Science 10 Notes

Naming Compounds

A simple binary ionic compound comprises of a metallic cation and nonmetallic anion. A **metallic cation** has **lost** an electron(s) while a non metallic anion has **gained** an electron(s) to ensure electron stability similar to the noble gases.

A covalent bond forms when 2 or more non metallic atoms combine. A covalent bond results when electrons are being shared to ensure electron stability similar to the noble gases.

Rules for Naming Ionic Compounds:

1) The first element is named using the full name of the metal followed by a shortened name of the nonmetal with *–ide* ending.
2) The shortened name of the nonmetal is usually the first syllable of the name of the nonmetal.

Examples:

Chemical Formula	Metal name	Nonmetal Name	Shortened Nonmetal name	Compound Name
NaCl	Sodium	Chlorine	*Chlor-*	Sodium chloride
MgO	Magnesium	Oxygen	*Ox-*	Magnesium oxide
$CaCl_2$	Calcium	Chlorine	*Chlor-*	Calcium chloride

Li_2O = Lithium oxide

3) polyvalent ions have 2 or more cations
   eg. $FeCl_2$ →iron II chloride **or** $FeCl_3$ →iron III chloride use Roman Numerals

3) ionic compounds using polyatomic ions → use the name of cation first followed by the name of anion
   eg. $Ca(OH)_2$ -- calcium hydroxide
   $(NH_4)_2SO_4$ -- ammonium sulfate

* [**polyatomic ions** are groups of atoms covalently bonded to each other but possess an overall valence charge making them ions] *

Rules for Naming Covalent Compounds:

1. The names for molecular compounds will vary depending upon the particular molecule.
   1) water → H_2O ammonia → NH_3 use their common names and do not use the IUPAC name normally assigned to them.

   2) molecules beginning with hydrogen are written as ionic compounds
      eg. H_2S → hydrogen sulfide
      H_2O_2 → hydrogen peroxide

3) molecules that are considered organic compounds have their own naming system.
eg. CH_4 → methane C_2H_6 → ethane

4) However, the majority of covalent molecules use a prefix system to illustrate the **ratio** between the combining of the nonmetallic atoms. The prefix is placed in front of the word indicating the subscript associate with the element

→The combining capacity of a nonmetal is a measure of the number of covalent bonds that it will need to form a stable molecule.

5) The **first** nonmetal maintains its name (like metals) while the **second** nonmetal's name is shortened and the suffix "*ide*" is added. The prefix is added when needed. It can be added to either element.

* just like ionic compounds but add a prefix *

6) The prefixes are as followed:

Prefix	Number
mon(o)-	1
Di-	2
Tri-	3
Tetra-	4
Pent(a)-	5
Hex(a)-	6
Hept(a)-	7
Oct(a)-	8

Examples:

Chemical Formula	First Nonmetal Name	Second Nonmetal Name	Shortened nonmetal name (first syllable)	Chemical Name
CO_2	Carbon	Oxygen	*ox-*	Carbon dioxide
N_2O_4	Nitrogen	Oxygen	*ox-*	Dinitrogen tetroxide
SF_6	Sulfur	Fluorine	*fluor-*	Sulfur hexafluoride