Naming Binary and Ionic Inorganic Compounds

1. When writing formulas for binary compounds, elements are arranged in group order, except for H, O, and F. The accepted order by groups and these elements is:

$$1A < 2A < 3A < 4A < 5A < H < 6A < 7A < O < F$$

2 Determine whether the compounds is *ionic* or *molecular*:

(a) Binary compounds of two nonmetals, two metalloids, or a metalloid and a nonmetal are usually *molecular*.

(b) Binary compounds of a metal and a nonmetal are usually *ionic*.

(c) A compound that contains a polyatomic cation or anion and any kind of counter ion (monatomic or polyatomic anion or cation) is *ionic*.

(d) Molecular compounds are named from their molecular formulas; ionic compounds are named from their empirical formulas.

3. For molecular compounds, name the first element followed by the stem of the second element plus "ide". Use Greek prefixes to indicate numbers of each atom in the molecular formula. (If there is only one of the first element, "mono" is not used.) Examples:

NO_2	nitrogen dioxide ("mono" not needed)
N_2O_4	dinitrogen tetroxide ("a" of "tetra" usually dropped)
SCl_4	sulfur tetrachloride
H_2S	(di)hydrogen sulfide ("di" not needed, since no other HS compound exists)
H_2O	water (not systematically named)
NH_3	ammonia (not systematically named)
CH_4	methane (not systematically named)

4. For ionic compounds, name the first element followed by the stem of the second element plus "ide", *but do not use Greek prefixes to indicate numbers of atoms* (unless a Greek prefix is a part of a complex ion's name). If a cation might have one of two or more possible charges, the charge is indicated by using a Roman numeral (Stock system). Examples:

LiF	lithium fluoride
$BaBr_2$	barium bromide ("di" not used)
NaCN	sodium cyanide (must know CN^- = cyanide)
Hg_2Cl_2	mercury(I) chloride (Hg_2^{2+} = mercury(I) ion, a diatomic ion)
NH_4NO_3	ammonium nitrate
NH_4NO_2	ammonium nitrite
$FeCl_2$	iron(II) chloride (formerly, ferrous chloride)
$FeCl_3$	iron(III) chloride (formerly, ferric chloride)