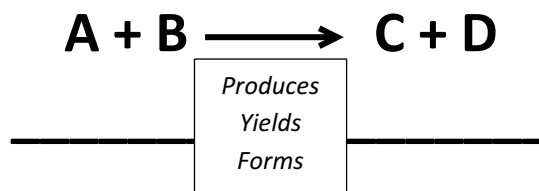


## Chapter 7: Chemical Reaction Guided Notes

### I. Chemical Changes in Matter

#### A. Chemical Reaction

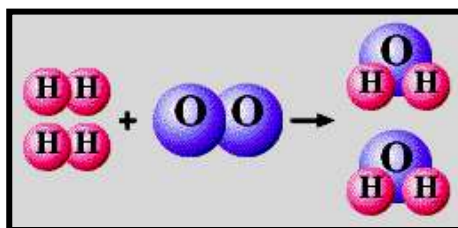
1. A change in which one or more substances are converted to \_\_\_\_\_ substances.



#### B. Law of Conservation of Matter

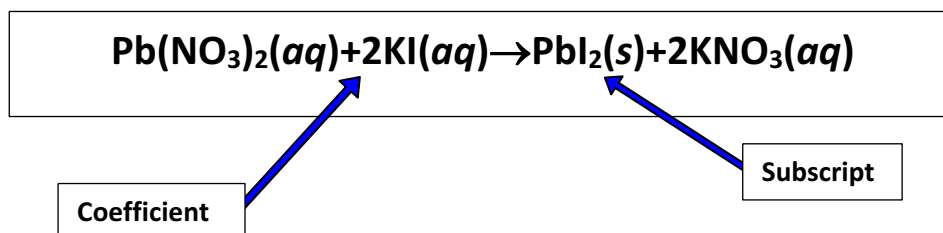
1. In a chemical reaction, matter is not \_\_\_\_\_ or \_\_\_\_\_.
2. Atoms can only be \_\_\_\_\_.
3. Discovered by Lavoisier.

\_\_\_\_\_ Hydrogen  
 \_\_\_\_\_ Oxygen



\_\_\_\_\_ Hydrogen  
 \_\_\_\_\_ Oxygen

#### C. Chemical Equations



1. \_\_\_\_\_ - # of units of each substance.
2. Individual atom = **atom**  
 $2\text{Mg} \Rightarrow 2$  \_\_\_\_\_ of magnesium
3. Covalent substance = **molecule**  
 $3\text{CO}_2 \Rightarrow 3$  \_\_\_\_\_ of carbon dioxide
4. Ionic substance = **unit**  
 $4\text{MgO} \Rightarrow 4$  \_\_\_\_\_ of magnesium oxide

SYMBOL	MEANING
$\longrightarrow$	produces, forms
+	plus, and
(s)	solid
(l)	liquid
(g)	gas
(aq)	aqueous (solid dissolved in water)
$\xrightarrow{\Delta}$	the reactants are heated

## II. Balancing Equations

### A. Steps for Balancing Equations

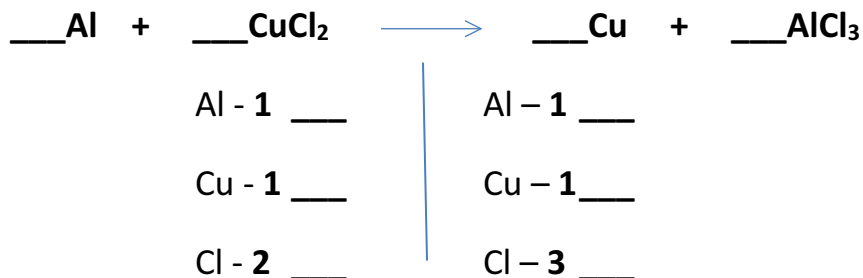
1. Write the \_\_\_\_\_ equation.
2. \_\_\_\_\_ atoms on each side.
3. Add \_\_\_\_\_ to make numbers (#) \_\_\_\_\_.

$$\text{Coefficient} \times \text{Subscript} = \# \text{ of Atoms}$$

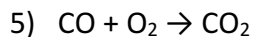
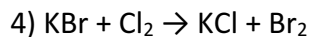
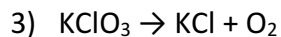
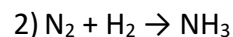
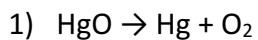
4. \_\_\_\_\_ coefficients to lowest possible ratio, if necessary.
5. Double check atom \_\_\_\_\_ !!!

### B. Balancing Example:

Aluminum and copper (II) chloride form copper and aluminum chloride.



### Balancing Equations Practice Problems



### C. Rates of Change

1. To increase the rate(speed) of a reaction (in most cases):

- Increase \_\_\_\_\_
- Increase \_\_\_\_\_ area
- \_\_\_\_\_ solutions
- \_\_\_\_\_ pressure
- Massive, bulky molecules react slower.

#### D. Catalysts

1. A **catalyst** is a substance that \_\_\_\_\_ up a chemical reaction without being permanently changed itself.
2. They are \_\_\_\_\_ reactants or products.
3. \_\_\_\_\_ are proteins that are catalysts for chemical reactions in \_\_\_\_\_ things.

#### E. Inhibitors

1. Substances that are used to \_\_\_\_\_ with one of the reactants to prevent certain reactions from occurring.
2. Examples are: \_\_\_\_\_ & lemon juice on cut fruit to keep it from turning brown.

#### F. Equilibrium Systems

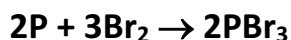
1. Some reactions are \_\_\_\_\_.
2. \_\_\_\_\_ results when rates balance.  
\*\*\*When the reaction moving  $\rightarrow$ , **equals** the reaction moving  $\leftarrow$ \*\*\*

### III. Types of Reactions

There are five (5) main types of Chemical Reactions. These are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.

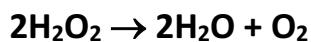
#### A. Synthesis

1. The \_\_\_\_\_ of two (2) or more substances to form a compound.
2. Only **one (1)** \_\_\_\_\_ forms.



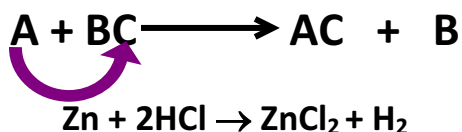
#### B. Decomposition

1. A compound \_\_\_\_\_ into two (2) or more simpler substances.
2. Only **one (1)** \_\_\_\_\_.



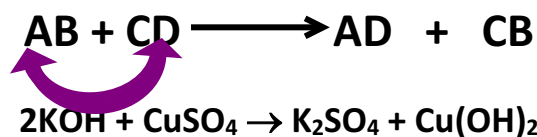
#### C. Single Replacement

1. One element \_\_\_\_\_ another in a compound.
  - Metal replaces metal (+)
  - Nonmetal replaces nonmetal (-)



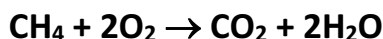
#### D. Double Replacement

1. Ions in two compounds " \_\_\_\_\_ " partners.
2. \_\_\_\_\_ (+) of one compound combines with \_\_\_\_\_ (-) of the other.



#### E. Combustion

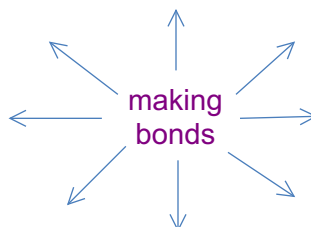
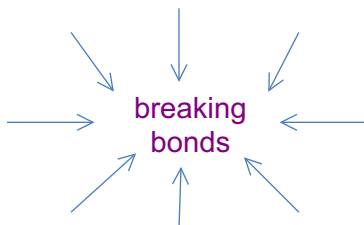
1. Uses \_\_\_\_\_ ( $\text{O}_2$ ) as a reactant.
2. Produces \_\_\_\_\_.
3. The products usually include \_\_\_\_\_ ( $\text{H}_2\text{O}$ ) and \_\_\_\_\_ ( $\text{CO}_2$ ).



### IV. Energy & Chemical Reactions

#### A. Energy Changes

1. During a chemical reaction...
  - energy is used to \_\_\_\_\_ bonds.
  - energy is \_\_\_\_\_ when new bonds are formed.



#### B. Endothermic Reaction

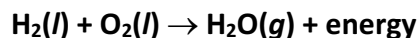
1. Reaction that \_\_\_\_\_ energy.
2. Energy required to \_\_\_\_\_ old bonds outweighs energy released by making new bonds.



3. Process used to obtain aluminum from aluminum ore.

#### C. Exothermic Reaction

1. Reaction that \_\_\_\_\_ energy.
2. Energy \_\_\_\_\_ by making new bonds outweighs energy required to break old bonds.



3. Reaction that powers the space shuttle lift-off.

## V. Moles

### A. Mole

The SI base unit that describes how many tiny particles make up a fixed amount of a \_\_\_\_\_.

### B. Avogadro's Constant

1. \_\_\_\_\_  $\times 10^{23}$  = the number of particles in exactly one mol (\_\_\_\_\_) of a substance.
2. This number is used to calculate the \_\_\_\_\_ of a substance.

### C. Molar Mass

The molar mass is used to \_\_\_\_\_ the number of particles of each substance in a chemical reaction.