CLASSES OF CHEMICAL REACTIONS

Combination or Synthesis: $A + B \rightarrow AB$

A) Metal oxides will react with water to form bases

$$Na_2O + H_2O \rightarrow 2NaOH$$

B) Some nonmetal oxides will react with water to form ternary acids

$$SO_2 + H_2O \rightarrow H_2SO_3$$

C) Many elements will react with oxygen to form oxides

$$4P + 5O_2 \rightarrow P_4O_{10}$$

D) Metals can combine with nonmetals to form ionic compounds

$$2Na + Cl_2 \rightarrow 2NaCl$$

Decomposition: $AB \rightarrow A + B$

A) Metallic carbonates, when heated, form metal oxides, plus carbon dioxide

$$CaCO_3 \rightarrow CaO + CO_2$$

B) Many metallic hydroxides, when heated, decompose into metallic oxides and water

$$Ca(OH)_2 \rightarrow CaO + H_2O$$

C) Metallic chlorates, when heated, decompose into metallic chlorides and oxygen

$$2KClO_3 \rightarrow 2KCl + 3O_2$$

D) Some acids, when heated, decompose into non-metallic oxides and water

$$H_2CO_3 \rightarrow H_2O + CO_2$$

E) Some oxides, when heated decompose

$$2HgO \rightarrow 2Hg + O_2$$

F) Some Decomposition reactions are produced by electricity

$$2H_2O \rightarrow 2H_2 + O_2$$

G) Ammonium Salts decompose to give off ammonia gas

$$NH_4Br \rightarrow NH_3 + HBr$$

Single Replacement: $A + BC \rightarrow AC + B$ or $D + BC \rightarrow C + BD$

A) An active metal will replace hydrogen in water

$$2Na + 2HOH \rightarrow 2NaOH + H_2$$

B) A metal may replace hydrogen in an acid

$$Zn + 2 HNO_3 \rightarrow Zn(NO_3)_2 + H_2$$

C) A metal in a compound may be replaced by a more active metal

$$Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$$

D) A halogen will replace a halogen below it in the Periodic Table

$$2 \text{ KBr} + \text{Cl}_2 \rightarrow 2 \text{KCl} + \text{Br}_2$$

Double Replacement: $AB + CD \rightarrow AD + CB$

A) An acid and a base will react to form a salt and water

$$NaOH + HCl \rightarrow NaCl + HOH$$

B) Two compounds may react to form a precipitate

$$AgNO_3 + KCl \rightarrow AgCl + KNO_3$$

C) A metal oxide may react with an acid to form a salt and water

$$CaO + 2HCl \rightarrow CaCl_2 + HOH$$

D) Two compounds may react to form a gas

$$Ca(OH)_2 + (NH_4)_2SO_4 \rightarrow CaSO_4 + 2NH_3 + 2HOH$$

Combustion: $X + O_2 \rightarrow Oxides$

A) Hydrocarbons can combust in oxygen to make carbon dioxide and water

$$C_xH_v + O_2 \rightarrow CO_2 + H_2O$$

B) Metals can be burned in oxygen to produce oxides.

$$2Mg + O_2 \rightarrow 2MgO$$