Review of CH30S

Naming & Formula Writing:

Covalent Compounds → **TWO NON-METALS**

- Use the **PREFIX** system of naming.

Mono= 1	Hexa = 6
Di = 2	Hepta = 7
Tri = 3	Octa = 8
Tetra = 4	Nona = 9
Penta = 5	Deca = 10

Examples:

CO – Carbon monoxide

CO_2 – Carbon dioxide

SF_6 – Sulphur hexafluoride

N_2O_5 – dinitrogen pentoxide

Naming & Formula Writing:

Ionic Compounds → **METAL & NON-METAL**

- When naming any ionic compound the name of the **CATION** (**POSITIVE** ion) is written **FIRST,** followed by the name of the **ANION** (**NEGATIVE** ion).

***NOTE: **NO PREFIXES**

Examples:

NaCl - Sodium chloride

$ZnBr_2$ - Zinc bromide

$AlPO_4$ - Aluminum phosphate

$Fe_2(SO_4)_3$ - Iron(III) Sulphate

Al^{3+} PO_4^{3-}

$3+$ $3+$ $2-$ $2-$ $2-$

Naming & Formula Writing:

***<u>Ionic Compounds</u>* - Writing formulas from names:**

- **<u>COMBINE</u>** the ions so that the **<u>CHARGES</u> <u>BALANCE</u>** and the resulting compound is **<u>NEUTRAL</u>**. (**<u>CRISS-CROSS METHOD</u>**)

<u>Examples:</u>

Sodium Sulfide –

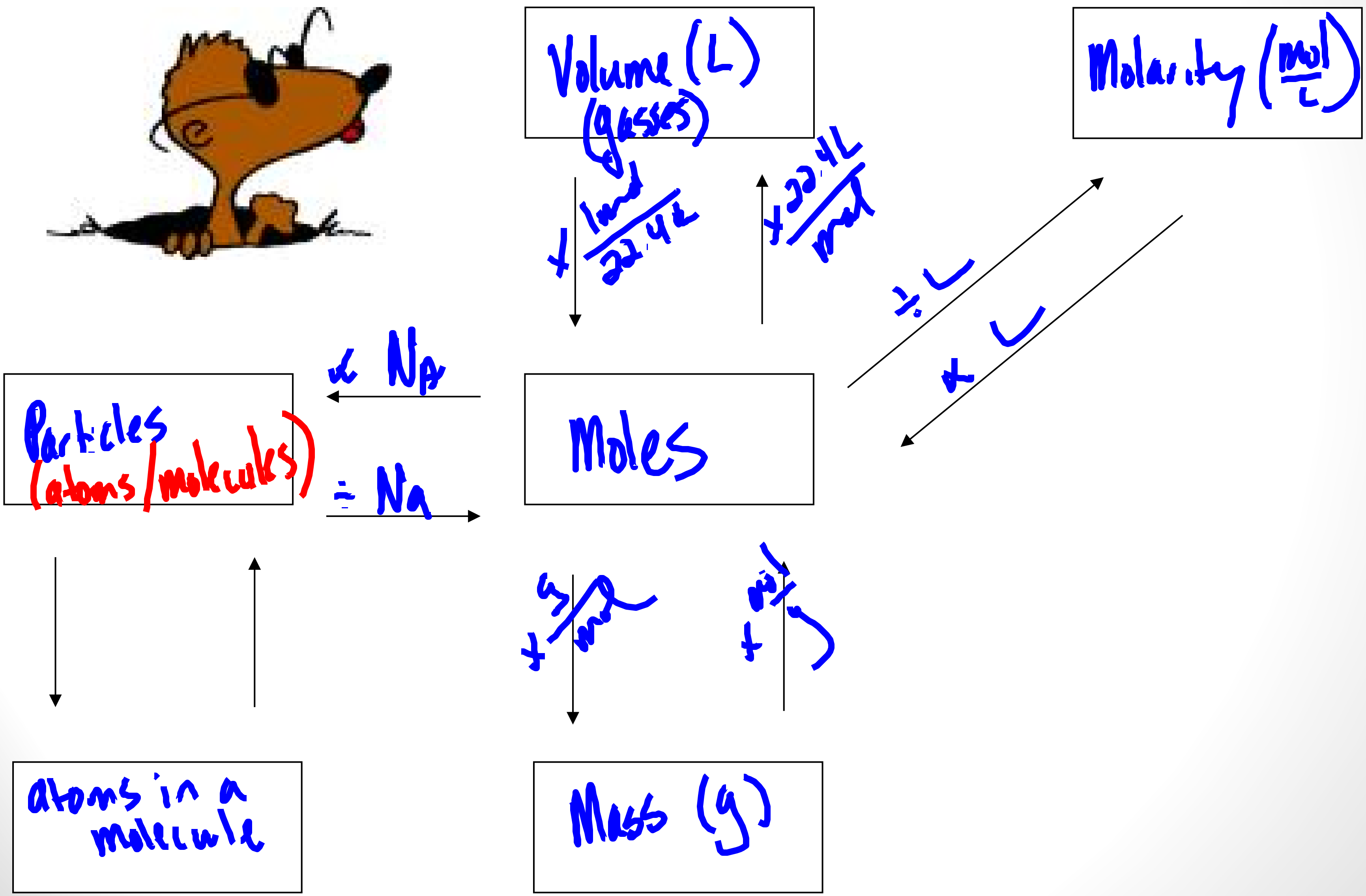
Magnesium Hydroxide -

Aluminum Sulphate –

Lead (IV) Sulphate -

Mole Conversions:

We can use the mole highway to review mole conversions…



Stoichiometry:

To solve any stoichiometry problem, follow these steps:

1. **BALANCE** the equation.

   $2H_2 + O_2 \rightarrow 2H_2O$

   10g

2. Use units to **CONVERT** the given value(s) to **MOLES**

3. If you are given values for **2 SPECIES**, you need to determine which is the **LIMITING FACTOR** using **MOLE RATIOS**.

4. Set up a **MOLE RATIO**, and solve for the moles of the required species using the **LIMITING FACTOR**.

5. **CONVERT** your units to the units asked for in the question (moles, mass, volume, particles)

Stoichiometry:

Examples:

1. How much CO_2 will be produced by the combustion of 5kg of propane (C_3H_8)?

5kg → 5000g

$$C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$$

$$5000\,g \times \frac{1\ mol}{44.08\ g} = 113.4\ mol\ C_3H_8 \times \frac{3\ mol\ CO_2}{1\ mol\ C_3H_8} = 340.2\ mol\ CO_2$$

$$340.2\ mol \times \frac{44\ g}{1\ mol} = 14968.8\ g\ CO_2$$

Stoichiometry:

Examples:

2. How many grams of H2O are produces when 100g of magnesium hydroxide reacts with 100g hydrochloric acid?

$$Mg(OH)_2 + 2HCl \rightarrow 2H_2O + MgCl_2$$

$$100g\ Mg(OH)_2 \times \frac{1\ mol}{58.32\ g} = 1.71\ mol\ Mg(OH)_2 \times \frac{2\ mol\ HCl}{1\ mol\ Mg(OH)_2} = 3.42\ mol\ HCl$$

need

$$100g\ HCl \times \frac{1\ mol}{36.51\ g} = 2.74\ mol\ HCl$$

HAVE

$$2.74\ mol\ HCl \times \frac{2\ mol\ H_2O}{2\ mol\ HCl} = 2.74\ mol\ H_2O \times \frac{18.02\ g}{1\ mol} = 49.4\ g\ H_2O$$

Stoichiometry:

Try these ones…

1) 45.0g of Iron (II) sulphide is mixed with excess hydrochloric acid (HCl). How many grams of Iron (II) chloride will be formed?

$$FeS + 2HCl \rightarrow H_2S + FeCl_2$$

$$45g \times \frac{1 mol}{87.5g} = 0.512 mol\ FeS \times \frac{1 mol\ FeCl_2}{1 mol\ FeS} = 0.512 mol\ FeCl_2 \times \frac{126.8g}{1 mol} = 64.9g$$

Stoichiometry:

Try these ones…

2) Calculate the volume of Hydrogen gas produced when 5.0g of aluminum is mixed with 4.0g of sulphuric acid.

$$2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2$$

$$4g\ H_2SO_4 \times \frac{1\,mol}{98g} = 0.041\,mol \times \frac{2\,mol\ Al}{3\,mol\ H_2SO_4} = 0.027\,mol\ Al$$

Need ∴ H_2SO_4 is L.R.

$$5g\ Al \times \frac{1\,mol}{27g} = 0.185\,mol$$

HAVE

$$0.041\,mol\ H_2SO_4 \times \frac{3\,mol\ H_2}{3\,mol\ H_2SO_4} = 0.041\,mol\ H_2 \times \frac{22.4L}{1\,mol} = 0.91L$$

Solubility:

Saturated Solution

- Contains as much **SOLUTE** as **POSSIBLE** at a given **TEMP**.

Unsaturated Solution

- Has **LESS** than the **MAX**. **AMOUNT** of **SOLUTE** at a given **TEMP**.

Supersaturated Solution

- Has **MORE** than the **MAX**. amount of **SOLUTE** at a given **TEMP**.

Dissolving and Dissociating:

When **IONIC COMPOUNDS** dissolve they **DISSOCIATE**:

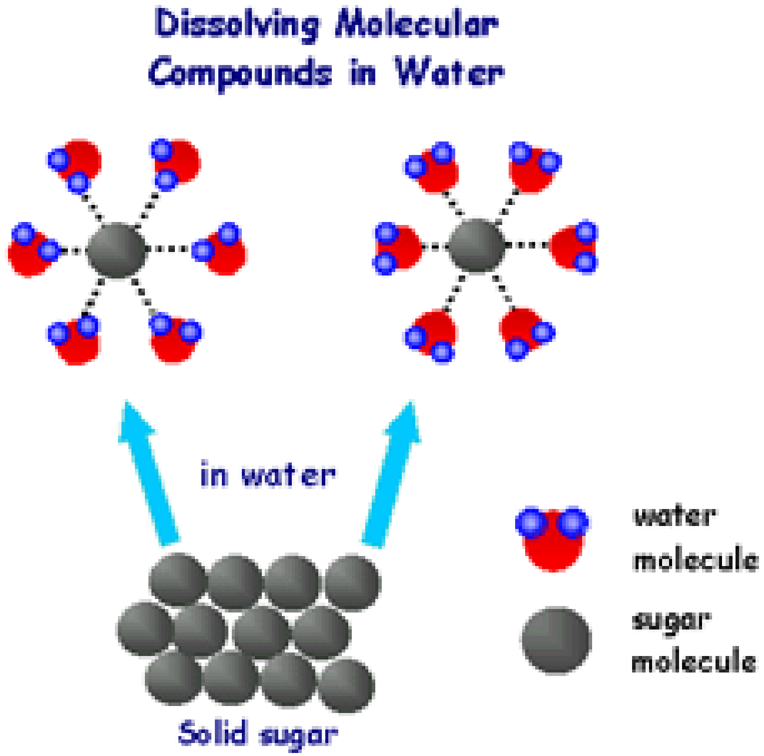
→ **DISSOCIATION** equation: $NaCl_{(s)} \rightarrow Na^{+}_{(aq)} + Cl^{-}_{(aq)}$

Dissociation Example

Dissolving and Dissociating:

When **COVALENT COMPOUNDS** dissolve they are simply **SURROUNDED** by **SOLVENT** particles (they **DON'T** break apart!)

→ Equation: $C_6H_{12}O_{6(s)} \rightarrow C_6H_{12}O_{6(aq)}$



Dissolving a Covalent Compound