## **Balancing Chemical Equations**

Example: Balance the following equation. Identify the type of reaction that it is.

$$Li + O_2 \rightarrow Li_2O$$

1. Count the number of each element on each side of the reaction.

$$Li-1$$
  $Li-2$   $O-2 \rightarrow O-1$ 

2. Add one of the compounds or elements to make sure the same number of atoms are on both sides of the equation.

$$Li + O_2 \rightarrow Li_2O$$
  
 $Li$ 

$$\begin{array}{ccc} Li-2 & Li-2 \\ O-2 & \rightarrow & O-1 \end{array}$$

3. Continue until the elements from reactants equals the elements from products.

$$Li + O_2 \rightarrow Li_2O$$
  
 $Li$   $Li_2O$ 

$$\begin{array}{ccc} \text{Li} - 2 & \text{Li} - 4 \\ \text{O} - 2 & \rightarrow & \text{O} - 2 \end{array}$$

$$Li + O_2 \rightarrow Li_2O$$

Li Li

$$\begin{array}{ccc}
\text{Li} - 4 & \text{Li} - 4 \\
\text{O} - 2 & \rightarrow & \text{O} - 2
\end{array}$$

4. Count up the total number of each compound or element and place that number in front of the compound or element. Never write 1.

$$4\text{Li} + \text{O}_2 \rightarrow 2\text{Li}_2\text{O}$$

5. Type of reaction: Synthesis (start with more than 1, end up with 1)

Problems – Balance the following.

1. 
$$HCl + Fe_2O_3 \rightarrow FeCl_3 + H_2O$$

2. 
$$MgCO_3 \rightarrow MgO + CO_2$$

3. 
$$HC_2H_3O_2 + Al(OH)_3 \rightarrow Al(C_2H_3O_2)_3 + H_2O$$

4. 
$$Fe_3O_4 + H_2 \rightarrow Fe + H_2O$$

5. 
$$C_6H_5OH + O_2 \rightarrow CO_2 + H_2O$$

6. 
$$KClO_4 \rightarrow KCl + O_2$$