

## Writing the Chemical Name and Formula of an Ionic Compound

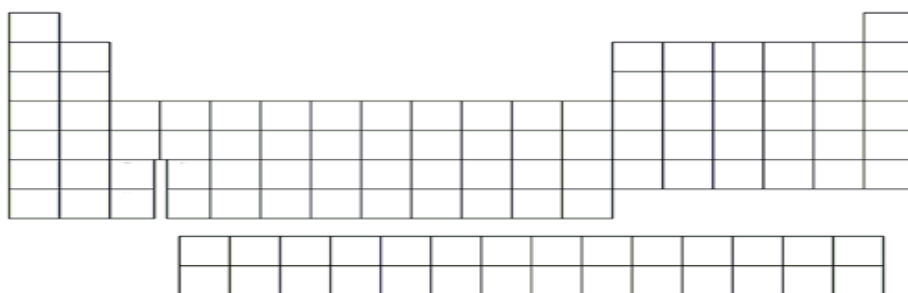
Name \_\_\_\_\_

Period \_\_\_\_\_

### Unit 4 – HW 2 Worksheet (Goals 3 – 4)

1. Representative Elements: There is a pattern in predicting how many electrons are lost and gained for the representative elements, can you guess it?

WRITE ON YOUR PERIODIC TABLES THE CHARGES OF THE REPRESENTATIVE ELEMENTS NOW.



2. The Transition metals have much more complicated patterns of valence electrons. There are two methods of naming such cations. The preferred method is called the stock system. As part of this system, a roman numeral in parentheses indicates the charge value of the cation.

Examples: Name the following transition metal ions:

- a. tin (lost 2 electrons): *Tin (II)*
- b. tin (lost 4 electrons)
- c. iron (lost 3 electrons)
- d. iron (lost 2 electrons)

There are 3 exceptions to this rule:

1. DO NOT USE A ROMAN NUMERAL WHEN NAMING SILVER, ZINC AND CADMIUM IONS.
2. ALWAYS USE A ROMAN NUMERAL WHEN NAMING ANY OTHER TRANSITION METAL ION.
3. DO NOT USE A ROMAN NUMERAL WHEN NAMING A REPRESENTATIVE ELEMENTS ION.

Write the symbol and charge of the following elements.		Name the ion	Cation or Anion?
a. sulfur	$S^{2-}$	Sulfide	anion
b. lead (4 electrons lost)			
c. strontium			
d. bromine			
e. copper (1 electron lost)			
f. selenium			
g. silver	$Ag^{+}$		
h. cesium			
i. phosphorus			

3. Polyatomic Ions: Ions made of \_\_\_\_\_.

4. What endings do most polyatomic ions receive when naming them?

5. There are 3 important exceptions, they are:

6. What are the "rules" for writing Binary Ionic Compounds?

a. Write the \_\_\_\_\_ ion first

b. Write the \_\_\_\_\_ ion last

c. The net charge for the compound must add to \_\_\_\_\_ (positives + negatives = 0)

d. Use \_\_\_\_\_ to indicate how many of each ion you need to "balance" the charge.

7. Write the formula for the ionic compound formed between potassium and chlorine.

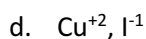
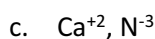
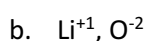
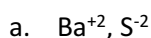
8. Write the formula for the ionic compound formed between calcium and bromine.

Another approach to writing a balanced formula for a compound is to use the crisscross method. In this method, the numerical charge of each ion is crossed over and used as the subscript for the other ion. The signs of the numbers are dropped.

9. Use the crisscross method to write the formula for the ionic compound formed between iron (III) and oxygen.

10. Use the crisscross method to write the formula for the ionic compound formed between calcium and sulfur.

11. Write the formulas for the compounds formed between these pairs of ions.



12. Write formulas for these compounds.

a. sodium iodide

b. potassium sulfide

c. tin (II) chloride (also called stannous chloride)

d. calcium iodide

13. Define ternary ionic compounds –

Remember, they are still just two ions, and all rules from before still apply!

14. Write the formula for lithium nitrate, a ternary compound:

15. Sometimes, we need to take more than one polyatomic ion to balance the charge to 0. If this happens, place the polyatomic ion in parenthesis and the subscript outside of the parentheses.

a. Write the formula for lithium carbonate:

b. Write the formula for potassium sulfate:

c. Write the formula for ammonium phosphate:

16. Write the name & formulas for ionic compounds formed from these pairs of ions:

- a.  $\text{NH}_4^{+1}$ ,  $\text{SO}_3^{2-}$
- b. Calcium ion, phosphate ion
- c.  $\text{Al}^{3+}$ ,  $\text{NO}_3^{-1}$
- d. Potassium ion, chromate ion

17. Write formulas for these compounds

- a. lithium hydrogen sulfate
- b. chromium (III) nitrite
- c. copper (II) bromide
- d. ammonium dichromate

18. Name these compounds:

- a.  $\text{LiCN}$
- b.  $(\text{NH}_4)_2\text{CO}_3$
- c.  $\text{Fe}(\text{ClO}_3)_3$
- d.  $\text{CaSO}_4$
- e.  $\text{KClO}$
- f.  $\text{KMnO}_4$
- g.  $\text{Li}_2\text{SO}_3$