

LEWIS STRUCTURES

Chem 192 — Cañada College

Step 1: Take Stock

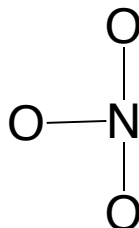
Figure out how many electrons you have to work with. Add the valence electrons for each element. If the structure is an ion, add an electron for each negative charge or remove an electron for each positive charge.



$$\begin{array}{r} 1\text{N } 1 (5e) \\ 3\text{O } 3 (6e) \\ -1 \text{ charge } 1e \\ + \hline 24e \text{ in structure} \end{array}$$

Step 2: Draw the Skeleton

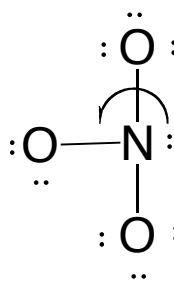
This is the hardest part. For simple molecules. One way to start is to put the most unique or heaviest element in the center and connect the remaining atoms to it.



$$\begin{array}{r} 24e \\ 3 \text{ bonds } 3(2e) \\ - \hline 18e \text{ left to place} \\ (9 \text{ pairs of } e \text{ to fill octets}) \end{array}$$

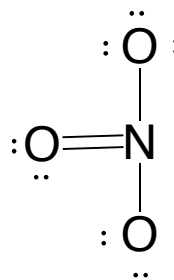
Step 3: Use remaining Electrons to Fill Octets

Figure out how many electrons were used in making the bonds you drew. Subtract 2 electrons for each bond from the total electrons you have. Use the remaining electrons to fill the octets of each atom.



move electron pairs into bonds to complete octets

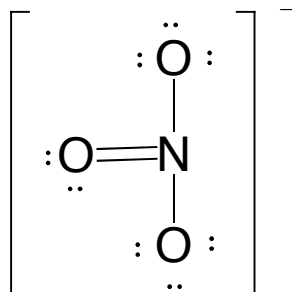
The Octet Rule: Most atoms want 8 valence electrons, that's the octet rule. There are exceptions. The most significant exceptions are Hydrogen, Helium, and Lithium—which try and reach a valence of 2 to look like the noble gas Hydrogen. Another exception is and Beryllium, Aluminum and Boron which do not form multiple bonds and do not usually have an octet.



if structure is an ion, be sure to use brackets and show the charge on the ion

Step 4: Make Multiple Bonds to Complete Octets

Check each atom to see if atoms that obey the octet rule are satisfied (see 8 electrons). If some atoms do not have an octet, move some electron pairs to form double or triple bonds.



Step 5: Show Charge on Structure

If structure is an ion, put structure in brackets and show charge on that structure.