**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**A Voyage through Equations**

After working on this worksheet, you should be able to do the following:

1) Given an equation, you should be able to tell what kind of reaction it is.

2) Predict the products of a reaction when given the reactants.

**Section 1: Identify the type of reaction**

For the following reactions, indicate whether the following are examples of synthesis, decomposition, combustion, single displacement, double displacement, or acid-base reactions:

1) Na3PO4 + 3 KOH → 3 NaOH + K3PO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) MgCl2 + Li2CO3 → MgCO3 + 2 LiCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) C6H12 + 9 O2 → 6 CO2 + 6 H2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) Pb + FeSO4 → PbSO4 + Fe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) CaCO3 → CaO + CO2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6) P4 + 3 O2 → 2 P2O3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) 2 RbNO3 + BeF2 → Be(NO3)2 + 2 RbF \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) 2 AgNO3 + Cu → Cu(NO3)2 + 2 Ag \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) C3H6O + 4 O2 → 3 CO2 + 3 H2O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10) 2 C5H5 + Fe → Fe(C5H5)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11) SeCl6 + O2 → SeO2 + 3Cl2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) 2 MgI2 + Mn(SO3)2 → 2 MgSO3 + MnI4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13) O3 → O. + O2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14) 2 NO2 → 2 O2 + N2\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Section 2: Practicing equation balancing**

Before you can write a balanced equation for a problem which asks you to predict the products of a reaction, you need to know how to balance an equation. Because some of you may not fully remember how to balance an equation, here are some practice problems:

1) \_\_ C6H6 + \_\_ O2 → \_\_ H2O + \_\_ CO2

2) \_\_ NaI + \_\_ Pb(SO4)2 → \_\_ PbI4 + \_\_ Na2SO4

3) \_\_ NH3 + \_\_ O2 →\_\_ NO + \_\_ H2O

4) \_\_ Fe(OH)3 → \_\_ Fe2O3 + \_\_ H2O

5) \_\_ HNO3 + \_\_ Mg(OH)2 → \_\_H2O + \_\_ Mg(NO3)2

6) \_\_ H3PO4 + \_\_ NaBr → \_\_ HBr + \_\_ Na3PO4

7) \_\_ C + \_\_ H2 → \_\_ C3H8

8) \_\_ CaO + \_\_ MnI4 → \_\_ MnO2 + \_\_ CaI2

9) \_\_ Fe2O3 + \_\_ H2O → \_\_ Fe(OH)3

10) \_\_ C2H2 + \_\_ H2 → \_\_ C2H6

11) \_\_ VF5 + \_\_ HI → \_\_ V2I10 + \_\_ HF

12) \_\_ OsO4 + \_\_ PtCl4 → \_\_ PtO2 + \_\_ OsCl8

13) \_\_ CF4 + \_\_ Br2 → \_\_ CBr4 + \_\_ F2

14) \_\_ Hg2I2 + \_\_ O2 → \_\_ Hg2O + \_\_ I2

15) \_\_ Y(NO3)2 + \_\_ GaPO4 → \_\_ YPO4 + \_\_ Ga(NO3)2

**Section 3: Predicting the products of chemical reactions**

Predict the products of the following reactions:

1) \_\_ Ag + \_\_CuSO4 →

Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2) \_\_ NaI + \_\_ CaCl2 →

Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3) \_\_ O2 + \_\_ H2 →

Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) \_\_ HNO3 + \_\_ Mn(OH)2 →

Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) \_\_ AgNO2 + \_\_ BaSO4 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6) \_\_ HCN + \_\_ CuSO4 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) \_\_ H2O + \_\_ AgI →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8) \_\_ HNO3 + \_\_Fe(OH)3 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9) \_\_ LiBr + \_\_ Co(SO3)2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10) \_\_ LiNO3 + \_\_Ag →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

11) \_\_ N2 + \_\_ O2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

12) \_\_ H2CO3 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

13) \_\_ AlCl3 + \_\_ Cs →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

14) \_\_ Al(NO3)3 + \_\_ Ga →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15) \_\_ H2SO4 + \_\_ NH4OH →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16) \_\_ CH3COOH + \_\_ O2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17) \_\_ C4H8 + \_\_ O2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18) \_\_ KCl + \_\_ Mg(OH)2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19) \_\_ Zn + \_\_ Au(NO2)2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

20) \_\_ KOH + \_\_ H2SO4 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

21) \_\_ BaS + \_\_ PtCl2 →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

22) \_\_ Na2O →

 Type:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_