**8-1 What is a chemical reaction?**

**Chemical reaction-**process in which new substances with new chemical and physical properties are formed.

**Reactant**-substance that is changed in a reaction

**Product**-substance that is formed in a reaction

 Example:

 AgNO3 + NaCl → AgCl + NaNO3

 (reactants) yield (products)

 (reactants are to the left of the arrow and products are to the right of the arrow)

**Catalyst**-chemical that changes the rate of a reaction

 without itself being changed.

**Law of Conservation of matter-**matter cannot be created or destroyed by chemical change. In a chemical reaction, the amount of matter present in the products must equal that in the reactants.

**8-2 What is a chemical Equation?**

**Coefficient-**number that shows how many molecules of a substance are involved in a chemical reaction. (This is the number in front of the molecule)

 For example;

2H2O represents two water molecules

There are 4 Hydrogen atoms and 2 Oxygen atoms

**Balanced Chemical Equations**-due to the law of conservation of matter, the number of atoms of each element must be the same on both sides of the arrow

The arrow in an equation means “yields”

In order to balance an equation, you must assign coefficeints to make the number of atoms on the left and right side of the equation equal.

For example, the following equation is not balanced:

 HgO → 2 Hg + O2

 The number of atoms of oxygen is not equal on both sides of the equation, so a 2 needs to be put as a coefficient in front of the HgO. This also fixes the problem of there not being an equal number of Hg on both sides. Now the balanced equation is written as:

 2 HgO → 2Hg + O2

**8-3 Oxidation and Reduction**

**Oxidation**-chemical change in which electrons are lost

**Reduction**-chemical change in which electrons are gained.

**8-4 What is a synthesis reaction?**

**Types of chemical reactions:**

1. Synthesis
2. Decomposition
3. Single Replacement (Single Displacement)
4. Double Replacement (Double Displacement)

**Synthesis Reactions**-occur when two or more

 substances combine to form a more complex

 substance. The reactants can be elements,

 compounds or both. The product is a

 compound.

 Example of synthesis reaction:

 C + O2 → CO2

**8-5 Decomposition Reactions**-occur when a substance

 breaks down into simpler substances. The

 reactant is a compound and the products are

 elements. (Decomposition reactions are the

 opposite of synthesis)

 Example of decomposition reaction:

 2NaCl → 2Na + Cl2

# 8-6 Single-Replacement Reactions

(Single Displacement Reactions)

-Reaction in which one element replaces

 another element in a compound

 A + BC → AC + B

Example;

 Zn + 2HCl → ZnCl2 + H2

## **8-7 Double-Replacement Reactions**

 (Double Displacement Reactions)

 -reaction in which elements from two different

 compounds replace each other.

 AB + CD → AD + CB

Example;

 AgNO3 + NaCl → NaNO3 + AgCl