Types of Chemical Reactions

- 1. Synthesis
- 2. Decomposition
- 3. Single Replacement (Displacement)
- 4. Double Replacement (Displacement)
- 5. Hydrocarbon Combustion

Synthesis: two or more substances combine to make one compound

$$A + B \rightarrow AB$$

$$2H_2 + O_2 \rightarrow 2H_2O$$
 $CaO + CO_2 \rightarrow CaCO_3$
 $CoCl_2 + 6H_2O \rightarrow CoCl_2 \bullet 6H_2O$

Decompostion: one compound decomposes to from
 two or more substances (substances could be
 elements or compounds)

$$2 \text{HgO} \rightarrow 2 \text{Hg} + \text{O}_2$$

$$2 \text{H}_2 \text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$$

$$\text{CoCl}_2 \bullet 6 \text{H}_2 \text{O} \rightarrow \text{CoCl}_2 + 6 \text{H}_2 \text{O}$$

<u>Single Replacement:</u> one element replaces another element in a compound

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

$$2H_2O + 2Cl_2 \rightarrow 4HCl + O_2$$

 $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$
 $Fe + AuCl_3 \rightarrow FeCl_3 + Au$

Double Replacement: switching of cation/anion
pairs

NaCl + AgNO₃
$$\rightarrow$$
 AgCl + NaNO₃
2AlCl₃ + 3Na₂S \rightarrow Al₂S₃ + 6NaCl
3Ca(NO₃)₂ + 2K₃PO₄ \rightarrow Ca₃(PO₄)₂ + 6KNO₃

Combustion of a Hydrocarbon: a hydrocarbon (C_xH_y) reacts with O_2 to from CO_2 and H_2O

$$CH_4 + O_2 \rightarrow CO_2 + 2H_2O$$
 $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
 $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$