NAMING IONIC COMPOUNDS I

Ionic compounds are named by the following simple rule:

Name the cation; then **name the anion.**

For example, NaCl is named **sodium chloride**. "NaCl" is the formula for the compound; "sodium chloride" is the name of the compound.

Notes:

1. Cations are positive ions. The **sodium** ion is Na^+.
2. Anions are negative ions. The **chloride** ion is Cl^-.
3. The positive ion is named before the negative ion.
4. Metals form cations, e.g., K^+, Mg^{2+}, Al^{3+}.
5. Nonmetals form anions, e.g., I^-, O^{2-}, N^{3-}.
6. A metal ion is named simply with the name of the metal. Ag^+ is a **silver** ion.
7. A nonmetal ion ends with "ide". Br^- is a **bromide** ion. S^{2-} is a **sulfide** ion.
8. Subscripts in the formula do not appear in the name. $CaCl_2$ is named **calcium chloride**. Al_2O_3 is named **aluminum oxide.**

You should be able to name the following:

a. NaI

b. KBr

c. MgF_2

d. CaO

e. BaS

f. CaI_2

g. $AlCl_3$

h. Na_2O

i. Li_3N

j. ZnS

k. AlN

l. AgCl

m. KF

n. Al_2S_3

o. BeI_2

p. $ZnBr_2$

q. CaF_2

r. Ag_2O

s. BaO

t. Na_3P

Answers are on the other side.

WRITING IONIC FORMULAS I

Formulas for ionic compounds are written by these rules:

Rule 1 **Write the formula** (symbol) **for the cation** (without the charge) **followed by a subscript;**

write the formula (symbol) **for the anion** (without the charge) **followed by a subscript.**

Rule 2 Subscripts are chosen so that the charges in a compound add to zero.

Notes:

1. The charges on the ions must be known before the formula can be written.
   The ionic charges are as follows:
   Group IA metals always form +1 ions: Li^+, Na^+, K^+, etc.
   Group IIA metals always form +2 ions: Be^{2+}, Mg^{2+}, Ca^{2+}, Ba^{2+}, etc.
   Aluminum (in IIIA) always forms a +3 ion: Al^{3+}.
   Zinc (in IIB) always forms a +2 ion: Zn^{2+}.
   Silver (in IB) always forms a +1 ion: Ag^+.

   Group VIIA always form –1 ions: F^-, Cl^-, Br^-, I^-.
   Group VIA always form –2 ions: O^{2-}, S^{2-}.
   Group VA always form –3 ions: N^{3-}, P^{3-}.
2. The subscript after the ionic formula indicates the number of those ions in the compound.
3. A subscript of one (1) is not written.
4. The cation charge times its subscript plus the anion charge times its subscript must equal zero.
5. Usually the subscripts can be determined by making the charge on an anion the subscript on the cation (leave off the minus sign) and making the charge on the cation the subscript on the anion.
6. Subscripts should be reduced to the lowest integer numbers.

To write the formula for magnesium fluoride,
Determine the charges: magnesium ion is Mg^{2+} and the fluoride ion is F^-.
Try subscripts 1 (the |charge| of the anion) and 2 (the charge of the cation)
The formula is: MgF_2
The sum of the charges equals zero: $1\times(+2) + 2\times(-1) = 0$

You should be able to write formulas for the following:

a. sodium iodide
b. potassium bromide
c. magnesium fluoride
d. calcium oxide
e. barium sulfide
f. calcium iodide
g. aluminum chloride
h. sodium oxide
i. lithium nitride
j. zinc sulfide
k. aluminum nitride
l. silver chloride
m. potassium fluoride
n. aluminum sulfide
o. beryllium iodide
p. zinc bromide
q. calcium fluoride
r. silver oxide
s. barium oxide
t. sodium phosphide