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Unit 4, Section 2 – Solutions Chemistry

Solute	+	Solvent	=	Solution

The **ratio** of _____ to _____ determines the _____ of the solution. Concentration is often written as brackets around the substance formula. (Ex: Concentration of Hydrochloric Acid - HCl can be written as [HCl]) Solubility, the ability of a substance to dissolve at a given set of conditions, can also be affected by changes in _____ because by changing this variable, you change the _____ between the molecules of solvent, allowing more or less solute to be dissolved **between** them.

Dissolution:

Types of Solutions:

Unsaturated	Saturated	Supersaturated

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Solutions Practice:

- A solution is made from $SrCl_2$ and Water. Circle the **solute**. Draw a box around the **solvent**.
- If you were to take an **unsaturated solution** and add **more solute**, what would happen to the solute? _____

Molarity:

Molarity is a measurement of the _____ of solute per _____ of solution.

$$\text{molarity, M} = \frac{\text{moles of solute}}{\text{liters of solution}}$$

The unit for molarity is a capital **M** and is usually read as "molar". Therefore, a solution with a label that states "2.0M" may be called a "2.0 Molar" solution.

Practice: *Show all work and round answers to the correct number of sig figs (or 2 decimal places)!*

1. Calculate the molarity of 0.060 moles $NaHCO_3$ in 1.50 L of solution.

2. Calculate the number of moles of NaCl contained in 0.500L of a 1.5M solution.

3. Calculate the molarity of 34.2 **grams** of HF in 0.5 L of solution. **(Start with gram→mol)**

4. What is the molarity if 1.0 mol of KCl is dissolved in 750.0 **mL** of solution (1L = 1000 mL)?

Mini Lab – Make a Stock Solution :)

Goal: Make 50 mL of a 0.10 M $CuCl_2$ solution.

Pre Lab Questions and Calculations:

1. The **solute** in this lab is _____ and the **solvent** in this lab is _____.
2. What formula is used to calculate molarity?
3. Convert the volume (50 mL) to **Liters**.

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4. Use the Molarity formula to calculate how many **moles** of $CuCl_2$ you need.

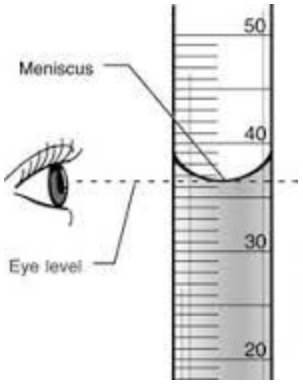
5. Calculate the molar mass of $CuCl_2$.

6. Convert the moles of solute to **grams**. (This is the mass we will use to make our solution!)

Making a Solution:

When making a solution, you want to make sure you are using your **best lab technique** because bad solutions can add major **sources of error** in lab calculations. EEK!

Procedure:



1. Measure the correct mass of solute needed on the digital balance.
    a. **This is your answer from Pre-Lab #6!!**
2. Use a graduated cylinder and a pipette to measure the correct volume of solvent.

    BE PRESCISE! Keep the graduated cylinder on a stable surface and bend down to eye level. Measure from the bottom of the meniscus.

3. Pour the solute in a beaker or erlenmeyer flask. Add a small amount of the solvent at a time swirling in between. Continue adding slowly.
4. Continue swirling or stirring with a stir rod until **all** of the solute is dissolved.