

CHEM 101
Introduction to Chemistry



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Solutions: homogenous mixtures of two or more pure substances.

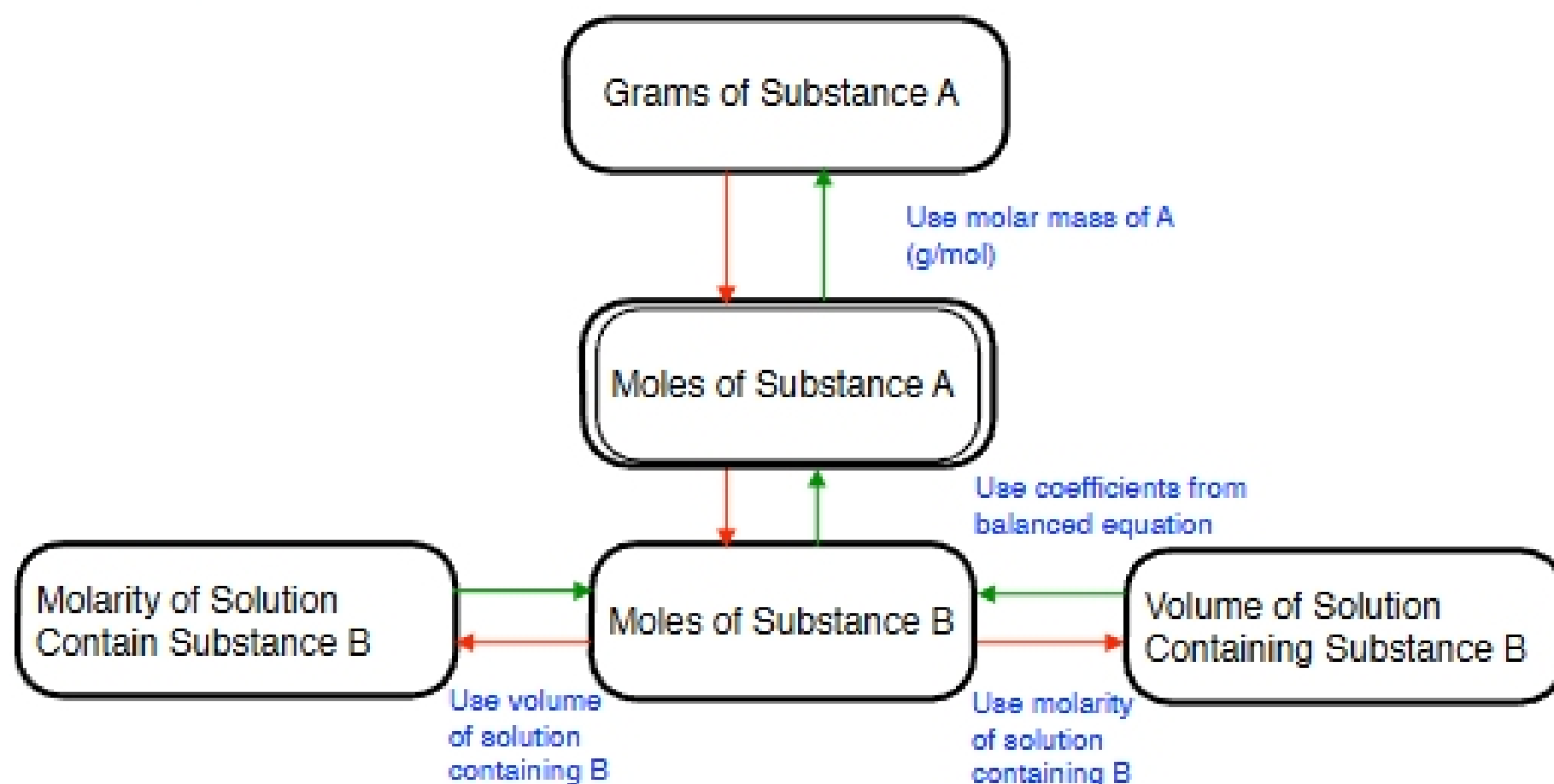
- The **solvent** is present in greatest abundance
- All other substances are called **solutes**.
- When water is the solvent, the solution is called an **aqueous solution**.

Molarity (M): measure of concentration

- Molarity is one way to measure the concentration of a solution:

$$M = \frac{\text{moles of solute}}{\text{volume of solute in Liters}}$$

Using Molarities in Stoichiometric Calculations



Ex:

What is the Molarity given 23.4g of Na₂SO₄ dissolved in H₂O to make 125mL of solution?

$M = \frac{\text{mol}}{\text{L}}$

1. Convert g to mol: 23.4g Na₂SO₄ (1mol/124.0g Na₂SO₄) = .188 mol Na₂SO₄
2. Convert mL to L: 125/1000 = .125L
3. Apply equation: $M = \frac{.188\text{mol Na}_2\text{SO}_4}{.125\text{L}} = 1.32 \text{ M}$

Dilution

In dilution one makes a less concentrated solution by adding solvent (H₂O).

makes solute (before dilution) = moles solute (after dilution)

or

Molarity x Volume = Molarity x Volume

or

$$M_1V_1 = M_2V_2$$

Acid Base Reaction

Acid: substances that increase the concentration of H⁺ when dissolved in H₂O.

- provides H⁺ to an aqueous solution .
- common acids: HCl, H₂SO₄, HNO₃, H₃PO₄

Base: substances that increase the concentration of OH⁻ when dissolved in H₂O.

- provides OH⁻ to an aqueous solution
- common bases: NaOH, Ca(OH)₂, KOH, NH₃

- In an acid-base reaction, the acid (H₂O) donates a proton (H⁺) to the base (NH₃).
- Reactions between an acid and a base are called **neutralization reactions**.
 - When the base is a metal hydroxide, H₂O and a salt (an ionic compound) are produced.
- Acid and base reactions can be represented:



and are called **neutralization or titrations**

