Writing Formulas for Ternary Ionic Compounds

Ternary ionic compounds contain atoms of three different elements. Usually these compounds contain one or more polyatomic ions.

Follow the same procedure for writing the formula of a ternary compound as a binary compound.

Ca^{2+} $(NO_3)^-$ K^+ $(SO_4)^{2-}$

$Ca(NO_3)_2$
Calcium nitrate

K_2SO_4
potassium sulfate

Whenever more than a single polyatomic ion is needed to balance a formula, parentheses must be used. This is the only time they are used.

Write the formulas for these compounds:

potassium hydroxide	magnesium perchlorate	iron(III) silicate
ammonium oxalate	copper(I) chromate	lead(II) sulfide

Write formulas for these ternary ionic compounds.

a. Barium sulfate

b. aluminum hydrogen carbonate

c. sodium hypochlorite

d. lead(IV) chromate

e. mercury(II) bromide

f. ammonium dichromate

g. lithium hydrogen sulfate

h. chromium(III) nitrite

Write names for these compounds.

a. $Cr(NO_3)_2$

b. $Mg_3(PO_4)_2$

c. Cu_2HPO_4

d. Li_2CrO_4

e. K_3AsO_4

f. SnS_2O_3

g. LiSCN

h. CH_3NH_3F

Name _____ Class _____ Date _____

Skillsheet 3-3

Writing Chemical Formulas

The tables below list some common ions. Some ions are made of single atoms that have gained or lost electrons. Others are made of groups of atoms that are joined together but have gained or lost electrons. The charge of each ion is given in the upper right corner of the symbol.

Positive Ions			
Name	**Symbol**	**Name**	**Symbol**
aluminum	Al^{3+}	lead	Pb^{2+}
ammonium	NH_4^+	potassium	K^+
calcium	Ca^{2+}	silver	Ag^+
copper	Cu^{2+}	sodium	Na^+
iron	Fe^{3+}	zinc	Zn^{2+}

Negative Ions			
Name	**Symbol**	**Name**	**Symbol**
acetate	$C_2H_3O_2^-$	iodide	I^-
carbonate	CO_3^{2-}	nitrate	NO_3^-
chlorate	ClO_3^-	oxide	O^{2-}
chloride	Cl^-	phosphate	PO_4^{3-}
hydroxide	OH^-	sulfate	SO_4^{2-}

Ionic compounds are a combination of possitive and negative ions. The total charge in the compound must be zero. The formula for the compound shows the minimum number of each kind of ion needed to cancel the positive and negative charges.

For example, calcium nitrate is made from Ca^{2+} and NO_3^- ions. There must be two NO_3^- ions for each Ca^{2+} ion. The formula for calcium nitrate is $Ca(NO_3)_2$.

Write correct formulas (total charge equals zero) for the following compounds.

1. ammonium nitrate _____
2. calcium chloride _____
3. aluminum nitrate _____
4. sodium carbonate _____
5. zinc sulfate _____
6. potassium chlorate _____
7. iron iodide _____
8. lead acetate _____
9. copper sulfate _____
10. silver nitrate _____
11. ammonium phosphate _____
12. calcium carbonate _____
13. aluminum oxide _____
14. sodium phosphate _____
15. zinc hydroxide _____
16. potassium iodide _____
17. iron chlorate _____
18. lead sulfate _____
19. copper chloride _____
20. silver sulfate _____