CHEMICAL REACTIONS PPT NOTES NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Describing Reactions**

* The most useful way of describing reactions (or a chemical change) is by stating what was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ before and after the chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

chemical reaction

* process in which one or more substances are changed into new substances

reactants

* substance that reacts

product

* the new substance that is formed

Conservation of mass

* The French chemist Antoine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ established that the total\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_always equals the total \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Mass is not created nor destroyed in a chemical reaction

Writing equations

* chemical equation:
  + shorthand method to describe a chemical reaction using chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Reactants Products
* HgO(s) 🡪 Hg(l) + O2(g)
* (aq) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(substance dissolved in water)
* (s)– solid
* (l) – liquid
* (g) – gas
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – the numbers to the left of the formulas used to help balance the equation

**Balancing equations**

* If you notice that the number of atoms on the left side does not equal the number of atoms on the right side then we must balance the equation.
  + Since mass is conserved before and after a chemical reaction, an equation \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order for it to be true.
* RULES:
* You should NEVER change the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a formula.

1. Start by, counting the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_of each element on \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ of the equation.
2. Change one or more coefficients until the equation is balanced

Example:

* Balance the following equation
* NiCl2(aq) + NaOH(aq) 🡪 Ni(OH)2(s) + NaCl(aq)
* example
* HgO(s) 🡪 Hg(l) + O2(g)

**Types of reactions**

* Reactions are classified by the type of\_\_\_\_\_\_\_\_\_\_\_\_ or the number of reactants and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* There are 4 different types of reactions that we will discuss

1. Synthesis
2. Decomposition
3. Single-Replacement
4. Double-Replacement

Synthesis

* A ***synthesis*** reaction is a reaction in which two or more substances react to form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_substance.
* The product *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*is always a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Examples
* A + B 🡺 AB
* 2Na + Cl2🡺 2NaCl

Decomposition

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of synthesis
* A ***decomposition*** reaction is a reaction in which a compound \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ into two or more simpler substances.
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_MUST BE a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Examples
* AB 🡺A + B
* 2H2O 🡺2H2 + O2

Single Replacement

* A ***single replacement*** reaction is a reaction in which one element\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ another element in a compound.
* Example Form:
* A + BC 🡺B + AC
* Cu + 2AgNO3 🡺 2Ag + Cu(NO3)2

Double replacement

* A ***double replacement*** reaction is one in which two different compounds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ positive ions and form two new compounds.
* Example Forms:
* AB + CD🡺 AD + CB
* Pb(NO3)2 + 2KI 🡺PbI2 + 2KNO3

**Energy Changes in Reactions**

* Chemical Reactions involve the breaking of chemical bonds in the reactants and the formation of chemical bonds in the products.
* During a chemical reaction, energy is either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A chemical reaction that RELEASES energy is called an ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reaction.***
* A chemical reaction that absorbs energy from its surroundings is called an ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_reaction.***

Exothermic Reactions

* A chemical reaction that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_energy is called an ***exothermic reaction.***
* The energy released as the products form is greater than the energy required to break the bonds in the reactants.
* Think of it as energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_the reaction
* **EX**iting \_ **Ex**othermic

Endothermic reactions

* A chemical reaction that\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy from its surroundings is called an ***endothermic reaction.***
* This means that there is more energy require to break the bonds of the reactants than is released by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the products.