Balancing Chemical Equations

Chemical Equations

- A way to represent a chemical reaction on paper.

Reactants → Products

"→" means "yields" or "reacts to produce". It separates reactants from products

"+" Separates individual reactants and individual products from one another

$2\ Mg\ (s) + O_2\ (g) \rightarrow 2\ MgO\ (s)$

Reactants

Product

Coefficient

Coefficient

Equations must be balanced:

- **Atoms can be neither created nor destroyed by ordinary chemical means**
  - **– (Law of conservation of matter)**
- **So we must have the same number of each type of atoms on each side of the equation (arrow)**

Balancing Chemical Equations:

1. Balance metals
2. Balance nonmetals
3. Balance oxygen
4. Balance hydrogen
5. Recheck all atoms
6. If EVERY coefficient will reduce, rewrite the whole equation using the simplest ratio of coefficients.

Signs of Chemical Rxns:

- **Gas formation**
- **Solid formation (Precipitate)**
- **Color Change**
- **Light or sound given off**
- **Heat absorbed or given off (temperature changes)**

Practice Balancing Equations

- $CO + Fe_3O_4 \rightarrow FeO + CO_2$
- $Nb + Cl \rightarrow NbCl_5$
- $ZnCO_3 + HNO_3 \rightarrow Zn(NO_3)_2 + CO_2 + H_2O$

Combustion (Burning)

- **Combustion is the reaction of a hydrocarbon with oxygen to produce carbon dioxide (CO_2) and water (H_2O)**
- $CH_4 + O_2 \rightarrow$
- $C_2H_2 + O_2 \rightarrow$
- $C_4H_{10} + O_2 \rightarrow$
- $C_5H_{10} + O_2 \rightarrow$
- $C_2H_5OH + O_2 \rightarrow$