

Steps for Drawing Lewis Dot Diagrams

1. **Draw a skeletal structure** and connect neighboring atoms with single bonds.
 - a. Hydrogen atoms are always terminal--never in the middle.
 - b. Place the least electronegative atom in the middle (unless inconsistent with c.)
 - c. The structure with the smallest (closest to zero) formal charges is preferred.
2. **Sum the valence electrons** for all atoms and adjust for charges (less for +, more for -).
3. Count each single bond as two electrons then place the remaining electrons by pairs (to outside atoms first) to **form octets on all atoms** (a duet--single bond only--on each H) .

Atoms that have more than 4 bonds will have more than an octet of electrons.
4.
 - a. If there are not enough electrons to form octets on all atoms, move pairs of electrons into bonds to **form double and triple bonds to complete octets**.
 - b. If there are more than enough electrons to form octets on all atoms, **place extra electrons on the central atom** as lone pairs. (The central atom will have more than an octet of electrons.)
 - c. If there are an odd number of electrons, at least one atom will have less than an octet of electrons.
 - d. It is usually preferable to avoid double bonds with Cl, Br, I, and especially F by leaving a neighboring atom with less than an octet.
5. Without eliminating octets **optimize formal charges** when possible by moving electron pairs.
 - a. Charges equal to (or closest to) zero are preferred. (0 is better than +1, +1 is better than +2.)
 - b. Atoms with higher electronegativity should **not** have more positive formal charges than atoms with lower electronegativity. (e.g., O should not have formal charge 0 or +1 if N has -1.)
6. Add **resonance structures** that have equivalent bonding patterns for the same skeletal structure (i.e., draw atoms in exactly identical patterns—only the electrons change places.) Draw double arrows (\leftrightarrow) between equivalent structures.
7. Draw **brackets** [] around structures for ions, and put the charge as a superscript outside the brackets.