Balancing Equations Practice #1 – Simple Coefficients

1) _____H_2 + _____Cl_2 → __2__HCl

2) __2__K + _____Br_2 → __2__KBr

3) __2__Ca + _____O_2 →__2__CaO

4) _____O_2 + __2__Mg → __2__MgO

5) _____F_2 + _2__NaI → _2__NaF + _____I_2

6) __2__K + _____Cl_2 → __2__KCl

7) _____ $AlBr_3$ + __3__ K → __3_ KBr + _____ Al

8) _____Mg_3N_2 → __3__Mg + _____N_2

9) _3__K + _____AlN → _____K_3N + _____Al

10) __2_ LiCl + _____ Br_2 → __2_ LiBr + _____ Cl_2

11) _____AlF_3 + _____Li_3N → _____AlN + ___3_LiF

12) _____ $PbBr_2$ + __2_ HCl → __2_ HBr + _____ $PbCl_2$

13) __2__NaF + _____Br_2 → ___2_NaBr + _____F_2

Balancing Equations Practice #2 – Lowest Common Factor

1) __2__Al + __3__Cl_2 → __2__$AlCl_3$

2) __3_Cl_2 + __2_$GaBr_3$ → _2__$GaCl_3$ + __3_Br_2

3) ___4__Ga + __3__O_2 → ___2__Ga_2O_3

4) ___2__AlI_3 → __2__Al + ___3__I_2

5) _____N_2 + __3__F_2 → __2__NF_3

6) _____Br_2 + ___2_KI → _____I_2 + ___2_KBr

7) ___2_Fe + __3__Cl_2 → ___2_$FeCl_3$

8) ___6_K + _____B_2O_3 → _____3_K_2O + _____2_B

9) __2__Al + ___6_HCl → __3__H_2 + ___2_ $AlCl_3$

10) _____ P_4 + __2__O_3 → __2__P_2O_3

11) _____N_2 + __3__H_2 → __2__NH_3

12) __2_Na_3P + __3_CaF_2 → __6_NaF + _____Ca_3P_2

13) ___2_ Mn + ___6_ HI → ___3_ H_2 + __2__ MnI_3

14) _____CF_4 + __2__ Br_2 → _____CBr_4 + __2__F_2

15) _____ P_4 + __6_ Br_2 → __4_ PBr_3

Balancing Equations Practice #3 – Polyatomic Ions

1) _2__$LiNO_3$ + _____$CaBr_2$ → _____$Ca(NO_3)_2$ + __2_LiBr

2) _____$Si(OH)_4$ + __4_NaBr → _____$SiBr_4$ + __4_NaOH

3) _2__$NaNO_3$ + _____$CuCO_3$ → _____Na_2CO_3 + _____$Cu(NO_3)_2$

4) __2_$FeCl_3$ + _3__$(NH_4)_2S$ → _____Fe_2S_3 + __6_NH_4Cl

5) __2_Al + __3_H_2SO_4 → _____$Al_2(SO_4)_3$ + __3_H_2

6) _2__$RbNO_3$ + _____BeF_2 → _____$Be(NO_3)_2$ + __2_RbF

7) __2_$AgNO_3$ + _____Cu → _____$Cu(NO_3)_2$ + __2_Ag

8) __2_$AlBr_3$ + _3__K_2SO_4 → __6_KBr + _____$Al_2(SO_4)_3$

9) __2_Na_3PO_4 + _3__$CaCl_2$ → __6_NaCl + _____$Ca_3(PO_4)_2$

10) _2__$CoBr_3$ + __3_$CaSO_4$ → __3_$CaBr_2$ + _____$Co_2(SO_4)_3$

11) __2_NH_4Br + _____K_2CO_3 → _____ $(NH_4)_2CO_3$ + __2_KBr

12) ___Na_3PO_4 + __3_KOH → __3_NaOH + _____K_3PO_4

13) _____Li_3PO_4 + __3_NaBr → _____Na_3PO_4 + __3_LiBr

14) _____CaF_2 + _____Li_2SO_4 → _____$CaSO_4$ + __2_LiF

15) __3_$MgCl_2$ + __2_$Al(OH)_3$ → __2_$AlCl_3$ + __3_$Mg(OH)_2$

16) ___$FeCl_3$ + __3_NaOH → ___$Fe(OH)_3$ + __3_NaCl

17) __2_Al + _6__HNO_3 → __2_$Al(NO_3)_3$ + __3_H_2

18) _____$Al_2(SO_3)_3$ + __6_NaOH → __3_Na_2SO_3 + _2__$Al(OH)_3$

19) __2_$FeCl_3$ + _3__Na_2SO_4 → _____$Fe_2(SO_4)_3$ + __6_NaCl

20)_2__HCN + _____$CuSO_4$ → _____H_2SO_4 + _____$Cu(CN)_2$

21) __3_$(NH_4)_2SO_4$ + __2_$Al(NO_3)_3$ → __6_NH_4NO_3 + _____$Al_2(SO_4)_3$

22)_3__$FeCO_3$ + _2__Li_3PO_4 → _____$Fe_3(PO_4)_2$ + _3__Li_2CO_3

23)_____$Mn_2(CO_3)_3$ + __3_$Ca(NO_3)_2$ → __2_$Mn(NO_3)_3$ + __3_$CaCO_3$

24)__3_K_2SO_4 + __2_$Ni(OH)_3$ → __6_KOH + _____$Ni_2(SO_4)_3$

25)__3_ $(NH_4)_2S$ + _____$Cr_2(CO_3)_3$ → __3_ $(NH_4)_2CO_3$ + _____Cr_2S_3

26) __3_$Ba(C_2H_3O_2)_2$ + __2_$Ti(OH)_3$ → __3_$Ba(OH)_2$ + __2_$Ti(C_2H_3O_2)_3$

Balancing Equations Set #4: Challenging Problem Solving Themes

Relatively Easy: no difficult themes or simple multiples

1) $2NH_3 + 3O_2 \rightarrow \_\_\_\_\_N_2O_3 + 3H_2O$

2) $2Fe + 3H_2O \rightarrow \_\_\_\_\_Fe_2O_3 + 3H_2$

3) $\_\_\_\_\_P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$

4) $2CO + \_\_\_\_\_O_2 \rightarrow 2CO_2$

5) $2KClO_3 \rightarrow 2KCl + 3O_2$

6) $\_\_\_\_\_P_4O_{10} + 6H_2O \rightarrow 4H_3PO_4$

7) $\_\_\_\_\_C_{10}H_{22} + 11Cl_2 \rightarrow 10C + 22HCl$

8) $\_\_\_\_\_C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$

Relatively Easy: Writing H_2O as H(OH)

9) $2HBr + \_\_\_\_\_Mg(OH)_2 \rightarrow \_\_\_\_\_MgBr_2 + 2H_2O$

10) $\_\_\_\_\_Be_2C + 4H_2O \rightarrow 2Be(OH)_2 + \_\_\_\_\_CH_4$

11) $2K + 2H_2O \rightarrow 2KOH + \_\_\_\_\_H_2$

12) $\_\_\_\_\_Mg_3N_2 + 6H_2O \rightarrow 3Mg(OH)_2 + 2NH_3$

Medium Difficulty: use of multiples or determining which element to start with

13) $3P_4 + 10O_3 \rightarrow 6P_2O_5$

14) $4Al_2O_3 + 9Fe \rightarrow 3Fe_3O_4 + 8Al$

15) $4KClO_3 \rightarrow \_\_\_\_\_KCl + 3KClO_4$

16) $2Si_5H_{11} + 11Br_2 \rightarrow 10Si + 22HBr$

17) $4P_4 + 5S_8 \rightarrow 8P_2S_5$

18) $\_\_\_\_\_NH_4NO_3 \rightarrow \_\_\_\_\_N_2O + 2H_2O$

19) $2NH_3 + 3CuO \rightarrow 3Cu + \_\_\_\_\_N_2 + 3H_2O$

20) $4FeS_2 + 11O_2 \rightarrow 2Fe_2O_3 + 8SO_2$

21) $2NaHCO_3 \rightarrow \_\_\_\_\_Na_2CO_3 + \_\_\_\_\_H_2O + \_\_\_\_\_CO_2$

22) $2ZnFeS_2 + 5O_2 \rightarrow 2Zn + 2FeO + 4SO_2$

Hard: equations with few patters if student has no knowledge of redox reactions

23) $4C_3H_8 + 5S_8 \rightarrow 12CS_2 + 16H_2S$

24) $2KMnO_4 + 16HCl \rightarrow 2KCl + 2MnCl_2 + 8H_2O + 5Cl_2$

25) $\_\_\_\_S_8 + 48HNO_3 \rightarrow 8H_2SO_4 + 48NO_2 + 16H_2O$

26) $3Cu + 8HNO_3 \rightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

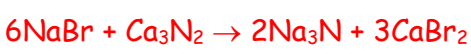
27) $\_\_\_\_K_4Fe(CN)_6 + 6H_2SO_4 + 6H_2O \rightarrow 2K_2SO_4 + \_\_\_\_FeSO_4 + 3(NH_4)_2SO_4 + 6CO$

28) $10K_4Fe(CN)_6 + 122KMnO_4 + 299H_2SO_4 \rightarrow 162KHSO_4 + 5Fe_2(SO_4)_3 + 122MnSO_4 + 60HNO_3 + 60CO_2 + 188H_2O$

Double Replacement Practice (PreIB) Name _____

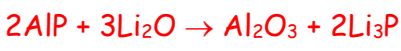
Write the general form of a double replacement reaction: **AB + CD → AD + CB**

1) Sodium bromide + calcium nitride →



$6NaBr + Ca_3N_2 \rightarrow 2Na_3N + 3CaBr_2$

2) Aluminum phosphide + lithium oxide →

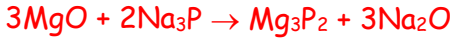


$2AlP + 3Li_2O \rightarrow Al_2O_3 + 2Li_3P$

3) Nickel (III) iodide + potassium phosphide →

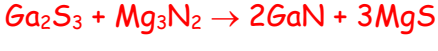
$NiI_3 + K_3P \rightarrow NiP + 3KI$

4) Magnesium oxide + sodium phosphide →



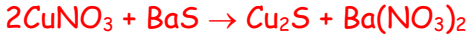
$3MgO + 2Na_3P \rightarrow Mg_3P_2 + 3Na_2O$

5) Gallium sulfide + magnesium nitride →



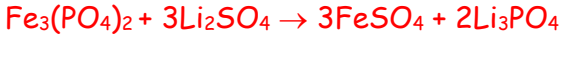
$Ga_2S_3 + Mg_3N_2 \rightarrow 2GaN + 3MgS$

6) Copper (I) nitrate + barium sulfide →



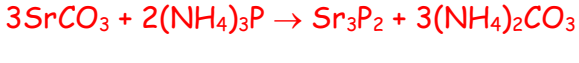
$2CuNO_3 + BaS \rightarrow Cu_2S + Ba(NO_3)_2$

7) Iron (II) phosphate + lithium sulfate →



$Fe_3(PO_4)_2 + 3Li_2SO_4 \rightarrow 3FeSO_4 + 2Li_3PO_4$

8) Strontium carbonate + ammonium phosphide →



$3SrCO_3 + 2(NH_4)_3P \rightarrow Sr_3P_2 + 3(NH_4)_2CO_3$

Synthesis and Decomposition Reactions Name: _____

1) What are the seven diatomic elements? Br I N Cl H O F

2) When do you put a "2" as a subscript with a diatomic element?
When the element is by itself and not bonded to other elements.

Synthesis

Write the general equation for a synthesis reaction: $A + B \rightarrow AB$

3) Sodium + chlorine →

$2Na + Cl_2 \rightarrow 2NaCl$

4) Aluminum + bromine →

$2Al + 3Br_2 \rightarrow 2AlBr_3$

5) Magnesium + nitrogen →

$3Mg + N_2 \rightarrow Mg_3N_2$

Decomposition

Write the general equation for a decomposition reaction: $AB \rightarrow A + B$

6) Lithium nitride →

$2Li_3N \rightarrow 6Li + N_2$

7) Aluminum fluoride →

$2AlF_3 \rightarrow 2Al + 3F_2$

8) Copper (II) oxide →

$2CuO \rightarrow 2Cu + O_2$

9) Water →

$2H_2O \rightarrow 2H_2 + O_2$

Chap 9: Review for Quiz (PreIB) Name: _____

Double Replacement General formula: AB + CD → AD + CB

1) Calcium nitride + lithium bromide →

   $Ca_3N_2 + 6LiBr \rightarrow 3CaBr_2 + 2Li_3N$

2) Ammonium sulfide + magnesium oxide →

   $(NH_4)_2S + MgO \rightarrow (NH_4)_2O + MgS$

3) Iron (III) chloride + potassium sulfate →

   $2FeCl_3 + 3K_2SO_4 \rightarrow Fe_2(SO_4)_3 + 6KCl$

Synthesis General formula: A + B → AB

4) Aluminum + iodine →

   $2Al + 3I_2 \rightarrow 2AlI_3$

5) Calcium + nitrogen →

   $3Ca + N_2 \rightarrow Ca_3N_2$

Decomposition General formula: AB → A + B

6) Strontium oxide →

   $2SrO \rightarrow 2Sr + O_2$

7) Sodium chloride →

   $2NaCl \rightarrow 2Na + Cl_2$

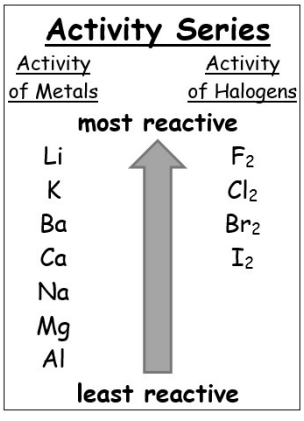
Single Replacement General formula: AB + C → AC + B

8) Chlorine + Aluminum iodide →

   $3Cl_2 + 2AlI_3 \rightarrow 2AlCl_3 + 3I_2$

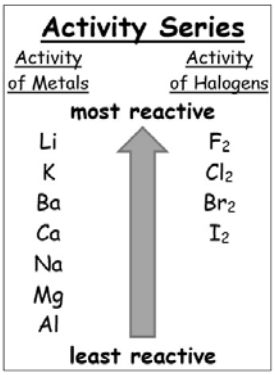
9) Sodium + Magnesium phosphide →

   $6Na + Mg_3P_2 \rightarrow 2Na_3P + 3Mg$



Single Replacement Practice (PreIB) Name _____

Write the general form of a single replacement reaction: **AB + C → AC + B**



1) Potassium + sodium phosphide →

2) Aluminum chloride + fluorine →

3) Calcium + potassium oxide →

No reaction *(Calcium has a lower activity than potassium)*

4) Potassium + calcium nitride →

5) Iodine + aluminum bromide →

No reaction *(Iodine has a lower activity than bromine)*

6) Sodium nitride + lithium →

7) Fluorine + iron (III) chloride →

8) Aluminum + barium oxide →

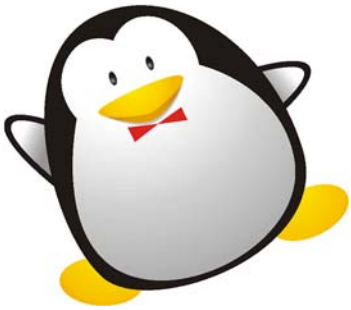
No reaction *(Aluminum has a lower activity than barium)*

9) Chlorine + magnesium bromide →

Combustion Fun! Name: _____

Complete with the video:

The general form of a combustion reaction is: $C_xH_y + O_2 \rightarrow CO_2 + H_2O$



1) $CH_4 + O_2 \rightarrow$

2) $C_2H_6 + O_2 \rightarrow$

3) $C_7H_6O + O_2 \rightarrow$

Complete on your own:

4) $C_5H_{12} + 8O_2 \rightarrow 5CO_2 + 6H_2O$

5) $2C_4H_{10}O_2 + 11O_2 \rightarrow 8CO_2 + 10H_2O$

6) $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$

7) $2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O$

8) $C_4H_8O_2 + 5O_2 \rightarrow 4CO_2 + 4H_2O$

9) $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$

10) $C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O$

Ch 9: Mixed Review (PreIB) Name: _____

Solve & label each: S=synthesis, D=decomposition, SR= single rep, DR= double rep, Comb=combustion

_____ 1) Rubidium fluoride →

$2RbF \rightarrow 2Rb + F_2$

_____ 2) Iron (III) chloride + lead (II) phosphate →

$2FeCl_3 + Pb_3(PO_4)_2 \rightarrow 2FePO_4 + 3PbCl_2$

_____ 3) Sodium phosphide + calcium sulfate →

$2Na_3P + 3CaSO_4 \rightarrow 3Na_2SO_4 + Ca_3P_2$

_____ 4) Potassium + calcium sulfide →

$2K + CaS \rightarrow K_2S + Ca$

_____ 5) Potassium + phosphorus →

$3K + P \rightarrow K_3P$

_____ 6) Fluorine + aluminum bromide →

$3F_2 + 2AlBr_3 \rightarrow 2AlF_3 + 3Br_2$

_____ 7) Chromium (III) sulfide +strontium nitrate →

$Cr_2S_3 + 3Sr(NO_3)_2 \rightarrow 2Cr(NO_3)_3 + 3SrS$

_____ 8) $C_7H_6O + O_2$ →

$C_7H_6O + 8O_2 \rightarrow 7CO_2 + 3H_2O$

_____ 9) Magnesium fluoride + lithium phosphide →

$3MgF_2 + 2Li_3P \rightarrow Mg_3P_2 + 6LiF$

_____ 10) Aluminum + potassium nitride →

No reaction

_____ 11) $C_4H_{10} + O_2$ →

$2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$