**Intro to Stoichiometry Worksheet Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Balance the following equations then determine the mole to mole ratio between the underlined substances.**

1. \_\_\_\_ N2 + \_\_\_\_ **H2** 🡪 \_\_\_\_ **NH3** Ratio: \_\_\_\_\_\_ mole hydrogen to \_\_\_\_\_\_\_ mole ammonia

2. \_\_\_\_ **KClO3** 🡪 \_\_\_\_ KCl + \_\_\_\_ **O2** Ratio: \_\_\_\_\_\_ mole KClO3 to \_\_\_\_\_\_\_ mole KCl

3. \_\_\_\_ NaCl + \_\_\_\_ **F2** 🡪 \_\_\_\_ **NaF** + \_\_\_\_ Cl2 Ratio: \_\_\_\_\_\_ mole Flourine to \_\_\_\_\_\_ mole NaF

4. \_\_\_\_ **H2** + \_\_\_\_ O2 🡪 \_\_\_\_ **H2O** Ratio:\_\_\_\_\_\_\_ mole Hydrogen to \_\_\_\_\_\_ mole water

5. \_\_\_\_ **Pb(OH)2** + \_\_\_\_ HCl 🡪 \_\_\_\_ **H2O** + \_\_\_\_ PbCl2 Ratio: \_\_\_\_\_ mole Pb(OH)2 to \_\_\_\_\_\_ mole water

**Solve the following mole:mole problems**

1. 2 NaOH + H2SO4 🡪 2 H2O + Na2SO4

1. How many moles of water will be formed if you start with 2.54 moles of sodium hydroxide?
2. How many moles of sodium sulfate will be formed if you start with 3.46 moles of H2SO4?
3. How many moles of sodium hydroxide is needed to produce 3.67 moles of water?
4. How many moles of H2SO4 is needed to produce 6.78 moles of Na2SO­4?

2. Pb(NO3)4 + 2 Li2SO4 🡪 Pb(SO4)2 + 4 LiNO3

1. How many moles of lithium nitrate will be produced from 5.67 moles of lithium sulfate?
2. How many moles of lead (IV) sulfate will be produced from 7.89 moles of lithium sulfate?
3. How many moles of lithium sulfate are required to form exactly 12.5 moles of lead (IV) sulfate?
4. How many moles of lead (IV) nitrate are needed to produce 3.45 moles of lithium nitrate?

3. 2 NO + O2 🡪 2 NO2

1. How many grams of nitrogen dioxide are produced by 4.67 moles of oxygen?
2. How many moles of nitrogen monoxide are needed to produce 2.34 moles of nitrogen dioxide?
3. How many moles of oxygen are needed to produce 7.98 moles of nitrogen dioxide?

**Solve the following stoichiometry problems**

4. Cu + 2 HgNO3 🡪 Cu(NO3)2 + 2 Hg

a. How many moles of mercury will be produced from 6 grams of copper?

b. How many moles of copper (II) nitrate will be produced from 4.5 moles of mercury (I) nitrate?

c. How many grams of copper are needed to produce 8.45 grams of copper (II) nitrate?

d. How many grams of mercury (I) nitrate are needed to produce 10.3 moles of copper (II) nitrate?

5. 2 NaCl + H2SO4 🡪 2 HCl + Na2SO4

a. How many grams of HCl will be produced from 2.5 moles of sodium chloride?

b. How many moles of sodium sulfate will be produced from 7.89 grams of H2SO4?

c. How many grams of NaCl are needed to make 5.6 grams of Na2SO4?

d. How many moles of H2SO4 are needed to make 6.78 moles of HCl?

6. 4 HCl + O2 🡪 2 H2O + 2 Cl2

a. How many moles of water are produced from 4.5 moles of oxygen?

b. How many grams of chlorine are produced from 7.8 grams of HCl?

c. How many moles of oxygen are needed to produce 9.0 grams of water?

d. How many grams of HCl are needed to produce 5.67 moles of Cl2?

7. CH4 + 2 O2🡪 CO2 + 2 H2O

a. How many grams of carbon dioxide are produced from 5.6 grams of CH4?

b. How many moles of water are produced from 3.4 grams of oxygen?

c. How many grams of CH4 are needed to produce 6.78 moles of CO2?

d. How many moles of O2 are needed to produce 4.6 moles of water?