

## AP Chemistry Summer Assignment – Brookwood High School

The following assignment is to be completed and brought on the first day of class.

### Nomenclature

1. Name these binary compounds of two nonmetals.

IF<sub>7</sub> \_\_\_\_\_ N<sub>2</sub>O<sub>5</sub> \_\_\_\_\_ XeF<sub>2</sub> \_\_\_\_\_  
N<sub>2</sub>O<sub>4</sub> \_\_\_\_\_ As<sub>4</sub>O<sub>10</sub> \_\_\_\_\_ SF<sub>6</sub> \_\_\_\_\_  
PCl<sub>3</sub> \_\_\_\_\_ S<sub>2</sub>Cl<sub>2</sub> \_\_\_\_\_

2. Name these binary compounds with a fixed charge metal.

AlCl<sub>3</sub> \_\_\_\_\_ MgO \_\_\_\_\_ BaI<sub>2</sub> \_\_\_\_\_  
KI \_\_\_\_\_ SrBr<sub>2</sub> \_\_\_\_\_ Na<sub>2</sub>S \_\_\_\_\_  
CaF<sub>2</sub> \_\_\_\_\_ Al<sub>2</sub>O<sub>3</sub> \_\_\_\_\_

3. Name these binary compounds of cations with variable charge.

CuCl<sub>2</sub> \_\_\_\_\_ Fe<sub>2</sub>O<sub>3</sub> \_\_\_\_\_ SnO \_\_\_\_\_  
PbCl<sub>4</sub> \_\_\_\_\_ Cu<sub>2</sub>S \_\_\_\_\_ HgS \_\_\_\_\_  
AuI<sub>3</sub> \_\_\_\_\_ CoP \_\_\_\_\_

4. Name these compounds with polyatomic ions.

Fe(NO<sub>3</sub>)<sub>3</sub> \_\_\_\_\_ NaOH \_\_\_\_\_ Cu<sub>2</sub>SO<sub>4</sub> \_\_\_\_\_  
Ca(ClO<sub>3</sub>)<sub>2</sub> \_\_\_\_\_ KNO<sub>2</sub> \_\_\_\_\_ NaHCO<sub>3</sub> \_\_\_\_\_  
NH<sub>4</sub>NO<sub>2</sub> \_\_\_\_\_ Cu<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> \_\_\_\_\_

5. Name these binary acids

HCl \_\_\_\_\_ HI \_\_\_\_\_

6. Name these acids with polyatomic ions.

HClO<sub>4</sub> \_\_\_\_\_ H<sub>2</sub>SO<sub>4</sub> \_\_\_\_\_ HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> \_\_\_\_\_  
H<sub>3</sub>PO<sub>4</sub> \_\_\_\_\_ HNO<sub>2</sub> \_\_\_\_\_ H<sub>2</sub>CrO<sub>4</sub> \_\_\_\_\_  
H<sub>2</sub>C<sub>2</sub>O<sub>4</sub> \_\_\_\_\_ H<sub>2</sub>CO<sub>3</sub> \_\_\_\_\_

7. Name these compounds appropriately.

CO \_\_\_\_\_ NH<sub>4</sub>CN \_\_\_\_\_ HIO<sub>3</sub> \_\_\_\_\_ NI<sub>3</sub> \_\_\_\_\_  
AlP \_\_\_\_\_ OF<sub>2</sub> \_\_\_\_\_ LiMnO<sub>4</sub> \_\_\_\_\_ HClO \_\_\_\_\_  
HF \_\_\_\_\_ SO<sub>2</sub> \_\_\_\_\_ CuCr<sub>2</sub>O<sub>7</sub> \_\_\_\_\_ K<sub>2</sub>O \_\_\_\_\_  
FeF<sub>3</sub> \_\_\_\_\_ KC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> \_\_\_\_\_ MnS \_\_\_\_\_

8. Write the formulas.

Tin (IV) phosphide \_\_\_\_\_ copper (II) cyanide \_\_\_\_\_  
Magnesium hydroxide \_\_\_\_\_ sodium peroxide \_\_\_\_\_  
Sulfurous acid \_\_\_\_\_ lithium silicate \_\_\_\_\_  
Potassium nitride \_\_\_\_\_ chromium (III) carbonate \_\_\_\_\_  
Gallium arsenide \_\_\_\_\_ cobalt (II) chromate \_\_\_\_\_  
Zinc fluoride \_\_\_\_\_ dichromic acid \_\_\_\_\_

### Solubility rules

9. Review solubility rules and identify each of the following compounds as soluble or insoluble in water.

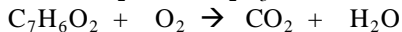
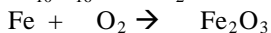
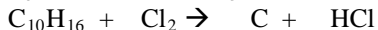
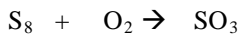
Na<sub>2</sub>CO<sub>3</sub> \_\_\_\_\_ CoCO<sub>3</sub> \_\_\_\_\_ Pb(NO<sub>3</sub>)<sub>2</sub> \_\_\_\_\_  
K<sub>2</sub>S \_\_\_\_\_ BaSO<sub>4</sub> \_\_\_\_\_ (NH<sub>4</sub>)<sub>2</sub>S \_\_\_\_\_  
AgI \_\_\_\_\_ Ni(NO<sub>3</sub>)<sub>2</sub> \_\_\_\_\_ KI \_\_\_\_\_  
FeS \_\_\_\_\_ PbCl<sub>2</sub> \_\_\_\_\_ CuSO<sub>4</sub> \_\_\_\_\_  
Li<sub>2</sub>O \_\_\_\_\_ Mn(C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>)<sub>2</sub> \_\_\_\_\_ Cr(OH)<sub>3</sub> \_\_\_\_\_  
AgClO<sub>3</sub> \_\_\_\_\_ Sn(SO<sub>3</sub>)<sub>4</sub> \_\_\_\_\_ FeF<sub>2</sub> \_\_\_\_\_

10. Predict whether each of these double replacement reactions will give a precipitate or not based on the solubility of the products. If yes, identify the precipitate.

- silver nitrate and potassium chloride \_\_\_\_\_  
magnesium nitrate and sodium carbonate \_\_\_\_\_  
strontium bromide and potassium sulfate \_\_\_\_\_  
cobalt (III) bromide and potassium sulfide \_\_\_\_\_  
ammonium hydroxide and copper (II) acetate \_\_\_\_\_  
lithium chlorate and chromium (III) fluoride \_\_\_\_\_

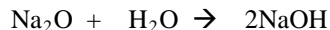
### Balancing Equations

11. Balance the following equations with the lowest whole number coefficients.



### Stoichiometry and Limiting Factor

12. Given the equation below, what mass of water would be needed to react with 10.0g of sodium oxide?



13.  $2\text{NaClO}_3 \rightarrow 2\text{NaCl} + 3\text{O}_2$

What mass of sodium chloride is formed along with 45.0g of oxygen gas?

14.  $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$

What mass of water will be produced when 100.0g of ammonia is reacted with excess oxygen?

15. If the reaction in #14 is done with 25.0g of each reactant, which would be the limiting factor?

16.  $\text{Na}_2\text{S} + 2\text{AgNO}_3 \rightarrow \text{Ag}_2\text{S} + 2\text{NaNO}_3$

If the above reaction is carried out with 50.0g of sodium sulfide and 35.0g of silver nitrate, which is the limiting factor?

What mass of the excess reactant remains?

What mass of silver sulfide would precipitate?

17.  $6\text{NaOH} + 2\text{Al} \rightarrow 2\text{Na}_3\text{AlO}_3 + 3\text{H}_2$

What volume of hydrogen gas (measured at STP) would result from reacting 75.0g of sodium hydroxide with 50.0g of aluminum?