Solutions.

Solute – a substance that is dissolved in another substance.

Solvent – a substance that dissolves the solute.

Solution – the substance that is formed when solute dissolves in a solvent.

Concentration refers to the amount of a substance (solute) present in a certain volume of solution. It is commonly expressed in terms like molarity (M), which is defined as the number of moles of solute per liter of solution.

What is a 1 Molar (1 M) Solution?

A **1 molar solution** contains exactly **1 mole of solute dissolved in 1 liter (L) of solution**.

- **Mole**: A mole is a measure of quantity in chemistry, equivalent to 6.022×10^{23} particles (atoms, molecules, ions, etc.).
- **Molar mass**: The mass of one mole of a substance is determined by the atomic or molecular weight, usually found on the periodic table.

How to Make a 1 Molar Solution

Determine the Molar Mass of the Solute: Look up the molar mass of the solute (e.g., NaCl has a molar mass of 58.44 g/mol, A_r of Na 23, A_r of Cl 35.5; 23+ 35.5=58.5).

1. **Measure the Solute**: Weigh out the exact mass corresponding to 1 mole of the solute. For example:
   - 1 mol NaCl=58.44 g
2. **Dissolve the Solute**:
   - Add the solute to a beaker or flask.
   - Add distilled water, up to 1 L
   - You will get 1 M solution of sodium chloride.

If we have 0.25 L of the solution with the same mass of NaCl (58.5g), the concentration of sodium chloride solution is 4 mol/L.

Questions.

1. Write down the mass (in grams) of 0.5 moles of NaBr.
2. We want to prepare the solution of KNO_3. We need 1 L of this solution, the concentration of KNO_3 should be 0.5 mol/L (0.5M). How many grams of KNO_3 will we take?
3. How to prepare 2M solution of Na_2SO_4 in 4 liters.