Names and Formulas **Name**_____

Binary Ionic Compounds

Read from **Lesson 1: Ionic Compounds** in the **Chemistry Tutorial Section, Chapter 4** of **The Physics Classroom**:
Part b: Combining Ions to form Ionic Compounds **Part c:** Binary Ionic Compounds

Chemists have specific rules for naming compounds. The rules for naming compounds and writing the formulas for these compounds is referred to as "**nomenclature**."
Let's start with ionic compounds. **Ionic compounds** are neutral compounds containing **cations** and **anions** bonded together by electrostatic forces. **Binary** ionic compounds are made of only two elements: a **metal (the cation)** and a **nonmetal (the anion).**

Rules For Naming Ionic Compounds

NaCl

1. Name the metal ion (cation) first by its regular metal name. For example, Na is "sodium."
2. Name the nonmetal ion (anion) second but substitute the ending with -ide. For example, Cl is chlorine , but in this compound, we name it "chlor**ide**."

NaCl is sodium chloride. $CaCl_2$ is calcium chloride. $AlCl_3$ is aluminum chloride. Get the idea?

Write the name of each of the following binary ionic compounds.

1. Na_3N _____
2. CaF_2 _____
3. MgS _____
4. $ZnBr_2$ _____
5. Na_2O _____
6. Li_3P _____
7. BaI_2 _____
8. Sr_3N_2 _____
9. K_2S _____
10. AlN _____

Writing Formulas for Binary Ionic Compounds

A common way to write the formula of a binary ionic compound is to use the "**crisscross**" method.

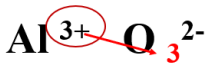
1. Write the symbol and charge of the metal (cation) first and the nonmetal (anion) second. (Find the charge from the periodic table or charge table – whichever your teacher prefers.)
2. Swap only the number of the positive charge to become the subscript of the nonmetal and the number only of the negative charge to become the subscript of the metal.
3. Reduce to the lowest whole number ratio.
4. Write the final formula. Leave out all subscripts that are 1. Do not include the charges.

Names and Formulas

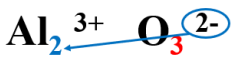
For example, what is the formula for aluminum oxide?

1. Write the symbol and charge of the metal (aluminum) first and the nonmetal (oxide) second.

$$Al^{3+} \quad O^{2-}$$



2. Swap only the number of the positive charge to become the subscript of the nonmetal and the number only of the negative charge to become the subscript of the metal.



3. Reduce to the lowest whole number ratio.

$$Al_2^{3+}\ O_3^{2-}$$

4. Write the final formula. Leave out all subscripts that are 1.

$$Al_2O_3$$

Write the formula of each of the following binary ionic compounds.

1. sodium fluoride:

2. barium chloride:

3. potassium oxide:

4. aluminum nitride:

5. magnesium sulfide

6. calcium selenide:

7. gallium bromide:

8. aluminum iodide:

9. lithium sulfide:

10. calcium phosphide: