Types of Chemical Reactions

* There are several types of chemical reactions. We will discuss five main types.
  * Combustion
  * Synthesis
  * Decomposition
  * Single Displacement
  * Double Displacement

Combustion

* When a substance reacts (burns) oxygen to produce an oxide
* General Equation

$$HC + O_2 \rightarrow CO_2 + H_2O + E$$

HC stands for hydrocarbon, any combination of hydrogen and carbon

Combustion

* Energy produced is usually heat or light
* When energy is produced during a reaction we call it exothermic
* Represent this as 'E' in equation

Synthesis

* Synthesis reactions occur when there is a combination of smaller atoms/molecules into larger molecules

* General Equation

$$A + B \rightarrow AB$$

Synthesis

* Examples:

* $H_{2(g)} + O_{2\,(g)} \rightarrow H_2O_{(l)}$

* $CO_{2(g)} + H_2O_{(l)} \rightarrow H_2CO_{3(aq)}$

Decomposition

* Decomposition reactions occur when there is a splitting of large molecules into elements or smaller molecules.

* General Equation

$$AB \rightarrow A + B$$

Decomposition

* Examples:
* $H_2O_{(l)} \rightarrow H_{2(g)} + O_{2\,(g)}$
* $H_2CO_{3(aq)} \rightarrow CO_{2(g)} + H_2O_{(l)}$

Single Displacement

* A reaction in which one element displaces another element from a compound.
* General Equation

$$A + BX \rightarrow B + AX$$

Single Displacement

* Examples:

* $Mg_{(s)} + Ag_3N_{(s)} \rightarrow Ag_{(s)} + Mg_3N_{(s)}$

* $Br_{2(l)} + CaI_{2(s)} \rightarrow I_{2(g)} + CaBr_{2(s)}$

Single Displacement

* Examples:

* $Mg_{(s)} + Ag_3N_{(s)} \rightarrow Ag_{(s)} + Mg_3N_{(s)}$

* $Br_{2(l)} + CaI_{2(s)} \rightarrow I_{2(g)} + CaBr_{2(s)}$

Double Displacement

* Involves two compounds as reactants. When elements in different compounds displace each other.

* General Equation

$$AX + BY \rightarrow BX + AY$$

Double Displacement

* Examples:

* $PbNO_{3(s)} + KI_{(s)} \rightarrow K_2NO_{3(s)} + PbI_{2(s)}$

* $NaBr_{(l)} + MgI_{2(s)} \rightarrow MgBr_{2(l)} + NaI_{(s)}$