NAMING INORGANIC COMPOUNDS

1. Positive Ions (cations)

a. Cations formed from single metal atoms (monoatomic ions) have the same name as the metal + "ion" [i.e., Na^+ = sodium ion; Zn^{2+} = zinc ion]
b. If a metal can form cations of differing charges, the positive charge is given by a Roman numeral in parentheses following the name of the metal [i.e., Fe^{2+} = iron (II) ion; Fe^{3+} = iron (III) ion]
c. Cations formed from nonmetal atoms have names that end in "-ium" [i.e., NH_4^+ = ammonium ion; H_3O^+ = hydronium ion]

2. Negative Ions (anions)

a. Monoatomic (one-atom) anions have names formed by replacing the ending of the name of the element with "-ide" [i.e., H^- = hydride ion; O^{2-} = oxide ion]
b. Polyatomic (many-atom) anions containing oxygen (oxyanions) have names ending in "-ate" or "-ite"
    i. "-ate" is for the more common oxyanion [i.e., NO_3^- = nitrate ion; SO_4^{2-} = sulfate ion]
    ii. "-ite" is for the oxyanion with the same charge as the common oxyanion but with one less oxygen [i.e., NO_2^- = nitrite ion; SO_3^{2-} = sulfite ion]
c. Oxyanions of the halogens can contain up to four oxygen atoms and are named according to the following schematic:

d. Anions derived by adding H^+ to an oxyanion are named by adding as a prefix the word "hydrogen" or "dihydrogen", as appropriate [i.e., CO_3^{2-} = carbonate ion; HCO_3^- = hydrogen carbonate ion; $H_2PO_4^-$ = dihydrogen phosphate]

3. Ionic Compounds

a. Names of ionic compounds consist of the cation name followed by the anion name (but drop the word "ion" for each) [i.e., $CaCl_2$ = calcium chloride; $Cu(ClO_4)_2$ = copper (II) perchlorate]

4. Binary Molecular Compounds

a. The name of the element farthest to the left in the periodic table is usually written first (exception: oxygen is always written last unless combined with fluorine)
b. If both elements are in the same group in the periodic table, the lower one is named first.
c. The name of the second element is given an "-ide" ending
d. Greek prefixes (i.e., mono-, di-, tri-, tetra-, etc.) are used to indicate the number of atoms of each element (mono- is never used with the first element)
e. Examples: Cl_2O = dichlorine monoxide; NF_3 = nitrogen trifluoride; N_2O_4 = dinitrogen tetroxide; P_4S_{10} = tetraphosphorous decasulfide

NAMING INORGANIC COMPOUNDS

5. Acids

a. For acids based on anions whose names end in "-ide"
   i. Add the prefix "hydro-" and change "-ide" to "-ic"
   ii. Examples: S^{2-} = sulfide; H_2S = hydrosulfuric acid

b. For acids based on anions whose names end in "-ate" or "-ite"
   i. "-ate" goes to "-ic" and add "acid" to the end
   ii. "-ite" goes to "-ous" and add "acid" to the end
   iii. Examples: SO_4^{2-} = sulfate; H_2SO_4 = sulfuric acid; NO_2^- = nitrite; HNO_2 = nitrous acid

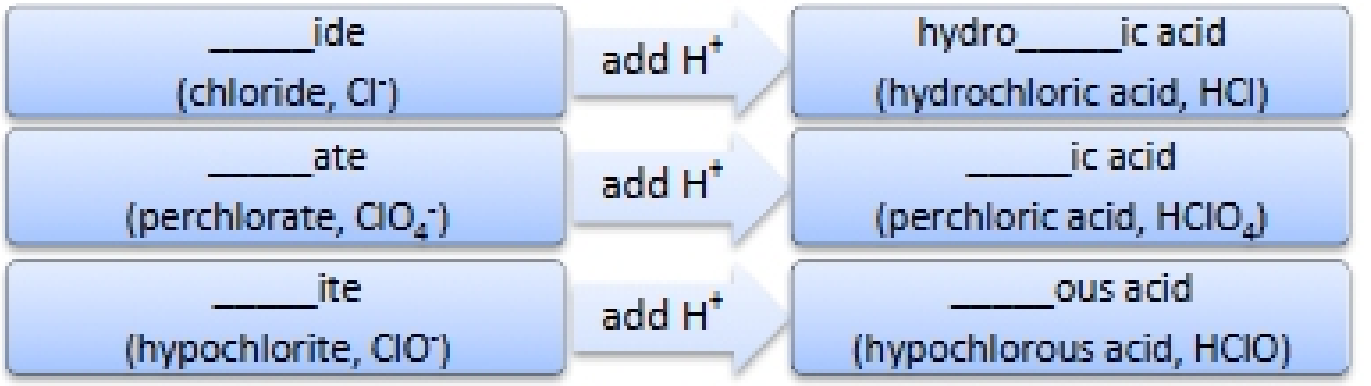

Table of Common Cations

Charge	Formula	Name	Formula	Name
1+	H^+	Hydrogen ion	NH_4^+	Ammonium ion
	Li^+	Lithium ion	Cu^+	Copper (I) or cuprous ion
	Na^+	Sodium ion		
	K^+	Potassium ion		
	Cs^+	Cesium ion		
	Ag^+	Silver ion		
2+	Mg^{2+}	Magnesium ion	Co^{2+}	Cobalt (II) or cobaltous ion
	Ca^{2+}	Calcium ion	Cu^{2+}	Copper (II) or cupric ion
	Sr^{2+}	Strontium ion	Fe^{2+}	Iron(II) or ferrous ion
	Ba^{2+}	Barium ion	Mn^{2+}	Manganese(II) or manganous ion
	Zn^{2+}	Zinc ion	Hg_2^{2+}	Mercury(I) or mercurous ion
	Cd^{2+}	Cadmium ion	Hg^{2+}	Mercury(II) or mercuric ion
			Ni^{2+}	Nickel(II) or nickelous ion
			Pb^{2+}	Lead(II) or plumbous ion
			Sn^{2+}	Tin(II) or stannous ion
3+	Al^{3+}	Aluminum ion	Cr^{3+}	Chromium(III) or chromic ion
			Fe^{3+}	Iron(III) or ferric ion

Table of Common Anions

Charge	Formula	Name	Formula	Name
1−	H^-	Hydride ion	$C_2H_3O_2^-$	Acetate ion
	F^-	Fluoride ion	ClO_3^-	Chlorate ion
	Cl^-	Chloride ion	ClO_4^-	Perchlorate ion
	Br^-	Bromide ion	NO_3^-	Nitrate ion
	I^-	Iodide ion	MnO_4^-	Permanganate ion
	CN^-	Cyanide ion		
	OH^-	Hydroxide ion		
2−	O^{2-}	Oxide ion	CO_3^{2-}	Carbonate ion
	O_2^{2-}	Peroxide ion	CrO_4^{2-}	Chromate ion
	S^{2-}	Sulfide ion	$Cr_2O_7^{2-}$	Dichromate ion
			SO_4^{2-}	Sulfate ion
3−	N^{3-}	Nitride ion	PO_4^{3-}	Phosphate ion