

## CHEMISTRY 11 EQUATION WORKSHEET #1

### A. BALANCING EQUATIONS FOR SYNTHESIS REACTIONS.

Synthesis or combination reaction involves the combination of two or more substances to form a compound.

Balance the following equations by writing the simplest whole number coefficient in the space provided.

1.  $\underline{\quad\quad}$   $\text{H}_2(\text{g}) + \underline{\quad\quad}$   $\text{F}_2(\text{g}) \text{ ----} > \underline{2}$   $\text{HF}(\text{g})$
2.  $\underline{2}$   $\text{Sb}(\text{s}) + \underline{3}$   $\text{Br}_2(\text{l}) \text{ ----} > \underline{2}$   $\text{SbBr}_3(\text{g})$
3.  $\underline{4}$   $\text{Ag} + \underline{\quad\quad}$   $\text{O}_2 \text{ ----} > \underline{2}$   $\text{Ag}_2\text{O}$
4.  $\underline{\quad\quad}$   $\text{H}_2(\text{g}) + \underline{\quad\quad}$   $\text{Cl}_2(\text{g}) \text{ ----} > \underline{2}$   $\text{HCl}(\text{g})$
5.  $\underline{2}$   $\text{Na}(\text{s}) + \underline{\quad\quad}$   $\text{O}_2(\text{g}) \text{ ----} > \underline{2}$   $\text{Na}_2\text{O}(\text{s})$

Write in the formulae for the products in the following synthesis reactions and then balance the equations.

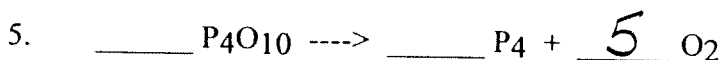
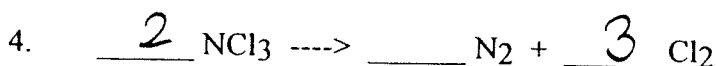
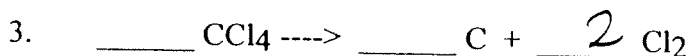
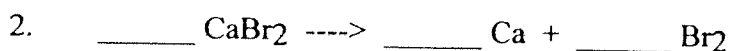
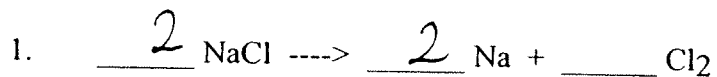
- To predict the product, you must join the two reactants together.
- The formula of the product is determined by examining the combining capacities of each reactant. Do not simply join the two together maintaining the same coefficient of the reactants.

6.  $\underline{2}$   $\text{Ca} + \text{O}_2 \text{ ----} > \underline{\quad\quad}$   $\text{CaO}$
7.  $\underline{16}$   $\text{Al} + \underline{3}$   $\text{S}_8 \text{ ----} > \underline{8}$   $\text{Al}_2\text{S}_3$
8.  $\underline{4}$   $\text{Al} + \underline{3}$   $\text{O}_2 \text{ ----} > \underline{2}$   $\text{Al}_2\text{O}_3$
9.  $\underline{2}$   $\text{Fe} + \underline{3}$   $\text{I}_2 \text{ ----} > \underline{2}$   $\text{FeI}_3$  (assume iron forms a ferric ion)
10.  $\underline{2}$   $\text{Zn} + \underline{\quad\quad}$   $\text{O}_2 \text{ ----} > \underline{2}$   $\text{ZnO}$

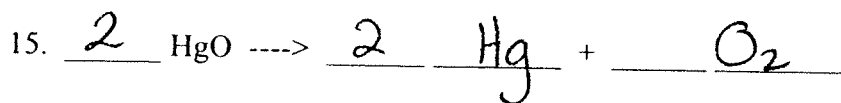
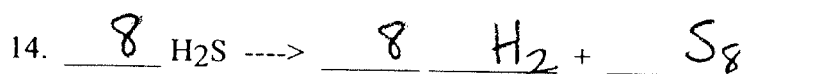
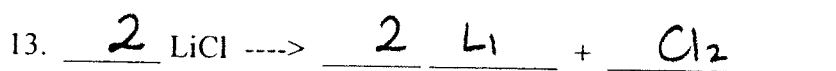
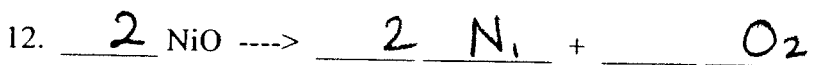
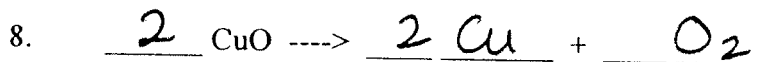
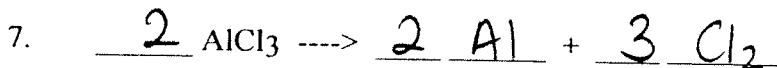
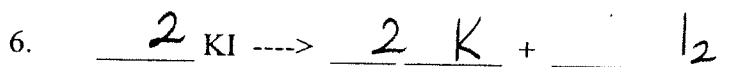
## CHEMISTRY 11 EQUATION WORKSHEET #2

### B. BALANCING EQUATIONS FOR SIMPLE DECOMPOSITION REACTIONS. Decomposition reaction involves breaking down a molecule into simpler substances.

Balance the following equations by writing in the simplest whole number coefficients in the spaces provided.



Write in the formulae for the products in the following simple decomposition reactions and then balance the equations.



## CHEMISTRY 11 EQUATION WORKSHEET 3

### C. BALANCING EQUATIONS FOR SINGLE REPLACEMENT REACTIONS

Balance the following equations by writing in the simplest whole number coefficients in the spaces provided.

- \_\_\_\_\_ Fe + \_\_\_\_\_ CuCl<sub>2</sub> ----> \_\_\_\_\_ Cu + \_\_\_\_\_ FeCl<sub>2</sub>
- \_\_\_\_\_ Zn + 2 HCl ----> \_\_\_\_\_ H<sub>2</sub> + \_\_\_\_\_ ZnCl<sub>2</sub>
- 4 Al + 3 SiO<sub>2</sub> ----> 3 Si + 2 Al<sub>2</sub>O<sub>3</sub>
- 2 Na + 2 HOH ----> \_\_\_\_\_ H<sub>2</sub> + 2 NaOH
- \_\_\_\_\_ Ni + \_\_\_\_\_ HgCl<sub>2</sub> ----> \_\_\_\_\_ Hg + \_\_\_\_\_ NiCl<sub>2</sub>
- 2 O<sub>2</sub> + \_\_\_\_\_ CaC<sub>2</sub> ----> \_\_\_\_\_ Ca + 2 CO<sub>2</sub>
- 2 Al + \_\_\_\_\_ Fe<sub>2</sub>O<sub>3</sub> ----> 2 Fe + \_\_\_\_\_ Al<sub>2</sub>O<sub>3</sub>
- 3 F<sub>2</sub> + 2 BN ----> \_\_\_\_\_ N<sub>2</sub> + 2 BF<sub>3</sub>
- 2 Al + 3 CuCl<sub>2</sub> ----> 3 Cu + 2 AlCl<sub>3</sub>
- 3 F<sub>2</sub> + 2 AlI<sub>3</sub> ----> 3 I<sub>2</sub> + 2 AlF<sub>3</sub>

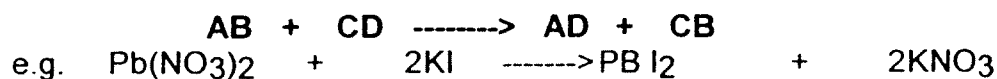
Write in the formulae for the products in the following single replacement reactions and then balance the equations.

- 2 Al + 3 H<sub>2</sub>SO<sub>4</sub> ----> 3 H<sub>2</sub> + \_\_\_\_\_ Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>
- \_\_\_\_\_ Cu + 2 AgNO<sub>3</sub> ----> 2 Ag + \_\_\_\_\_ Cu(NO<sub>3</sub>)<sub>2</sub>
- \_\_\_\_\_ Cl<sub>2</sub> + 2 NaBr ----> 2 NaCl + \_\_\_\_\_ Br<sub>2</sub>
- 4 H<sub>2</sub> + \_\_\_\_\_ Fe<sub>3</sub>O<sub>4</sub> ----> 3 Fe + 4 H<sub>2</sub>O
- 3 Cl<sub>2</sub> + 2 CrBr<sub>3</sub> ----> 2 CrCl<sub>3</sub> + 3 Br<sub>2</sub>

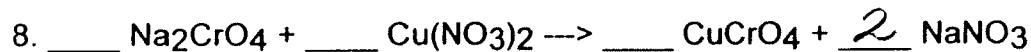
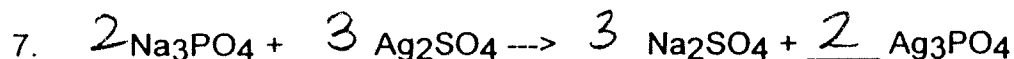
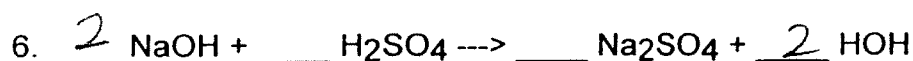
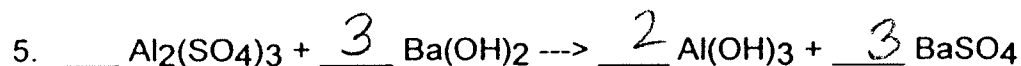
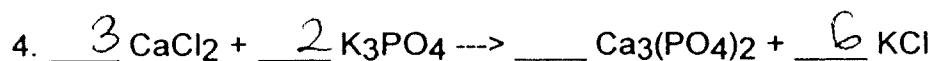
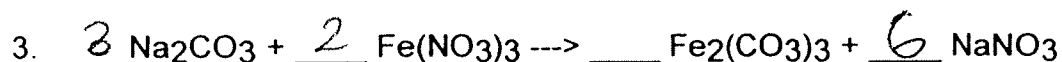
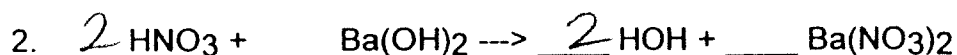
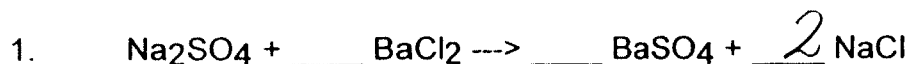
CHEMISTRY 11 EQUATION WORKSHEET #4

BALANCING EQUATIONS FOR DOUBLE REPLACEMENT REACTIONS

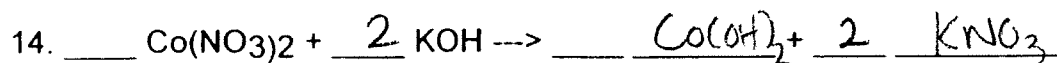
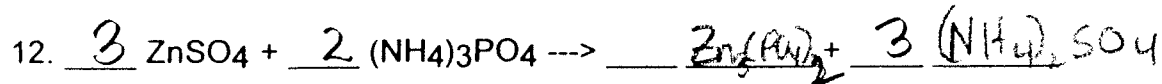
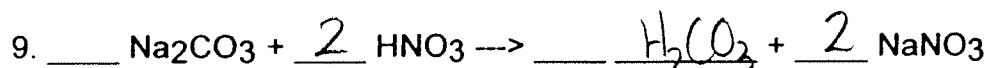
Generalized Equation:



Balance the following equations by writing in the simplest whole number coefficients in the spaces provided.



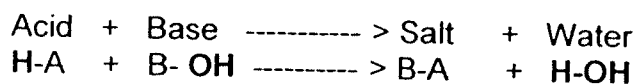
Write in the formulae for the products in the following double replacement reactions and then balance them.



# CHEMISTRY 11 EQUATION WORKSHEET #5

## BALANCING EQUATIONS FOR ACID-BASE REACTIONS

Generalized Equation:



Balance the following equations by writing in the simplest whole number coefficients in the spaces provided.

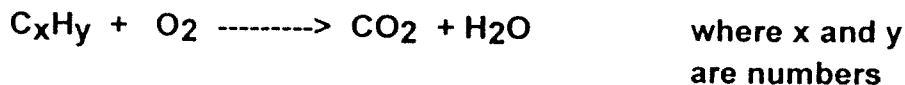
1. \_\_\_ HCl + \_\_\_ NaOH ----- > \_\_\_ NaCl + \_\_\_ H<sub>2</sub>O
2. \_\_\_ H<sub>2</sub>SO<sub>4</sub> + 2 KOH ----- > \_\_\_ K<sub>2</sub>SO<sub>4</sub> + 2 H<sub>2</sub>O
3. 2 HNO<sub>3</sub> + \_\_\_ Ca(OH)<sub>2</sub> ----- > \_\_\_ Ca(NO<sub>3</sub>)<sub>2</sub> + 2 H<sub>2</sub>O
4. 3 HCl + \_\_\_ Al(OH)<sub>3</sub> ----- > \_\_\_ AlCl<sub>3</sub> + 3 H<sub>2</sub>O
5. \_\_\_ Ba(OH)<sub>2</sub> + \_\_\_ H<sub>2</sub>SO<sub>4</sub> ----- > \_\_\_ BaSO<sub>4</sub> + 2 H<sub>2</sub>O
6. 3 Ca(OH)<sub>2</sub> + 2 H<sub>3</sub>PO<sub>4</sub> ----- > \_\_\_ Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> + 6 H<sub>2</sub>O

Write in the formulae for the products in the following double replacement reactions and then balance them.

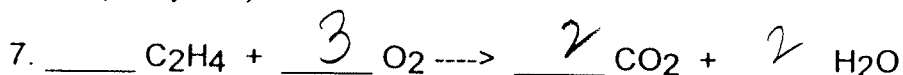
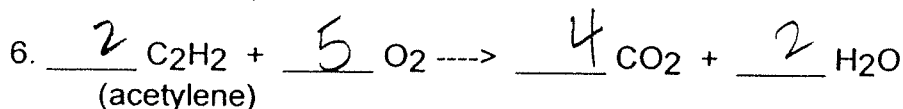
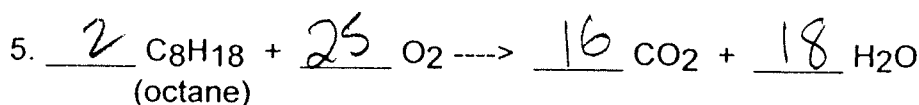
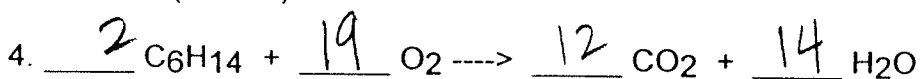
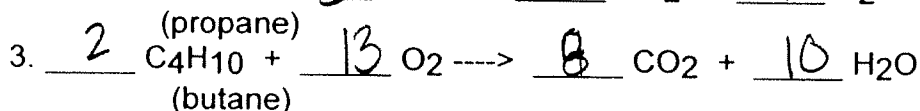
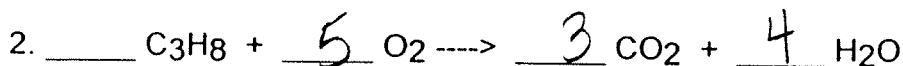
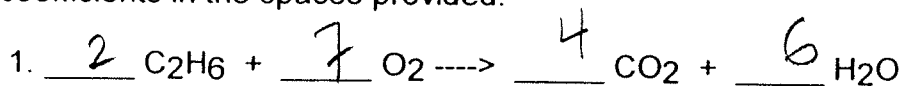
7. \_\_\_ H<sub>3</sub>PO<sub>4</sub> + 3 KOH ---> 3 H<sub>2</sub>O + \_\_\_ K<sub>3</sub>PO<sub>4</sub>
8. 2 NaOH + \_\_\_ H<sub>2</sub>SO<sub>4</sub> ----- > 2 H<sub>2</sub>O + \_\_\_ Na<sub>2</sub>SO<sub>4</sub>
9. 3 Mg(OH)<sub>2</sub> + 2 H<sub>3</sub>PO<sub>4</sub> ----- > 6 H<sub>2</sub>O + \_\_\_ Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>
10. \_\_\_ HCl + \_\_\_ KOH ----- > \_\_\_ H<sub>2</sub>O + \_\_\_ KCl
11. 2 Al(OH)<sub>3</sub> + 3 H<sub>2</sub>SO<sub>4</sub> ----- > 6 H<sub>2</sub>O + \_\_\_ Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>

## CHEMISTRY 11 EQUATION WORKSHEET #6

**BALANCING EQUATIONS FOR HYDROCARBON COMBUSTION REACTIONS** (hydrocarbon: molecules that are made up of carbon, hydrogen, and oxygen)



Balance the following equations by writing in the simplest whole number coefficients in the spaces provided.



Write in the formulae for the products in the following double replacement reactions and then balance them. Generally,

HYDROCARBON + OXYGEN  $\longrightarrow$  CARBON DIOXIDE + WATER

