BALANCING

$3MgCl_2 + 2Na_3PO_4 \longrightarrow Mg_3(PO_4)_2 + 6NaCl$

$C_2H_2 + \frac{5}{2}O_2 \longrightarrow 2CO_2 + H_2O$

$2CO_2$: 4 oxygen; H_2O: 1 oxygen; $\frac{5}{2}O_2$: 5

... To get a SINGLE oxygen atom from molecular oxygen, we need half of an oxygen molecule. So, to get 5 oxygen atoms, we need 5/2 oxygen molcules!

To get rid of the fraction, multiply ALL the coefficients by the denominator of the fraction (2):

$2C_2H_2 + 5O_2 \longrightarrow 4CO_2 + 2H_2O$

$H_2SO_4 + 2NaOH \longrightarrow Na_2SO_4 + 2H_2O$

H: 2 + 2 = 4

O: 4 + 2 = 6

H: 4

O: 4 + 2 = 6

... Initially, we skipped hydrogen and oxygen because they appeared in multiple compounds on each side. We balanced sulfur and sodium, then came back and did hydrogen then oxygen once we had figured out some coefficients!

IDENTIFYING REACTIONS

You may see one or more of these signs when a chemical reaction occurs

1. - A change in temperature that can't be explained in another way.

2. - Emission of light that can't be explained in another way

3. - The formation of a solid - or PRECIPITATION - in a previously liquid solution. (Not a simple phase change!) or gas formation.

4. - Color change (not simply lightening of color caused by diluting a solution!)

CLASSIFYING REACTIONS

- It's simpler to talk about different reactions if we can classify them into a small number of classes.

- Most of these reaction classes are reactions that involve TRANSFER OF ELECTRONS from one atom to another. The LAST class or reactions we will discuss does NOT involve electron transfer!

1) COMBINATION REACTIONS

- Reactions that involve two or more simple substances COMBINING to form a SINGLE product

- Often involve large energy changes. Sometimes violent!

- Form: $A + B + \ldots \longrightarrow C$

Example:

$$2\,Al(s) + 3\,Br_2(l) \longrightarrow 2\,AlBr_3(s)$$

CLASSIFYING REACTIONS

2 DECOMPOSITION REACTIONS

- Reactions where a SINGLE REACTANT breaks apart into several products

- Form: $A \longrightarrow B + C + \ldots$

Example:

$$2\,H_2O_2(\ell) \longrightarrow 2\,H_2O(\ell) + O_2(g)$$

* This reaction is NOT a combustion reaction, even though O_2 is involved!

* Combustion reactions CONSUME O_2, while this reaction PRODUCES O_2