

Drawing Lewis Structures

- Step #1: Look at the formula for the compound and determine the number of atoms of each element in the molecule.
- Step #2: Determine the number of valence electrons that each atom contributes.
- Step #3: Determine the total number of valence electrons contributed by all of the atoms.
- Step #4: Arrange the atoms to form a skeleton structure for the molecule. The atom that wants the most bonds (HONC rule) is at the center. If there is more than one carbon, the carbon atoms *usually* bond to each other. Hydrogens and halogens can only form one bond, so they are never at the center (unless the molecule is diatomic!)
- Step #5: Join the atoms with bonding pairs so that you fulfill the HONC rule.
- Step #6: Add unshared pairs of electrons so that each nonmetal (except hydrogen) is surrounded by eight electrons (4 pairs).
- Step #7: Count the electrons in the structure to be sure that the number of valence electrons used equals the number available.
- Step #8: Replace bonding pairs of electrons with lines representing bonds:
≡ is three shared pairs, a triple covalent bond
= is two shared pairs, a double covalent bond
– is one shared pair, a single covalent bond
DO NOT replace unshared pairs with lines!

Please Draw 2D and Build 3D models for the following molecules. They are “fair game” on the tests, as are their structural analogs.

Structural analog = same basic structure with different elements.

Example: CF_4 has the same basic structure as CBr_4 and SiF_4 .

Example: H_2S has the same basic structure as H_2O

HI	OF_2	C_2I_4	O_2	H_2S
CH_2O	CO	CF_4	HCN	C_2H_2
CH_4	NH_3	CO_2	CS_2	H_2O
C_2H_4	CH_2I_2	PF_3	$\text{C}_2\text{H}_4\text{F}_2$	C_2H_6
NI_3	HF			

Here are some “challenges” for those of you who need a bit more. They may show up for the tests:

Benzene, C_6H_6
Carbonate Ion

Formic acid, HCO_2H
Nitrate Ion

Glycine, $\text{NH}_2\text{CH}_2\text{CO}_2\text{H}$

Try to build two different structures that have two carbons, six hydrogens, and one oxygen!