mL volumetric flask and fill up to 100.0 mL. Return solution to the beaker and label it as '**A**'.
2. Dissolve 0.342 grams in ABOUT 75 mL of water in a 150-mL beaker. Pour into a 100-mL volumetric flask and fill up to 100.0 mL. Return solution to the beaker and label it as '**B**'.

Practice Problems

Solve the following problems. In the space below each problem, show a labeled setup. Write the answers in the spaces at the right. Do not forget to include units!

1) What is the molarity of a solution that contains 85.0 grams Na_2SO_4 in 325 mL of solution?

_____

2) What mass of CH_3OH is required to prepare 1.50 liters of 3.00 *M* solution?

_____

3) What volume, in mL, of 1.40 *M* $HC_2H_3O_2$ solution contains 0.400 mole of $HC_2H_3O_2$?

_____

4) What is the concentration of the sugar ($C_{12}H_{22}O_{11}$) solution in **Beaker A**?

_____

5) What is the concentration of the sugar ($C_{12}H_{22}O_{11}$) solution in **Beaker B**?

_____

Part II: How Much Solvent?

Your task is to create two (2) more solutions of simulated blood sugar. This time, however, you will be diluting a solution that already exists.

Changing the Concentration of a Solution

Formula for Dilution of a Solution: $M_1V_1 = M_2V_2$

Procedure

1) Measure out 10.0 mL of solution **A** using a 10-mL pipette. Dispense this into a 100-mL volumetric flask and dilute up to 100.0 mL. Pour solution to a beaker and label it as '**C**'.
2) Measure out 10.0 mL of solution **B** using a 10-mL pipette. Dispense this into a 100-mL volumetric flask and dilute up to 100.0 mL. Pour solution to a beaker and label it as '**D**'.

Practice Problems

Solve the following problems. In the space below each problem, show a labeled setup. Write the answers in the spaces at the right. Do not forget to include units!

6) If I dilute 250 mL of 0.10 *M* lithium acetate solution to a volume of 750 mL, what will the concentration of the new solution be?

_____

7) If I have 340 mL of a 0.5 *M* NaBr solution, what will the concentration be if I add 560 mL water?

_____

8) What is the concentration of the sugar ($C_{12}H_{22}O_{11}$) solution in **Beaker C**?

_____

9) What is the concentration of the sugar ($C_{12}H_{22}O_{11}$) solution in **Beaker D**?

_____

Conclusion

10) What is the relationship between the color of the solution and its concentration?

11) Is the color of the solution consistent with the concentration? Explain your thinking.

12) Normal blood sugar concentrations are about 0.0056 M. Which of the four solutions are above the normal healthy range?