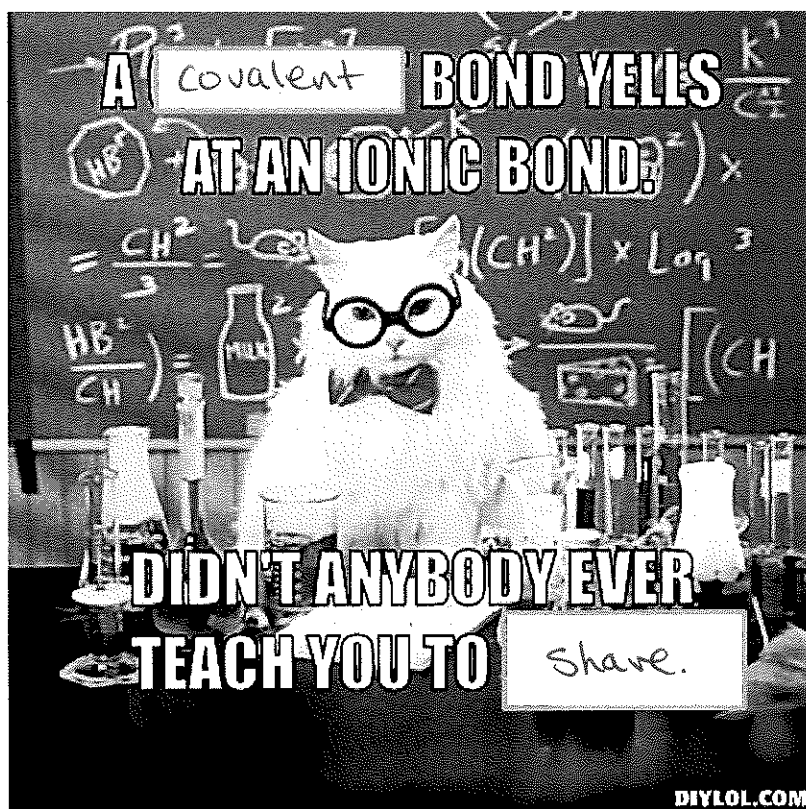


## Molecular Compounds: Formation & Naming

### Formation of Molecular Compounds

When non-metals react with one another, electrons are NOT transferred since both atoms tend to gain electrons to fill their valence energy level. Instead, the valence electrons are shared

These compounds are referred to as molecular and the sharing of electrons forms a bond called covalent (co = share, valent = valence shell).



### Important notes about molecular compounds:

-molecules do NOT usually form a crystal lattice shape  
-Molecules can be solid, liquid, gas at room temperature and usually do not conduct electricity in solution.

It is important to note that the physical and chemical properties of a compound are different from those of the individual elements that make up the compound.

A binary molecular compound forms when atoms of non-metals form a covalent bond and become a molecule.

Some elements cannot exist as just one atom and will exist in a diatomic (two-atom) or polyatomic (multiple atom) form using covalent bonds.

**memorize:** diatomic elements ( $N_2$ ,  $O_2$ ,  $H_2$ ,  $F_2$ ,  $Cl_2$ ,  $Br_2$ ,  $I_2$ )

polyatomic elements  $P_4$  +  $S_8$

**\*Memory Sheet\***

Many molecules are known by their common names, such as water,  $H_2O$ , and ammonia,  $NH_3$ . **\*Memory Sheet\***

**memorize:**

$O_3$  - ozone

$NH_3$  - ammonia

$C_2H_6$  - ethane

$CH_4$  - methane

$CH_3OH$  - methanol

$C_2H_5OH$  - ethanol

$C_6H_{12}O_6$  - glucose  $C_{12}H_{22}O_{11}$  - sucrose  $H_2O_2$  - hydrogen peroxide

• Others are named as follows:

1. Use the full name of the first element (the most metal-like goes first)

2. Put the name of the second element last and change the ending to -ide

3. Use the correct prefix to indicate the number of each element

4. Exception: do not use the prefix mono when the first element only has 1 atom

○ when hydrogen is the first element in the formula, the compound is molecular **BUT** prefixes are **NOT** used

○ <u>Number of Atoms</u>	<u>Prefix</u>	<i>*Memory Sheet*</i>
1	- mono	
2	- di	
3	- tri	
4	- tetra	
5	- penta	
6	- hexa	
7	- hepta	
8	- octa	
9	- nona	
10	- <del>ten</del> deca	

So: To name molecules...

**Prefix + First Element, Prefix + Second Element (with -ide ending)**

Try These

Name the following molecular compounds:



2. NO<sub>3</sub> - nitrogen trioxide



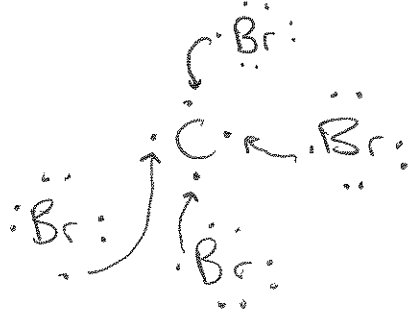
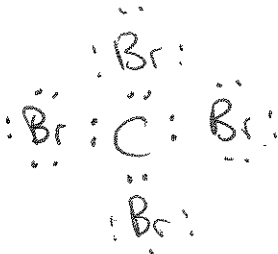
3. N<sub>2</sub>O - dinitrogen monoxide

4. NF<sub>3</sub> - nitrogen trifluoride

5. N<sub>2</sub>O<sub>3</sub> - dinitrogen trioxide

6. CO - carbon monoxide.

Formation of Molecular compounds can be explained using a Lewis diagram  
 Recall that Lewis structures represent the valence electrons. The number of valence electrons can be found using the group #. Electrons that are 'by themselves' in a Lewis structure are called bonding electrons. In molecular compounds, the covalent bond involves sharing electrons (rather than ionic which exchanges electrons)

2 non-metals	Electron dot diagram of each non-metal	Lewis structure of new compound formed	Molecular formula and molecular compound name
oxygen & oxygen			<p>O<sub>2</sub> oxygen.</p>
carbon bromine			<p>carbon tetrabromide CBr<sub>4</sub></p>