

Creating Lewis Structures

Start by learning this basic step-by-step procedure for drawing Lewis structures.

- 1. Draw a skeleton structure.** A skeleton structure is a rough map showing the arrangement of atoms within the molecule. In general, you need to determine the skeleton experimentally, but here are a few guidelines for predicting skeleton structures from molecular formulas.
 - Central atoms are usually
 - the atoms with highest valence, or
 - the largest atoms, or
 - the least electronegative atom.
 - H and the halogens are usually outside atoms.
 - Don't put more than four atoms around a central atom unless the central atom is third period or lower.
- 2. Count total valence electrons.**
 - Add the number of electrons in the valence shells of all atoms in the molecule.
 - If the molecule is charged, add an electron for each negative charge and subtract an electron for each positive charge.
 - Noble gas compounds are very uncommon (except on general chemistry tests!) Should you encounter one, each noble gas atom has 8 valence electrons.
- 3. Connect the structure.**
 - Draw a bond between the central atom and each outside atom.
 - Each bond uses 2 valence electrons.
- 4. Place electrons on outside atoms.**
 - Use remaining electrons to satisfy the octets for each of the outside atoms.
 - If you run out of electrons at this point, *the skeleton structure was wrong*. Go back to step I.
- 5. Place all remaining electrons on the central atom.**
 - If there are more than 8 electrons on the central atom, and the central atom is not third period or lower, *you counted the number of valence electrons incorrectly*. Go back to step II.
 - If the octet on the central atom is not complete, try sharing lone pairs of outside atoms to *form double or triple bonds*. Write one multiply bound structure for each outside atom with a lone pair to share; these are resonance structures.
 - If you can't get an octet on the central atom, at this point, check to see whether the total number of valence electrons for this molecule is odd. *It's impossible to give octets to all atoms in an odd electron molecule*. Get as close to an octet as possible by forming multiple bonds.