

## Types of Chemical Reactions

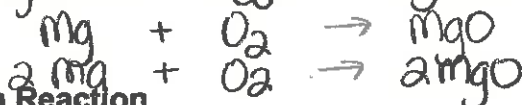
- all chemical reactions involve a change in substances and an change in energy
- can be classified into 5 types:

### 1) Synthesis Reaction

= 2 or more substances combine to make a larger compound  
- this could be elements, compounds or an elements & a compounds

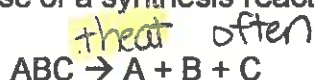


example- magnesium + oxygen  $\rightarrow$  magnesium oxide

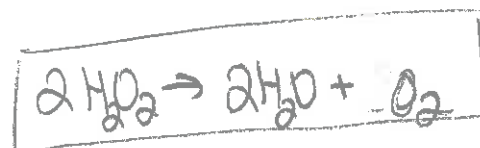


### 2) Decomposition Reaction

= larger compound is broken down into 2 or more smaller substances  
- is the reverse of a synthesis reaction



example-  $6 \text{H}_2\text{O}_2 \rightarrow 6 \text{H}_2\text{O} + 3 \text{O}_2$  \*



### 3) Single Displacement Reaction

= single element replaces another element (cations replace cations)  
(anions replace anions)  
- involves either metal replacement or halide replacement



example-  $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$

### 4) Double Displacement Reaction

= elements exchange with each other (cations replace cations, anions replace anions)  
- always involves 2 ionic compounds in aqueous solution  
- usually results in the formation of a precipitate, a gas, or water



example-  $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$

### 5) Combustion Reaction

= oxygen is added to a hydrocarbon ( $\text{C}_x\text{H}_y$ ) to produce  
- combustion = burning which requires oxygen gas  
 $\text{CO}_2 + \text{heat} + \text{H}_2\text{O}$



example-  $2 \text{C}_2\text{H}_5\text{OH} + 3 \text{O}_2 \rightarrow 2 \text{CO}_2 + 4 \text{H}_2\text{O}$   
(methanol)

review endo vs exo