Lewis Dot Diagrams: NASL Method

N - calculate needed as the sum of electrons needed for all atoms by the octet rule Exceptions (H=2, Be=4, B=6)

A - calculate available as the sum of all valence electrons

S - calculate shared as the difference between N and A. Divide S by 2 to obtain the number of bonds to be extended from the central atom

L - calculate lone pair of electrons (dots) as the difference between A and S.

Formal charge - Count the number of valence electrons the atom has in the molecule (both electrons in any un-bonded pairs and one electron for each bond). Subtract this number from the number of valence electrons from the periodic table

Neutralize charges on neighboring atoms by moving unbonded electrons into bonds. Only if the (-) atom has an unbonded pair of electrons and the (+) atom is not completely filled. The exception is that if the (+) atom lies in a row further down on the periodic table than the (-) atom. In that case the charges can be transferred even if it means “overfilling” the atom.

Resonance, Bond Order, Bond Length, Bond Energy

Resonance	Bond Order	Bond Energy	Bond Length
Resonance structures have the same relative placement of atoms, but different locations of multiple bonds and lone electron pairs.	The number of electron pairs being shared by any pair of bonded atoms	The energy required to overcome this attraction	Distance between two nuclei of two bonded atoms A higher bond order for a given pair of atoms will result in a shorter bond length, and higher bond energy
Smaller formal charges (+ or -) are preferred over larger ones Like formal charges on adjacent atoms are not desirable. A more (-) formal charge should reside on a more electrone-gative atom in a molecule	Single bond - bond order of 1 Double bond- bond order of 2 Triple bond - bond order of 3		