

Review:

1) How to write correct structural formulas

(with formal charges?)

2) How to predict molecular shape?

The rules:

- 1) **Remember: Lines are covalent bonds.** C can form 4 covalent bonds, N can form 3 cov. bonds, O can form 2 cov. Bonds, H can form 1 cov. Bond.
- 2) Count total number of valence e-
- 3) Connect atoms maximizing bonds without breaking the octet rule.
You can form multiple bonds (double, triple)
- 4) Calculate how many electrons you have left for lone pairs with the formula: lone pair e- = (Total valence e-) – (Bonding electrons)
Bonding electrons are two per each line.
- 5) Distribute electrons around the atoms following the octet rule.
Remember octet rule may not apply for any element on period 3 or higher (such as S, Cl), and for any element of rows 1-3.

Example:

Write structural formula for NO_3^- anion.

Calculate formal charge for each atom:

(Number of valence e^-) – (e^- around atom)

(e^- around atom = $\frac{1}{2}$ of bonding e^- + all e^- in lone pairs)

Predict the shape of molecule:

1): Count how many bonds and lone pairs you have around central atom.

Attention: double and triple bonds count as one bond!

2) : For number 2: Linear (180 deg.)

For number 3: Trigonal planar (120 deg.)
(or bent if you have lone pairs))

For number 4: Tetrahedral (110 deg.)
(or trigonal pyramidal or bent if you have lone pairs)

Practice for nitrate anion:

Practice for sulfate anion: