**Purpose:** Today we will begin Chapter 11: Chemical reactions. This chapter is an introduction to writing chemical reactions in scientific shorthand (i.e. chemical equations using chemical symbols) and to identifying/predicting what chemical reaction will occur when two substances are mixed.

**Tonight’s HW:** Read 11.1-11.2; Complete back page of this worksheet and work on Empirical Formula lab report

**Vocabulary that we use when talking about chemical reactions**

**Chemical equation details:**

**reactant plus reactant yields product plus product**

*Other words*

*commonly used: reacts with produces and*

 *combines with forms*

 *is bonded with to make*

*State symbols: (g)- gas*

 *(l) – liquid*

 *(s) – solid*

 *(aq)- in aqueous solution (dissolved in water)*

**Balancing equations:**

***Let’s build a sandwich***

***2Bread+12Bacon+1Lettuce+2Tomatoes+4servingsMayo 🡪 Bd2Bc12LT2M4***

 ***(more commonly known as a BLT!! ☺)***

***Example problems:***

 ***\_1\_\_ H2O2  🡪 \_1\_\_ H2 + \_\_1\_ O2***

 ***Solid iron reacts with oxygen in the air to produce iron (III) oxide.***

 ***Fe(s) + O2 (g) 🡪 Fe2O3 (s)***

**Balancing equations practice problems:**

(1)To balance an equation we must first have a chemical equation in the symbolic form. So we must convert a text format to a formula format.

(2) Next we must tally how many of each kind of atom we have.

(3)Then we must insert coefficients (NOT CHANGE SUBSCRIPTS) to make it equal on both sides. Changing coefficients changes the amount of substance, while changing subscripts changes the identity of the substance.

\*\*Hint\*\* First work with atoms that are only in one molecule on both sides, then attempt the ones that are in more than one molecule on one side of the equation. These tend to be H and O

1.) \_\_FeS + \_2\_HCl 🡪 \_\_FeCl2 + H2S 2.) \_2\_KClO3  🡪 \_2\_KCl + \_3\_O2

3.) \_2\_H2S + \_3\_O2 🡪 \_2\_SO2 +\_2\_H2O 4.) \_\_Na2O2 + \_\_H2O 🡪 \_\_O2 + \_2\_NaOH

5.) \_\_BaCl2 + \_\_Na2SO4 🡪 \_2\_NaCl + \_\_BaSO4 6.) \_2\_SO2 + \_\_O2 🡪 \_2\_SO3

7.) \_2\_C6H6 + \_15\_O2 🡪 \_12\_CO2 + \_6\_H2O 8.) \_\_Pb(NO3)2 + \_\_H2S 🡪 \_\_PbS + \_2\_HNO3

9.) \_2\_K + \_2\_H2O 🡪 \_\_H2 + \_\_2\_KOH 10.) \_\_SO3 + \_\_H2O 🡪 \_\_H2SO4

11.) \_2\_Na + \_2\_H2O 🡪 \_2\_NaOH + \_\_H2  12.) \_4\_NH3 + \_5\_O2 🡪 \_4\_NO + \_\_6\_H2O

13.) \_\_CO2 + \_\_H2 🡪 \_\_CO + \_\_H2O 14.) \_2\_Ag2S + \_2\_H2O 🡪 \_4\_Ag + \_2\_H2S + \_\_O2

1. Zinc plus sulfur yields zinc sulfide.

Zn + S 🡪 ZnS

1. Calcium oxide plus water yields calcium hydroxide.

CaO + H2O 🡪 Ca(OH)2

1. Aluminum metal reacts with hydrochloric acid to product aluminum chloride and hydrogen gas.

2Al + 6HCl 🡪 2AlCl3 + 3H2

1. Sodium hydrogen carbonate yields sodium carbonate plus carbon dioxide plus water.

2NaHCO3 🡪 Na2CO3 + CO2 + H2O