**Types of Chemical Reactions and Solution Chemistry**

**NOTE**: Remember a solution is a homogeneous mixture where a solute is dissolved in a solvent.

**TERMS**

1. Solute is dissolved.
2. Solvent does the dissolving.
3. Aqueous solutions are solutions where the solvent is ***water***.
4. Polar molecule:
   1. A molecule that has unequal sharing of electrons, causing dipoles to form.
   2. Water is a polar molecule.
5. Hydration: when polar molecule dipoles “pull-apart” a solute compound.
6. Solubility: how much solute can be dissolved in the solvent.

# PROPERTIES OF AQUEOUS SOLUTIONS

## Electrolytes

* 1. Solutions that conduct an electric current
  2. Two types
     1. strong
        1. completely dissociate (consult solubility rules)
        2. light bulb very bright
     2. weak
        1. do not dissociate
        2. only about 5% dissociation (ammonia & acetic acid)
        3. light bulb very weak, but still emits light
  3. Non-electrolytes
     1. Solutions where dissolving has occurred, but the solute ***does not*** make ions and therefore cannot conduct electricity.
     2. Pure water, sugar, alcohols, antifreeze, and starch.
     3. Light bulb does not come on.

Composition of Solutions

1. Molarity
   1. Concentration unit of moles per liter.
      1. [NaCl] = 0.75 M means 0.75 moles of salt is contained in 1.00 L of solution.
      2. [square brackets]
         1. Indicate whatever is inside is

in solution

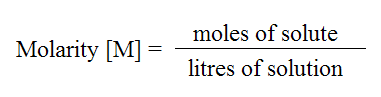
its concentration is expressed in molarity.

This is very common on the multiple choice part of the AP exam. Simple numbers – remember no calculators!!!

* + 1. Concentration of ions
       1. [MgCl2] = 0.5 M means that:
          1. [MgCl2] = 0.5 M
          2. [Mg2+] = 0.5 M
          3. [Cl-1] = 1.0 M

since MgCl2 has two Cl- ions,

🡺 2 x 0.5 M = 1.0 M



“Litre” is the European spelling of “liter”

**MOLES**

**M**

###### L

PREPARING SOLUTIONS OF KNOWN CONCENTRATIONS

1. use a volumetric flask
2. weigh out the solid as accurately as possible
3. fill the flask about ½ full of liquid
4. add solid to flask
5. add water filling to the mark on the flask

**NOTE:** You cannot dump the solid into flask that is already filled to the mark. The solid will take up space and overflow the flask (go above the line).

**PREPARING SOLUTIONS BY DILUTION**

1. Often your solution will need to be diluted.
2. Diluting a more concentrated solution to make a dilute solution

Use the equation:



1. Determine the volume needed of the stock solution (the solution that is more concentrated).
2. Use any of the following to measure out the stock solution:
   1. Volumetric flask
   2. graduated cylinder
   3. pipet
      1. measuring pipet
      2. volumetric pipet
3. Clean a volumetric flask the same size as the diluted solution that you require.
   1. Fill the flask about ½ full (or an amount that will allow you to add the volume of the stock solution to the flask).
   2. Add water filling to the mark on the flask.