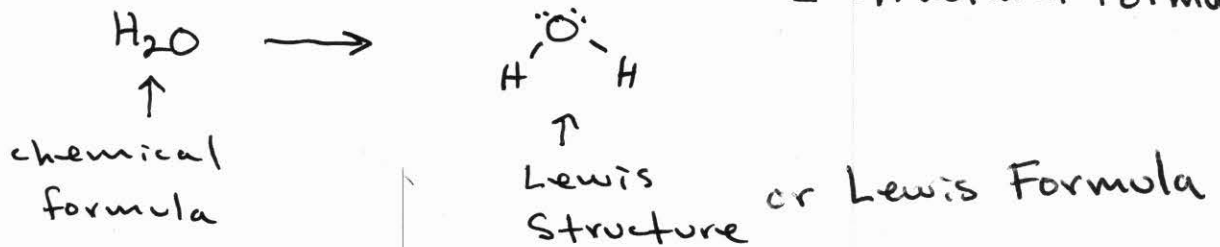


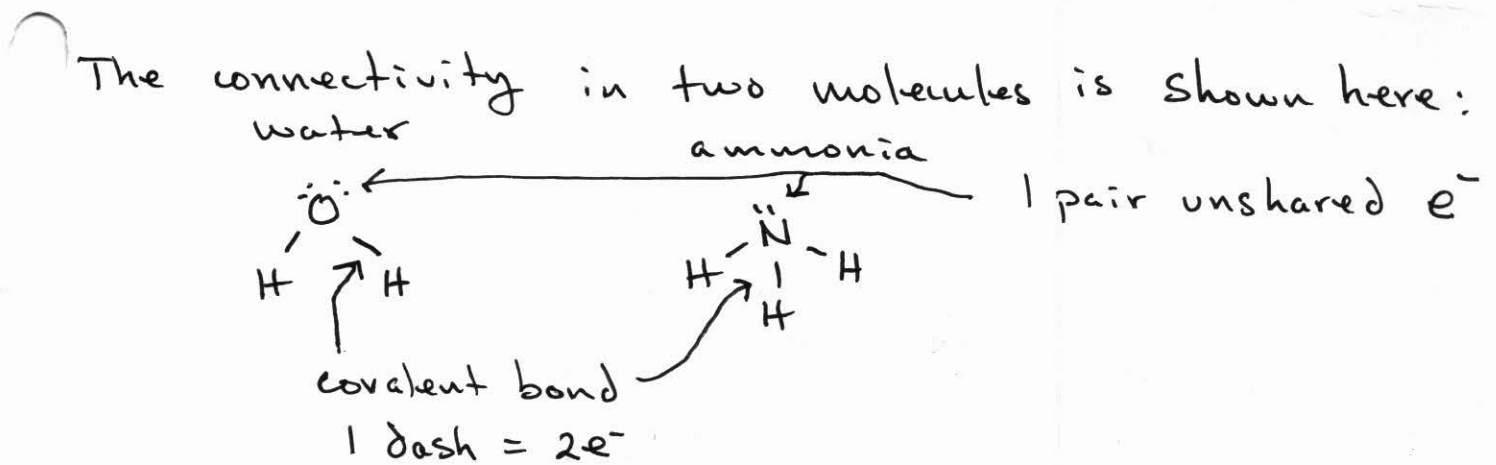
Lewis Structures = Structural Formula

Molecule = collection of atoms bonded by covalent bonds.

Lewis Structure: The connectivity between atoms in a molecule is shown using a Lewis Structure. = Structural Formula



Atoms in a molecule are bonded together by sharing pairs of e^- . How the atoms are connected is important because the connectivity influences how the molecule reacts.



Dash = — = $2e^-$ = one bond

•• = 1 pair unshared e^-

Molecular compounds have 2 kinds of e^- : bonded pairs (—) and unshared pairs e^- .

How to Draw Lewis Structure (LS)

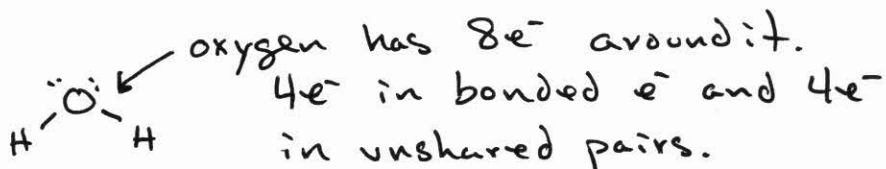
The fundamental idea required to get from H_2O to $\begin{array}{c} \cdot\cdot \\ \text{H} - \text{O} - \text{H} \\ \cdot\cdot \end{array}$ is to understand that the valence electrons of all atoms in the molecule will be combined so that each atom in the compound has a Noble Gas configuration ($8e^-$). ← only for period 2 elements: C, N, O, F as central atoms.

The central period 2 element will have $8e^-$ around it. Hydrogen will have $2e^-$ next to it.

a. Octet rule: central period 2 element has $8e^-$ around it.

b. Duet rule: hydrogen has $2e^-$ next to it.

Example



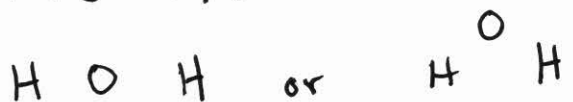
Rules for Drawing LS

H_2O is the model

1. Count up all the valence e^- :

$$\begin{array}{c} \nearrow \\ 2(1e^-) + 1(6e^-) = 8e^- \\ \uparrow \quad \uparrow \\ \text{valence H} \quad \text{valence O} \\ \# \text{ of atoms} \end{array}$$

2. Draw skeleton structure. Central atoms are usually C, N, O and sometimes S, P.

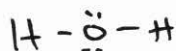


3. Link outer atoms to central atom with a dash



we used $4e^-$. we have $4e^-$ to go.

4. Place remaining e^- as unshared pairs starting on the central atom and moving out so each atom has $8e^-$ except for H.



5. Test your structure :

a) count total e^- . Sum should equal count in #1.

b) Octet rule + Duet rule must be met.

6. For charged molecules; in step #1

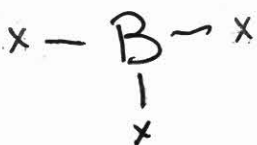
a. Add the negative charge

b. Subtract a positive charge

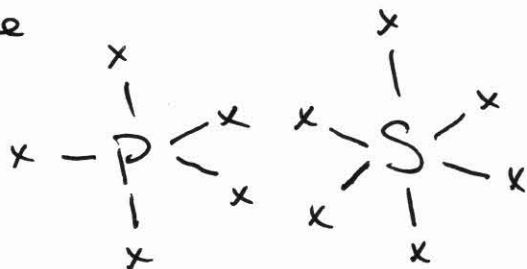
7. Exceptions to the octet rule



$\text{X} = 7\text{A}, \text{H}$



$\text{X} = 7\text{A}, \text{H}$



$\text{X} = \text{variable}$