

Exercise 6.2b

Lewis Dot Structures

Name: _____

Date: _____ Per: _____

For a molecule, the Lewis structure shows the way in which the bonded atoms share the use of electrons in order to achieve full octets. The Lewis structure shows the types and number of covalent bonds within the molecule, as well the location of unshared pairs of electrons which affect the shape of the molecule. Covalent bonds may be single, double, or triple and are represented by bars instead of dots (single bond = 1 bar = 2 shared electrons; double bond = 2 bars = 4 shared electrons; triple bond = 3 bars = 6 shared electrons).

Polyatomic ions, like molecules, share electrons, but also gain or lose electrons in their formation. Polyatomic cations lose electrons in order to form and polyatomic anions gain electrons as they form.

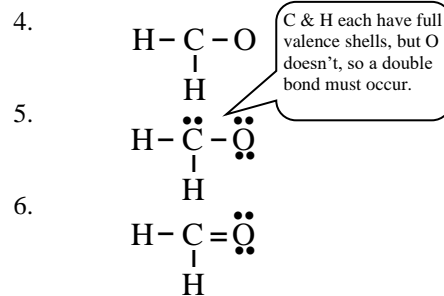
Drawing Lewis Dot Diagrams for Covalent Compounds & Polyatomic Ions

Drawing Lewis Dot Structures

- Find the total number of valence electrons in the molecule using the periodic table. (If the particle is charged, add (negative charge) or subtract (positive charge) the correct number of electrons.)
- Determine # of electron pairs by dividing total valence electrons by 2.
- Predict atom locations.
 - The central atom will usually have lower electronegativity.
 - Hydrogen can form only one bond.
 - Halogens typically form only one bond.
 - Most atoms seek 8 valence electrons, but hydrogen only holds 2 electrons.
- Place one bonded pair between the central atom and each terminal atom to create the skeleton.
- Distribute remaining pairs by filling octets of all atoms starting with the central atom.
- If some elements lack a complete octet, they may have multiple bonds and require sharing with the central atom.

Draw a Lewis Structure for CH₂O:

- Total valence electrons = 4 + 2(1) + 6 = 12.
- 12 ÷ 2 = 6 e⁻ pairs
- C has low electronegativity and should be central. Hydrogen must be terminal.



DIRECTIONS: Draw Lewis dot diagrams for each of the covalent compounds below.

PH ₃	NH ₄ ⁺	H ₂ S	PCl ₃	SiO ₂
OH ⁻	H ₂ O	HClO ₃	CHI ₃	CH ₃ OH
C ₂ H ₄	HClO	CO ₂	C ₂ H ₂	HCN