**Concentration**

**Concentration** – the amount of solute per quantity of solvent

1. **Percentage Concentrations**
2. volume/volume (V/V) percent = volume of solute (mL) x 100

 volume of solution (mL)

e.g. vinegar is 5% V/V acetic acid, which means that in a 100 mL solution of vinegar, there are \_\_\_\_\_\_\_ mL of acetic acid.

1. Weight/weight (W/W) percent = weight of solute (g) x 100

 weight of solution (g)

e.g. In a 200 g tube of toothpaste, there are 0.486 g of dissolved sodium fluoride.

W/W concentration of NaF =

1. Weight/volume (W/V) percent = mass solute (g) x 100

 volume of solution (mL)

e.g. A salt solution has 12.8 g of salt in 1 L of solution. .

W/V concentration of NaCl =

1. **Parts per Million**
* concentrations of very small quantities can be expressed in parts per million (ppm)

ppm = mass of solute (mg)

volume of solution (L)

e.g. In a 0.25 L sample of pond water, 2.2 mg of dissolved oxygen are measured.

 Concentration of O2 in ppm=

1. **Molar Concentration** (**Molarity**)– the number of moles of solute that can dissolve in 1 L of solution (mol/L or M)

Molar concentration = amount of solute (mol)

volume of solution (L)

C = n

 V

Ex. 1 A solution contains 5.85 g of sodium chloride dissolved in 5000 mL of water. What is the concentration of the sodium chloride in mol/L?

Ex. 2 What is the concentration in mol/L of a solution that contains 49 g of sulfuric acid in 3.0 L of solution?

Ex. 3 What mass of potassium hydroxide is required to prepare 600 mL of a 0.225 mol/L solution?

Ex. 4 A solution containing 0.125 mol/L of magnesium chloride is required for an experiment. If 87.8 g of solid magnesium chloride is available, what is the maximum volume of solution that can be prepared?

HW: #1 pg 373, #11 pg 375, #22 pg 376, #31 pg378, #41,42,44,46(tricky think of # of atoms) pg 381