Naming Compounds

Molecular Compounds

- Prefixes indicate the number of each atom in a given molecule
- Mono- prefix is not required for the first element if there is only one atom present
- The second atom should end in –ide, as with binary ionic compounds.
- Molecular formulae don't get reduced with common factors

Number of Atoms	Prefix
1	mono-
2	di-
3	tri-
4	tetra-
5	penta-
6	hexa-
7	hepta-
8	octa-
9	nona-
10	deca-

Molecular Compounds

NO

N_2O

S_2Cl_2

Cl_2O_7

Molecular Compounds

sulphur tetrafluoride

tetraphosphorous hexoxide

Molecular Compounds

- Some compounds have common names. These are listed on page two of your data booklet
- These are usually compounds that have uses in day-to-day life
- Your data book has more than the ones on the right

Molecular Compounds to be Memorized

These compounds have traditional names that are often used. It is helpful to memorize the names and formulas of these compounds.

$NH_{3(g)}$	ammonia
$C_6H_{12}O_{6(s)}$	glucose (simple sugar)
$C_{12}H_{22}O_{11(s)}$	sucrose (table sugar)
$CH_{4(g)}$	methane
$C_3H_{8(g)}$	propane
$CH_3COOH_{(l)}$	acetic acid (vinegar)
$O_{3(g)}$	ozone
$CH_3OH_{(l)}$	methanol
$C_2H_5OH_{(l)}$	ethanol (grain alcohol)
$H_2O_{2(l)}$	hydrogen peroxide

Di- and Polyatomic Elements

- Many non-metals are most stable with multiple atoms in a molecule
- These elements are normally found in nature with many atoms.
- All halogens are di-atomic, having two atoms in each molecule.

astatine	
bromine	
chlorine	
fluorine	
hydrogen	
iodine	
nitrogen	
oxygen	
phosphorous	
sulfur	

Binary Ionic Compounds

- Binary ionic compounds are made from one metal and one nonmetal

- Metals have positive charges and are called cations
- Nonmetals have negative charges and are called anions

Li^+ Cl^-

Binary Ionic Compounds

- When naming binary compounds, the cation is named first, then the anion
- The suffix of the anion is changed to -ide

$$Li^+ + Cl^- \rightarrow LiCl$$

lithium + chloride → lithium chloride

Binary Ionic Compounds

- Ionic compounds need to be neutral (zero charge).
- If our ions have more than a 1+ charge, we need to “cross our charges” to reach neutral
- Unlike molecular compounds, we don’t worry about how many atoms we have when naming

$$Al^{3+} + O^{2-}$$

Polyatomic Ions

- Sometimes ions can combine and not form neutral compounds. These new ions act like a single object when reacting and naming

- A list of polyatomic ions is given on your data sheet

Polyatomic Ions

Table of Common Polyatomic Ions and Elements

acetate (ethanoate)	CH_3COO^-	chromate	CrO_4^{2-}	phosphate	PO_4^{3-}
ammonium	NH_4^+	dichromate	$Cr_2O_7^{2-}$	hydrogenphosphate	HPO_4^{2-}
benzoate	$C_6H_5COO^-$	cyanide	CN^-	dihydrogenphosphate	$H_2PO_4^-$
borate	BO_3^{3-}	hydroxide	OH^-	silicate	SiO_3^{2-}
tetraborate	$B_4O_7^{2-}$	iodate	IO_3^-	stearate	$C_{17}H_{35}COO^{1-}$
bromate	BrO_3^{1-}	nitrate	NO_3^-	sulfate	SO_4^{2-}
carbide	C_2^{2-}	nitrite	NO_2^-	hydrogensulfate	HSO_4^-
carbonate	CO_3^{2-}	oxalate	$OOCCOO^{2-}$	sulfite	SO_3^{2-}
hydrogencarbonate	HCO_3^-	hydrogenoxalate	$HOOCCOO^-$	hydrogensulfite	HSO_3^-
perchlorate	ClO_4^-	permanganate	MnO_4^-	hydrogensulfide	HS^-
chlorate	ClO_3^-	peroxide	O_2^{2-}	thiocyanate	SCN^-
chlorite	ClO_2^-	persulfide	S_2^{2-}	thiosulfate	$S_2O_3^{2-}$
glutamate	$C_5H_8NO_4^{1-}$				
hypochlorite	ClO^- or OCl^-				

Polyatomic Ions

- When making compounds we treat the entire ion like a single nonmetal ion (or metal in the case of ammonium)

calcium carbonate

Polyatomic Ions

- If we need multiples of a polyatomic ion, we use brackets to indicate.

barium permanganate

Polyatomic Ions

- When naming compounds, our names should be binary (two names). We should only ever have three names if it specified in the table.

$LiNO_3$

Polyatomic Ions

$NaNO_2$ $NaNO_2$

$NaNO_2$ $NaNO_2$

Polyatomic Ions

aluminum nitrate

sodium thiosulfate

Polyatomic Ions

lead(II) sulfate

ammonium chloride