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) $Na_3PO_4 + 3\ KOH \rightarrow 3\ NaOH + K_3PO_4$ _____

2) $MgCl_2 + Li_2CO_3 \rightarrow MgCO_3 + 2\ LiCl$ _____

3) $C_6H_{12} + 9\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$ _____

4) $Pb + FeSO_4 \rightarrow PbSO_4 + Fe$ _____

5) $CaCO_3 \rightarrow CaO + CO_2$ _____

6) $P_4 + 3\ O_2 \rightarrow 2\ P_2O_3$ _____

7) $2\ RbNO_3 + BeF_2 \rightarrow Be(NO_3)_2 + 2\ RbF$ _____

8) $2\ AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2\ Ag$ _____

9) $C_3H_6O + 4\ O_2 \rightarrow 3\ CO_2 + 3\ H_2O$ _____

10) $2\ C_5H_5 + Fe \rightarrow Fe(C_5H_5)_2$ _____

11) $SeCl_6 + O_2 \rightarrow SeO_2 + 3Cl_2$ _____

12) $2\ MgI_2 + Mn(SO_3)_2 \rightarrow 2\ MgSO_3 + MnI_4$ _____

13) $O_3 \rightarrow O^{\cdot} + O_2$ _____

14) $2\ NO_2 \rightarrow 2\ O_2 + N_2$_____

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) __ C_6H_6 + __ O_2 → __ H_2O + __ CO_2

2) __ NaI + __ $Pb(SO_4)_2$ → __ PbI_4 + __ Na_2SO_4

3) __ NH_3 + __ O_2 →__ NO + __ H_2O

4) __ $Fe(OH)_3$ → __ Fe_2O_3 + __ H_2O

5) __ HNO_3 + __ $Mg(OH)_2$ → __H_2O + __ $Mg(NO_3)_2$

6) __ H_3PO_4 + __ NaBr → __ HBr + __ Na_3PO_4

7) __ C + __ H_2 → __ C_3H_8

8) __ CaO + __ MnI_4 → __ MnO_2 + __ CaI_2

9) __ Fe_2O_3 + __ H_2O → __ $Fe(OH)_3$

10) __ C_2H_2 + __ H_2 → __ C_2H_6

11) __ VF_5 + __ HI → __ V_2I_{10} + __ HF

12) __ OsO_4 + __ $PtCl_4$ → __ PtO_2 + __ $OsCl_8$

13) __ CF_4 + __ Br_2 → __ CBr_4 + __ F_2

14) __ Hg_2I_2 + __ O_2 → __ Hg_2O + __ I_2

15) __ $Y(NO_3)_2$ + __ $GaPO_4$ → __ YPO_4 + __ $Ga(NO_3)_2$

Section 3: Predicting the products of chemical reactions

Predict the products of the following reactions:

1) __ Ag + __$CuSO_4$ →

Type:_____

2) __ NaI + __ $CaCl_2$ →

Type:_____

3) __ O_2 + __ H_2 →

Type:_____

4) __ HNO_3 + __ $Mn(OH)_2$ →

Type:_____

5) __ $AgNO_2$ + __ $BaSO_4$ →

Type:_____

6) __ HCN + __ $CuSO_4$ →

Type:_____

7) __ H_2O + __ AgI →

Type:_____

8) __ HNO_3 + __$Fe(OH)_3$ →

Type:_____

9) __ LiBr + __ $Co(SO_3)_2$ →

Type:_____

10) __ $LiNO_3$ + __Ag →

Type:_____

11) __ N_2 + __ O_2 →

Type:_____

12) __ H_2CO_3 →

Type:_____

13) __ $AlCl_3$ + __ Cs →

Type:_____

14) __ $Al(NO_3)_3$ + __ Ga →

Type:_____

15) __ H_2SO_4 + __ NH_4OH →

Type:_____

16) __ CH_3COOH + __ O_2 →

Type:_____

17) __ C_4H_8 + __ O_2 →

Type:_____

18) __ KCl + __ $Mg(OH)_2$ →

Type:_____

19) __ Zn + __ $Au(NO_2)_2$ →

Type:_____

20) __ KOH + __ H_2SO_4 →

Type:_____

21) __ BaS + __ $PtCl_2$ →

Type:_____

22) __ Na_2O →

Type:_____