

# Solutions

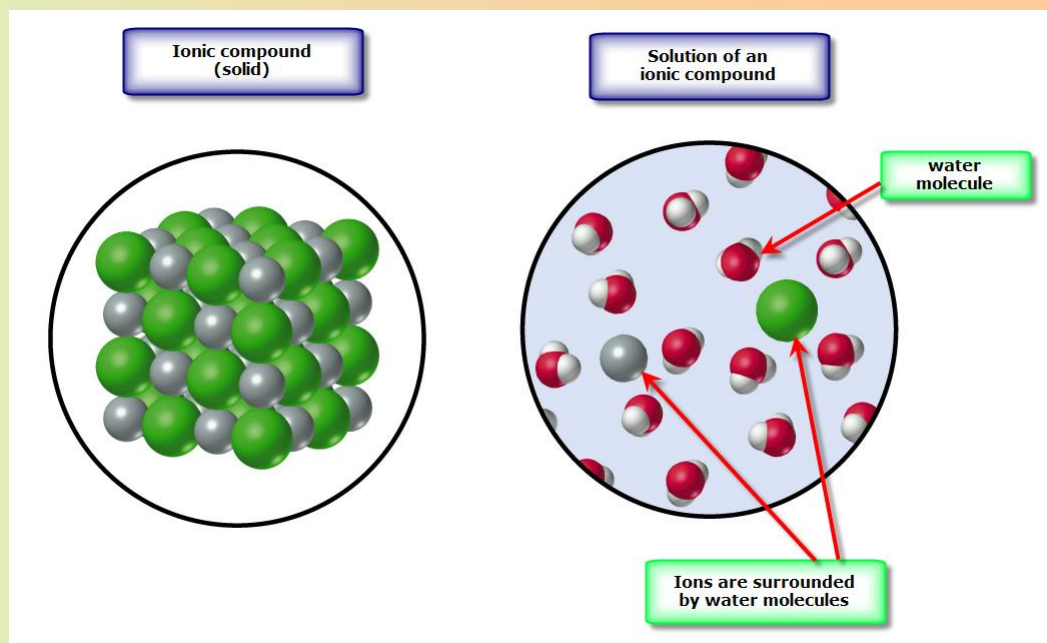
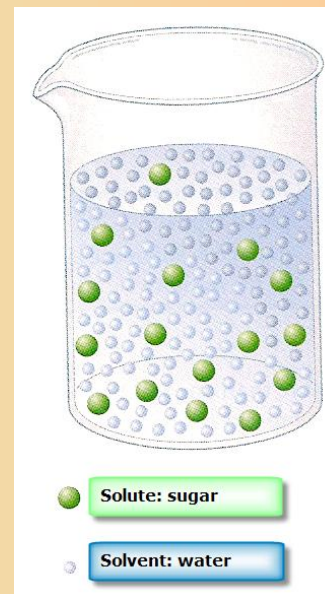
## Introduction

A solution is an homogeneous mixture of two or more substances.

The substance that is present in the greater amount is called the **solvent** (in most cases the solvent is water).

The substance present in the lesser amount is called the **solute**.

When the solute is an ionic compound the ions are kept apart and surrounded by molecules of water.



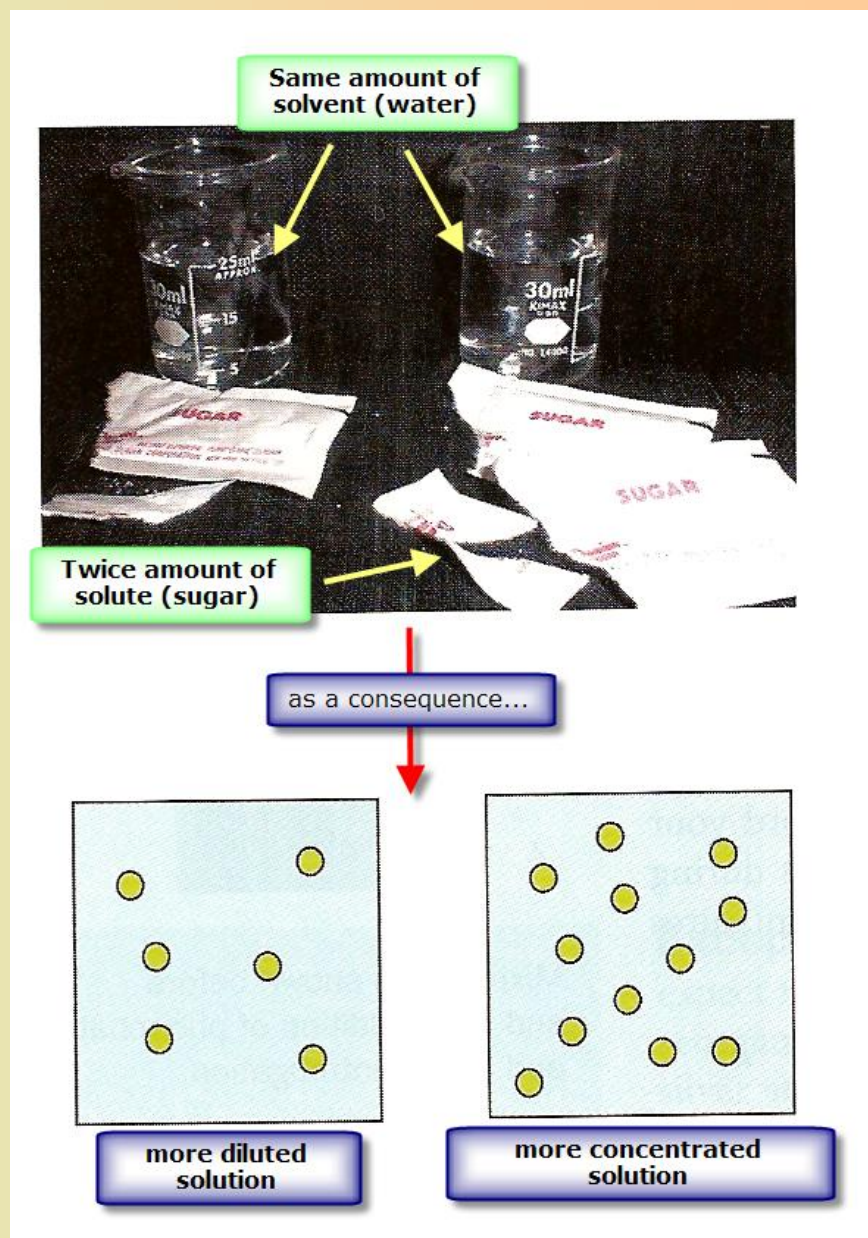
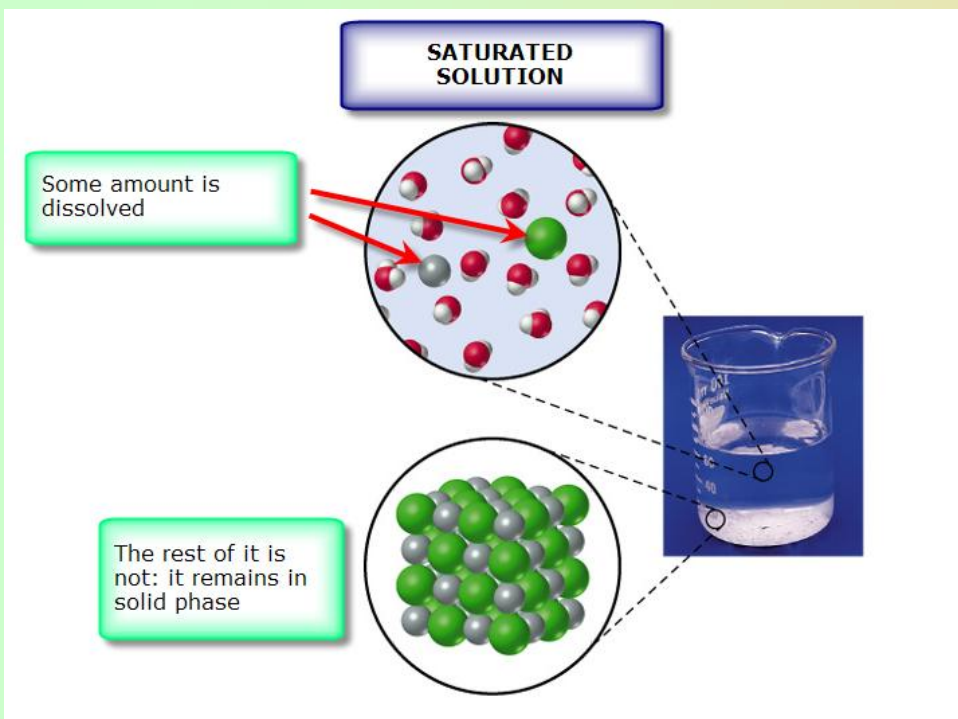
# Solutions

## Concentration of a solution

A solution is said to be **saturated** when no more solute can be dissolved.

When more solute can be dissolved, a solution is **non-saturated**.

When a solution has little amount of solute, the solution is called **diluted**; on the other hand, when the amount of solute is increased, we will have a **concentrated** solution.



# Solutions

## Concentration of a solution

The value of the concentration expresses the amount of solute per unit of solution.

Here are the most important ways of measuring concentration:

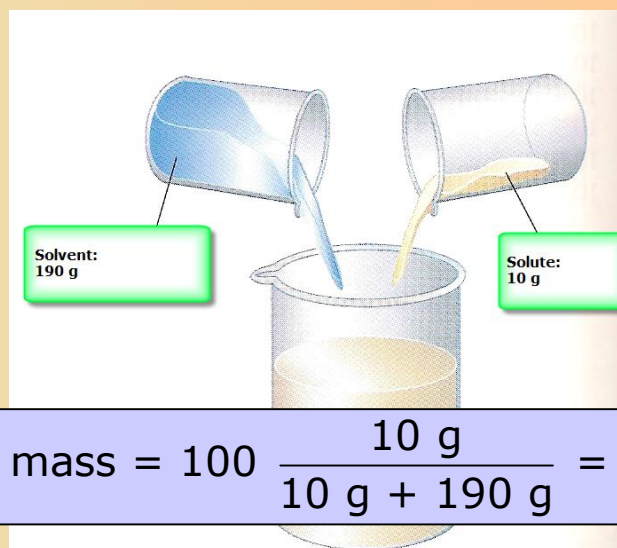
- **percentage of mass:** the mass of solute per 100 grams of solution

$$\% \text{ mass} = 100 \frac{\text{mass of solute}}{\text{mass of solution}}$$

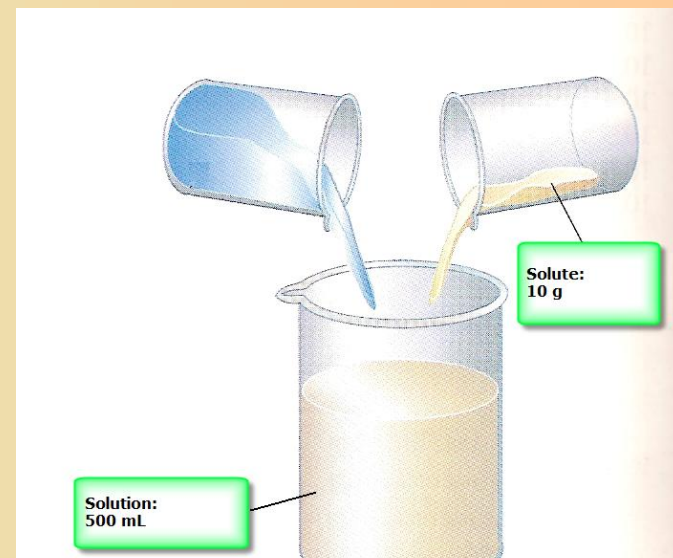
$$\% \text{ mass} = 100 \frac{\text{mass of solute}}{\text{mass of solute} + \text{mass of solvent}}$$

- **g/L:** the mass of solute (in grams) per liter of solution

$$\text{conc (g/L)} = \frac{\text{mass of solute}}{\text{volume of solution}}$$



$$\% \text{ mass} = 100 \frac{10 \text{ g}}{10 \text{ g} + 190 \text{ g}} = \% 5$$



$$\text{conc (g/L)} = \frac{10 \text{ g solute}}{0,5 \text{ L solution}} = 20 \frac{\text{g}}{\text{L}}$$

# Solutions

## Concentration of a solution

The value of the concentration expresses the amount of solute per unit of solution.

• **mol/L (or M)**: the amount of solute in moles per liter of solution

$$\text{conc (mol/L)} = \text{conc (M)} = \frac{\text{moles of solute}}{\text{volume of solution}}$$

$$\text{conc (mol/L)} = \frac{10 \text{ g solute}}{0,5 \text{ L solution}} \frac{1 \text{ mol solute}}{50 \text{ g solute}} = 0,4 \frac{\text{mol}}{\text{L}} \text{ or } 0,4 \text{ M}$$

