

## Ions and Ionic Nomenclature

### Practice Sheet #

1. What is the octet rule? How does the octet rule apply to ionic compounds?
  
2. Decide whether each of the following descriptions are for Metals (M) or Non-Metals (NM):
  - a. \_\_\_\_\_ Want to gain electrons to fill valence shells
  - b. \_\_\_\_\_ Form cations
  - c. \_\_\_\_\_ Form negatively charged ions
  - d. \_\_\_\_\_ Form anions
  - e. \_\_\_\_\_ Want to lose electrons to empty their valence shell, because the next shell down is full
  - f. \_\_\_\_\_ Follow the octet rule
  - g. \_\_\_\_\_ Strive to gain the same electron configuration as the nearest Nobel gas on the periodic table.

3. Fill out the following table:

Element	# of valence electrons	Will this element LOSE or GAIN electrons to obey the octet rule?	How many electrons will the ion lose or gain?	What charge will the resulting ion have?	Write the formula for the ion
iodine					
magnesium					
helium					
phosphorous					
sodium					
sulfur					

4. What ions are in the following ionic compounds? Complete the following table.

Ionic Compound	How many cations?	How many anions?	Total charge?
CaCl <sub>2</sub>	Ca <sup>2+</sup>	Cl <sup>-</sup> Cl <sup>-</sup>	+2-1-1= 0
NaCl			
MgS			
Mg Cl <sub>2</sub>			
K <sub>2</sub> O			
BCl <sub>3</sub>			
Li <sub>3</sub> N			
Mg <sub>3</sub> N <sub>2</sub>			
Al <sub>2</sub> O <sub>3</sub>			
Ga <sub>2</sub> O <sub>3</sub>			

5. Draw the electron distribution for the following ionic compounds. Complete the following table

Elements	Lewis Diagram "Before" the bond forms	Lewis Diagram "After" the bond forms	Formula	Name
<i>Magnesium and Chlorine</i>				
<i>Aluminum and Sulfur</i>				
<i>Beryllium and Fluorine</i>				
<i>Potassium and Phosphorous</i>				

6. Name the following *simple* ionic compounds.

- |                            |   |
|----------------------------|---|
| a. MgCl <sub>2</sub> _____ | b. CsF _____                            |
| c. CaO _____               | d. Ca <sub>3</sub> P <sub>2</sub> _____ |
| e. Na <sub>3</sub> P _____ | f. Ca <sub>3</sub> N <sub>2</sub> _____ |
| g. Na <sub>3</sub> N _____ | h. AlN _____                            |
| i. AlBr <sub>3</sub> _____ | j. CaBr <sub>2</sub> _____              |

7. Write the formula for the following *simple* ionic compounds.

- |                             |                            |
|-----------------------------|----------------------------|
| a. magnesium fluoride _____ | b. potassium oxide _____   |
| c. sodium oxide _____       | d. lithium phosphide _____ |
| e. cesium nitride _____     | f. boron bromide _____     |
| g. strontium iodide _____   | h. aluminum oxide _____    |
| i. barium nitride _____     | j. calcium phosphide _____ |

8. Name the following *multivalent* ionic compounds.

- |              |       |              |       |
|--------------|-------|--------------|-------|
| a. $PbI_2$   | _____ | b. $PbO_2$   | _____ |
| c. $CoCl_3$  | _____ | d. $TiP$     | _____ |
| e. $Cr_2O_3$ | _____ | f. $FeBr_2$  | _____ |
| g. $CuS$     | _____ | h. $Ni_2O_3$ | _____ |

9. Write the formula for the following *multivalent* ionic compounds.

- |                           |       |                           |       |
|---------------------------|-------|---------------------------|-------|
| a. lead (II) bromide      | _____ | b. chromium (III) nitride | _____ |
| c. copper (II) oxide      | _____ | d. lead (II) sulfide      | _____ |
| e. plutonium (V) chloride | _____ | f. gold (I) oxide         | _____ |
| g. manganese (IV) sulfide | _____ | h. tin (IV) oxide         | _____ |

10. Name the following *polyatomic* ionic compounds.

- |                   |       |                   |       |
|-------------------|-------|-------------------|-------|
| a. $Ca(NO_3)_2$   | _____ | b. $NaCN$         | _____ |
| c. $Li_2CO_3$     | _____ | d. $Mg_3(PO_4)_2$ | _____ |
| e. $Al_2(SO_4)_3$ | _____ | f. $NH_4OH$       | _____ |
| g. $CaC_2O_4$     | _____ | h. $Be(ClO)_2$    | _____ |

11. Write the formula for the following *polyatomic* ionic compounds.

- |                       |       |                          |       |
|-----------------------|-------|--------------------------|-------|
| a. ammonium phosphate | _____ | b. potassium perchlorate | _____ |
| c. aluminum nitrate   | _____ | d. lithium hydroxide     | _____ |
| e. ammonium sulfate   | _____ | f. barium acetate        | _____ |
| g. sodium oxalate     | _____ | h. zinc hypochlorite     | _____ |

12. Name the following *multivalent* and *polyatomic ionic* compounds.

- |                 |       |                   |       |
|-----------------|-------|-------------------|-------|
| a. $CuSO_4$     | _____ | b. $CuClO$        | _____ |
| c. $Fe(NO_3)_3$ | _____ | d. $Fe_3(PO_4)_2$ | _____ |

13. Write the formula for the following *multivalent* and *polyatomic ionic* compounds.

- |                          |       |                         |       |
|--------------------------|-------|-------------------------|-------|
| a. Tin (II) Chlorite     | _____ | b. Gold (III) hydroxide | _____ |
| c. Cobalt (II) Carbonate | _____ | d. Lead (IV) sulfate    | _____ |

Name: \_\_\_\_\_ Per \_\_\_\_\_

14. *Ionic Compounds Review*. Write the name or the formula for each of the following.

Name	Formula
Aluminum sulfide	
	MgCl <sub>2</sub>
Barium fluoride	
	AlF <sub>3</sub>
Scandium nitride	
	CrBr <sub>3</sub>
	CaNO <sub>3</sub>
	NaOH
	ZnCrO <sub>4</sub>
Sodium bromite	
	CuBr
	Li <sub>3</sub> PO <sub>3</sub>
Manganese (II) iodide	
	Zr(NO <sub>3</sub> ) <sub>4</sub>
	Fe <sub>2</sub> O <sub>3</sub>
Lithium phosphide	
Strontium sulphite	
Beryllium nitrate	
Lead (IV) iodate	