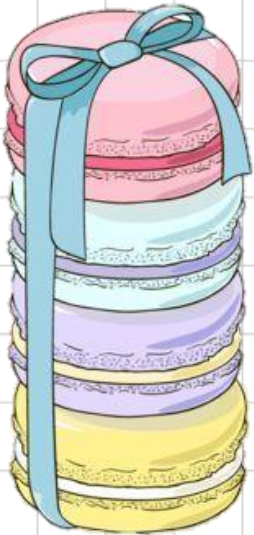


# SOLUTE, SOLVENT AND SOLUTION

- If a substance dissolves in a liquid, it is called a solute and the liquid is called the solvent.
- The resulting mixture is called a solution.
- $\text{Solute} + \text{Solvent} = \text{Solution}$



Solute	Solid which dissolves
Solvent	Liquid which does the dissolving
Solution	Solute + solvent
Saturated solution	A solution which will dissolve no more solute.
Soluble substance	A substance that will dissolve in a solvent.
Insoluble substance	A substance that will not dissolve in a solvent



## CONCENTRATION OF SOLUTION

- The concentration of a solution tells you how much solute is dissolved in 1 unit volume of solution.
- The volume of a solution is measured in  $\text{dm}^3$  (litres).  $1 \text{ dm}^3 = 1000 \text{ cm}^3$ .
- The amount of solute can be measured in grams or moles.
- 2 units of concentration used in chemistry are  $\text{g dm}^{-3}$  and  $\text{mol dm}^{-3}$

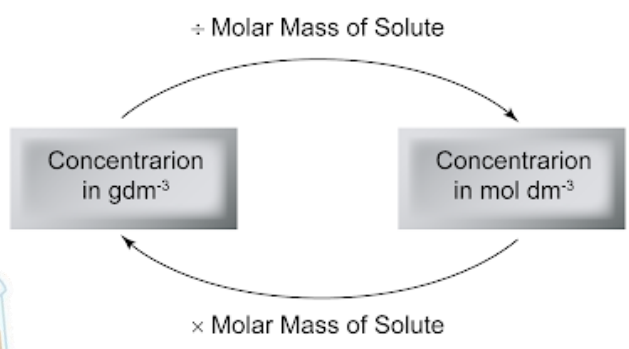
### Concentration in $\text{g dm}^{-3}$

- Concentration is the number of moles of solute per litre of solution.
- A concentration of  $10 \text{ g dm}^{-3}$  means there is 10 g of solute dissolved in  $1 \text{ dm}^3$  of solution.
- $\text{Concentration} = \frac{\text{Mass of solute (g)}}{\text{Volume of solution (dm}^3\text{)}}$

### Concentration in $\text{mol dm}^{-3}$ (Molarity)

- Molarity is probably the most commonly used unit of concentration. It is the number of moles of solute per litre of solution.
- A concentration of  $2 \text{ mol dm}^{-3}$  means there are 2 moles of solute dissolved in  $1 \text{ dm}^3$  of solution.
- $\text{Molarity} = \frac{\text{Mole of solute (mol)}}{\text{Volume of solution (dm}^3\text{)}}$





- The chart above shows how to convert the units of concentration from  $\text{g dm}^{-3}$  to  $\text{mol dm}^{-3}$  and vice versa.
- The molar mass of the solute is equal to the relative molecular mass of the solute.

# MOLARITY AND NUMBER OF MOLES

- Number of mole of solute in a solution can be calculated by using the following formula :-

$$n = \frac{MV}{1000}$$

- $n$  = number of moles of solute
- $M$  = molarity of the solution
- $V$  = volume of the solution in  $\text{cm}^3$

# MOLARITY AND THE PH VALUE



Molarity of Acids	pH value	
	Hydrochloric acid	Ethanoic Acid
$0.1 \text{ mol dm}^{-3}$	1.0	2.9
$0.01 \text{ mol dm}^{-3}$	2.0	3.4
$0.001 \text{ mol dm}^{-3}$	3.0	3.9
$0.0001 \text{ mol dm}^{-3}$	4.0	4.4
$0.00001 \text{ mol dm}^{-3}$	5.0	4.9

Molarity of alkali	pH value	
	Sodium hydroxide solution	Ammonia aqueous
$0.1 \text{ mol dm}^{-3}$	13.0	11.1
$0.01 \text{ mol dm}^{-3}$	12.0	10.6
$0.001 \text{ mol dm}^{-3}$	11.0	10.1
$0.0001 \text{ mol dm}^{-3}$	10.0	9.6
$0.00001 \text{ mol dm}^{-3}$	9.0	9.1

