

# Drawing Organic Structures

UCI Chem 51A

Dr. Link

# Goals

- After this lesson you should be able to:
  - Identify different ways of drawing organic molecules and when each should be used.
  - Draw molecules using condensed structures.
  - Draw molecules using skeletal structures.

# Representations



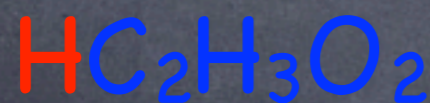
- On a street, what does this shape mean?
- Color?
- Words?

We use shape, color, and words all to convey the idea of "stop".

# Many Methods of Representing Molecules

- Learn to think on the molecular level.
- Recognize multiple representations of the same molecule.

acetic acid

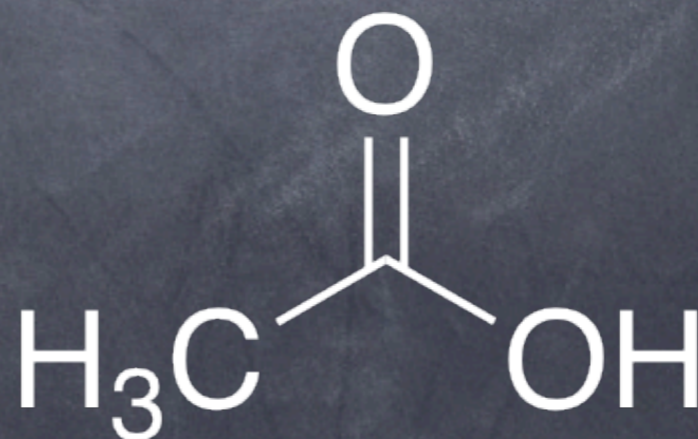
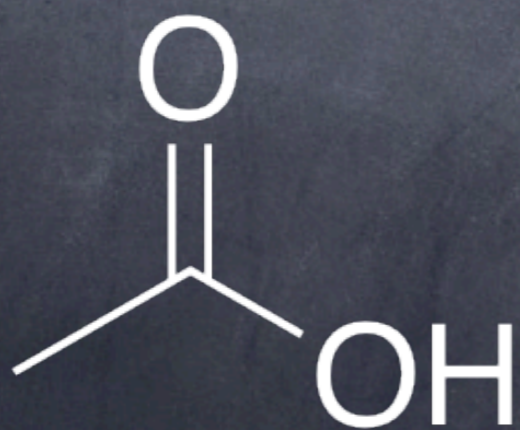
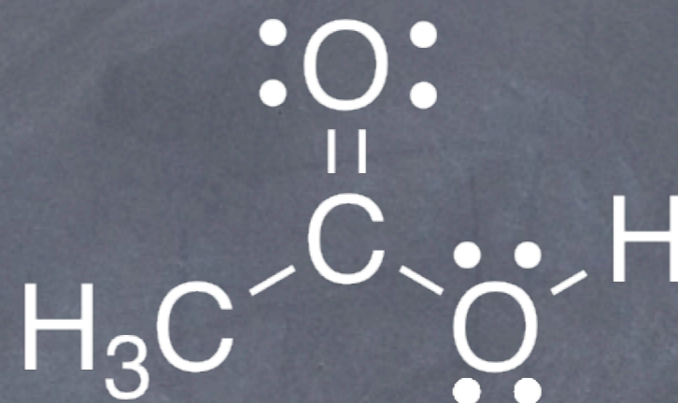
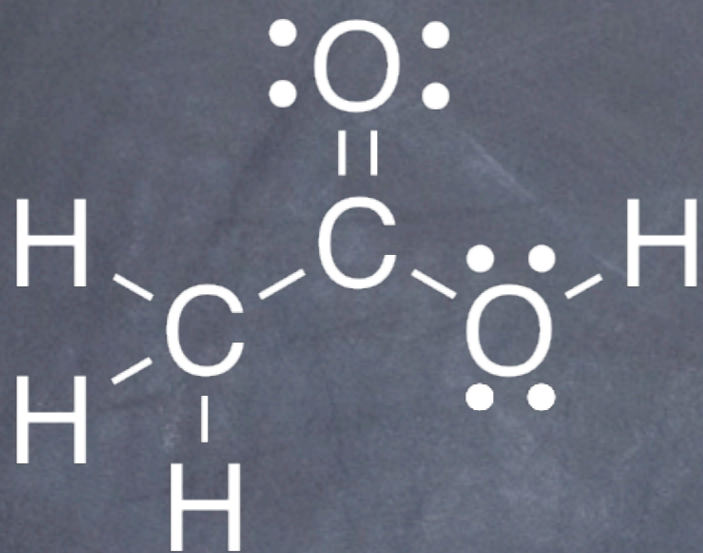


acidic H acetate ion

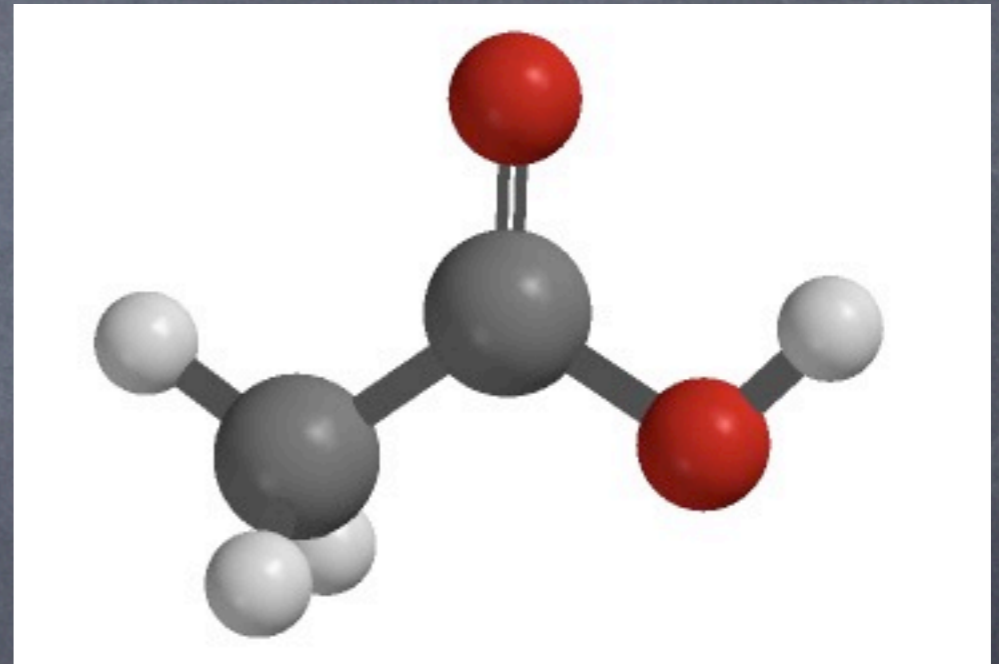
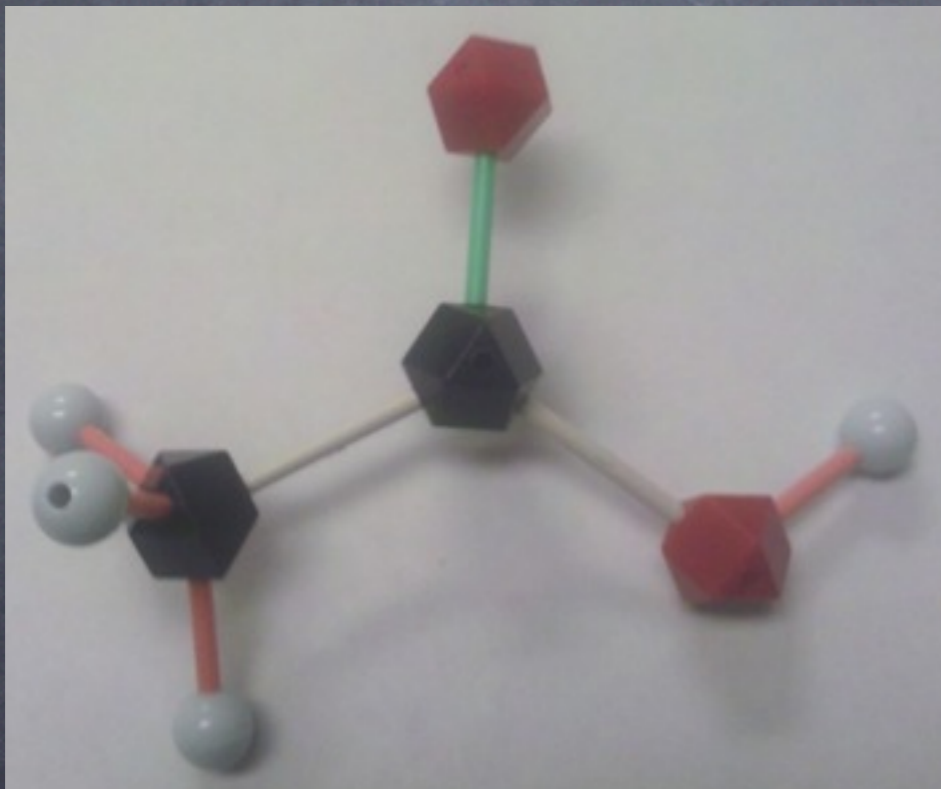


condensed structures  
convey order of atoms

# More Representations



# Three-Dimensional Representations



# Why Do We Need MORE Ways to Draw Structures?

- Ways to represent molecules you already know:
  - Molecular formulas
  - Lewis structures
- Why do we need more ways?
  - Imagine drawing a large molecule as a full Lewis structure!

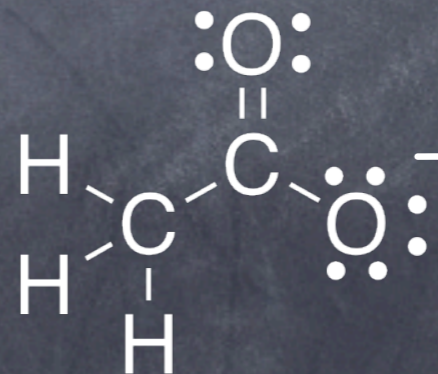
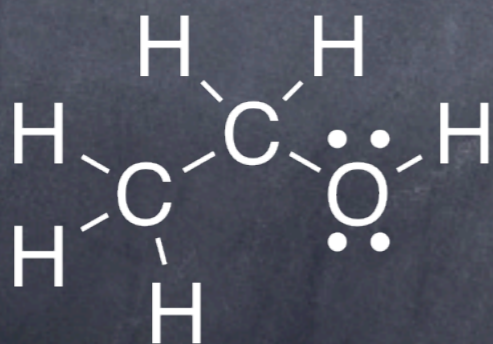
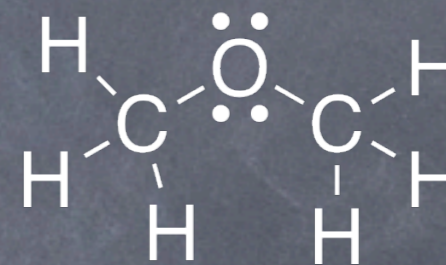
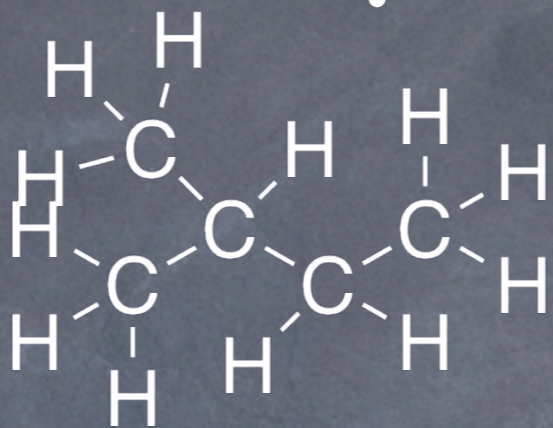
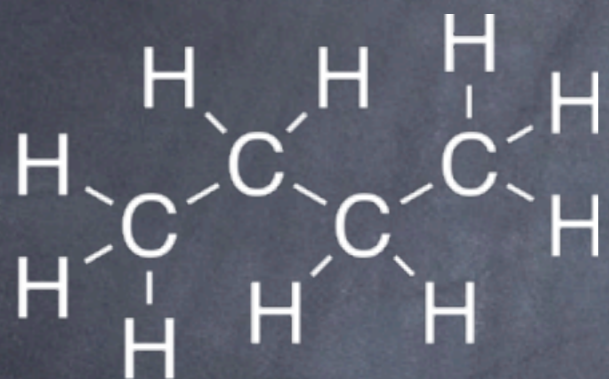
# Condensed Structures

- How to draw:
  - Generally only atoms, usually listed in order of how they're bonded
  - Leave out nonbonding pairs
  - Use parentheses around multiple groups bonded to the same atom.
- When to draw:
  - Use for relatively simple or small molecules where structure can easily be conveyed by order



# Condensed Structure

## Examples



# Common Condensed Structure Mistakes

- H can't be in the middle!
- C must be tetravalent

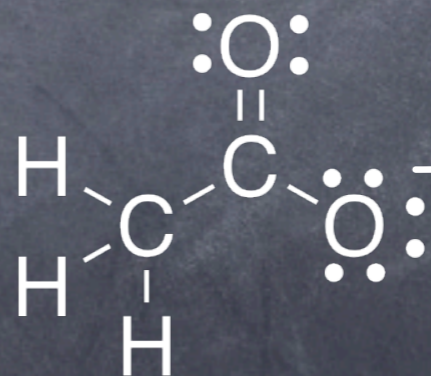
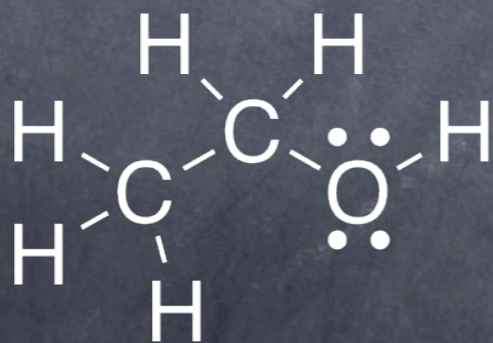
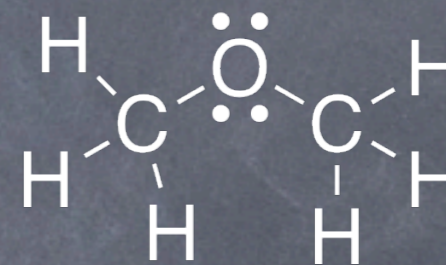
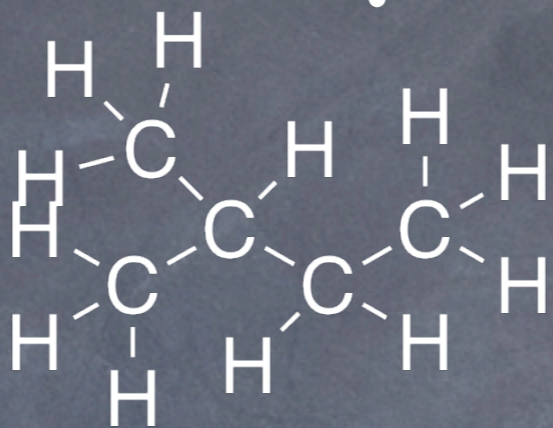
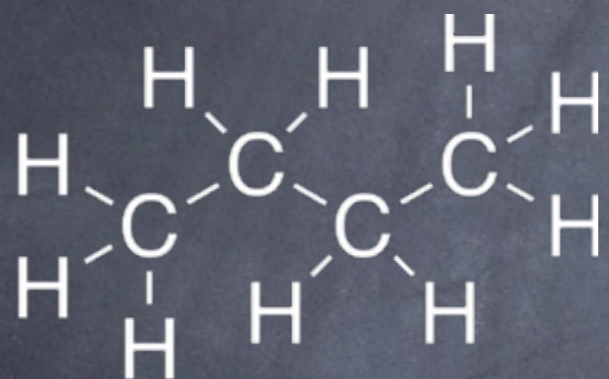


# Skeletal Structures

- We can also draw structures and leave out most of the atoms.
- How to draw:
  - Ends and junctions of lines = C atom
  - Leave out H (but remember they are there!)
  - Draw in all atoms other than C or H (heteroatoms). Draw any H bonded to heteroatoms.
- When to draw:
  - Big molecules
  - Picture explains more than condensed structure

# Skeletal Structure

## Examples



# Common Mistakes

- Don't forget that the H-atoms are there!

# Wrapping Up

- Practice going back and forth between multiple forms
- Practice making some models
- Practice looking at a formula and imagining the 3-D shape