

# Lewis Structures

UCI Chem 51A

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# Goals

- After this lesson you should be able to:
  - 1. Explain why Lewis structures are integral to organic chemistry.
  - 2. Draw valid Lewis structures.
  - 3. Count formal charge.



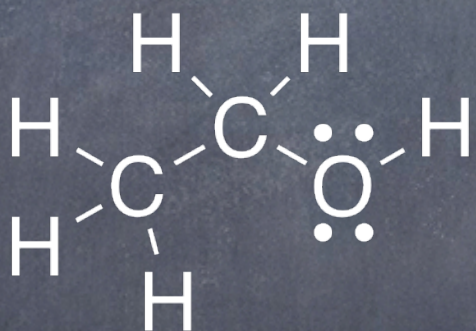
# Lewis Structures: Quick Review



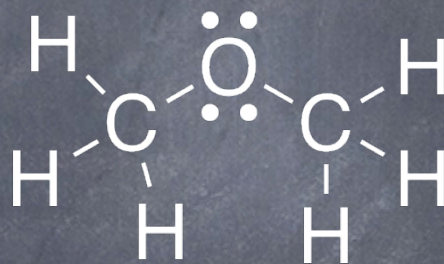
- Lewis structures are representations of molecules that depict bonds and lone pairs.
- Why are structures needed?
  - In gchem, you used mainly formulas.



# One Formula, Many Structures



ethanol



dimethyl ether

1 formula can = multiple structures!

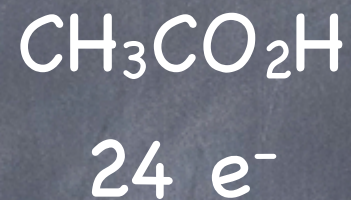
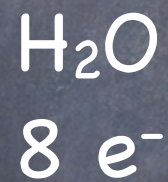


# How to Draw Lewis Structures:

- 1. Count valence electrons. (As you become more comfortable drawing structures you can sometimes skip this step, but occasionally double-check!)
- 2. Arrange atoms. Organic formulas will usually give you an idea of how.
- 3. Draw in single bonds. Distribute lone pairs. Count your electrons.
- 4. Check for octets. IF NEEDED add double or triple bonds. (Don't get double-bond-happy!)
- 5. Maximize octets, minimize formal charge. (More on this later.)



# Lewis Structure Examples





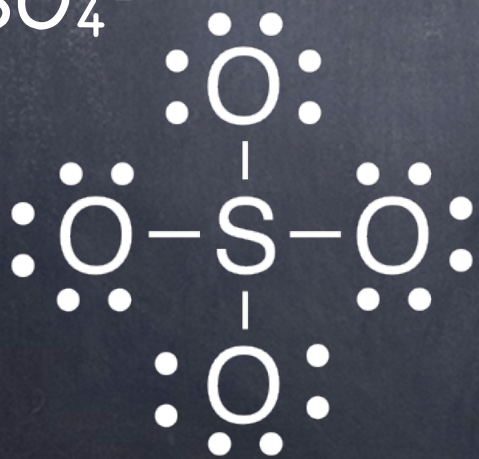
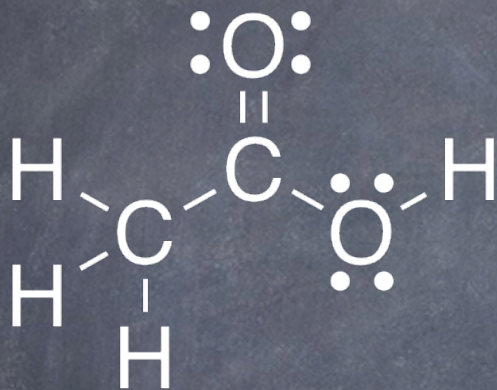
# Electron Accounting

## Methods: Formal Charge

- Formal charge lets us know if an atom is electron-rich or electron-poor! (Important for reactions later!)
- Counting formal charge is different than counting for octet rule! Be careful!
- Counting rules:
  - 1. Count formal charge for individual atoms in a structure.
  - 2. Non-bonding pairs count as 2 electrons. Bonds count as 1 electron.
  - 3. Compare number of electrons in structure to NORMAL number of valence electrons.
    - Extra electrons in structure? (-) charge
    - Fewer electrons in structure? (+) charge



# Formal Charge Examples





# Wrapping Up

- Practice drawing Lewis structures, including formal charge.