

Drawing Organic Structures

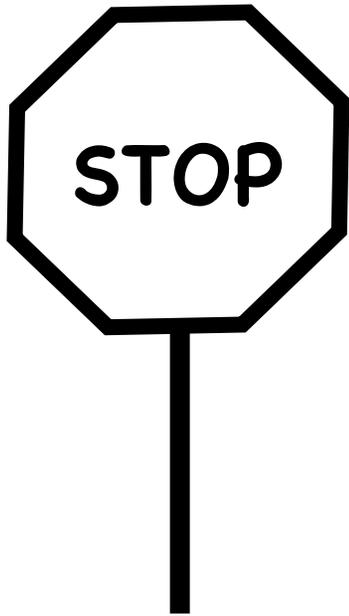
UCI Chem 51A

Dr. Link

Goals

- ① After this lesson you should be able to:
 - ① Identify different ways of drawing organic molecules and when each should be used.
 - ② Draw molecules using condensed structures.
 - ③ Draw molecules using skeletal structures.

Representations



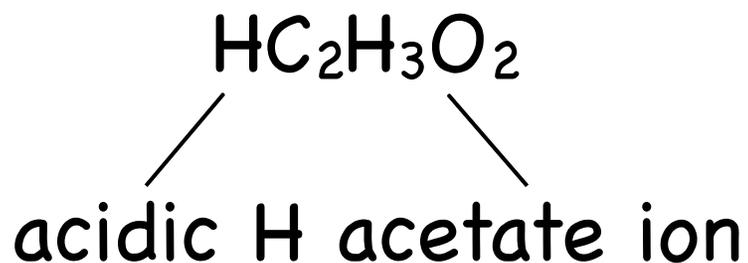
- ④ On a street, what does this shape mean?
- ④ Color?
- ④ Words?

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

Many Methods of Representing Molecules

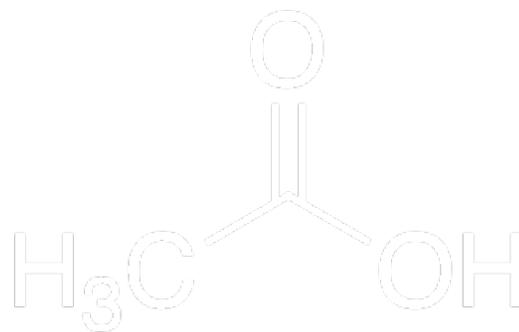
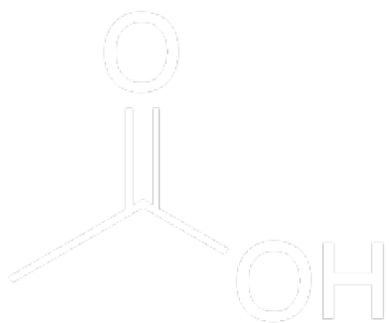
- ④ Learn to think on the molecular level.
- ④ Recognize multiple representations of the same molecule.

acetic acid

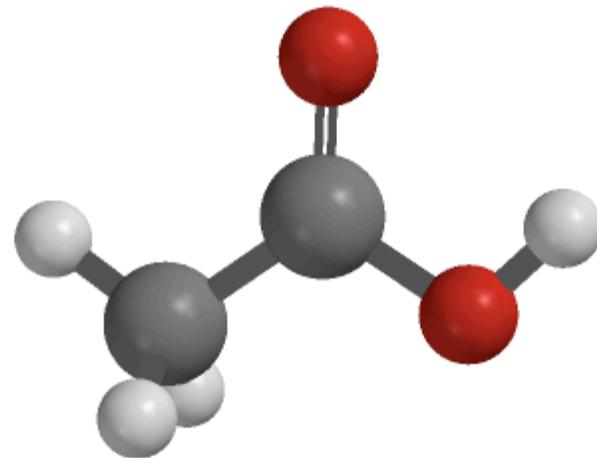
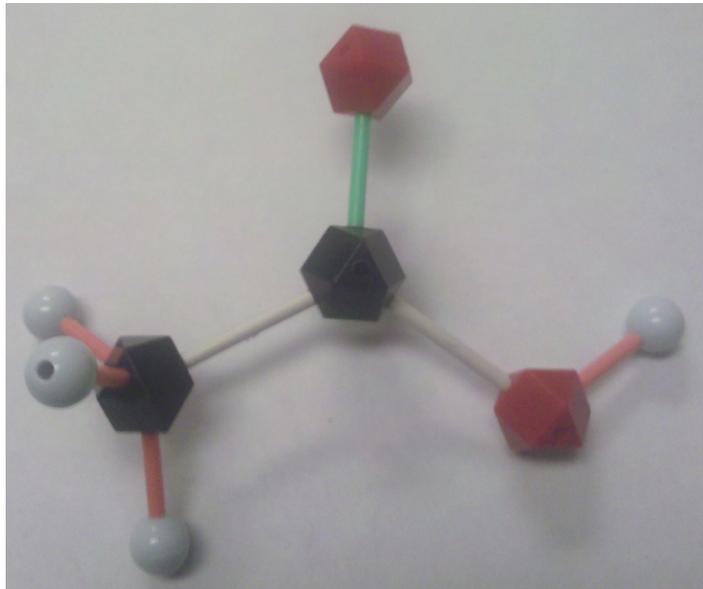


condensed structures
convey order of atoms

More Representations



Three-Dimensional Representations



Why Do We Need MORE Ways to Draw Structures?

- ③ Ways to represent molecules you already know:
 - ③ Molecular formulas
 - ③ Lewis structures
- ③ Why do we need more ways?
 - ③ Imagine drawing a large molecule as a full Lewis structure!

Condensed Structures

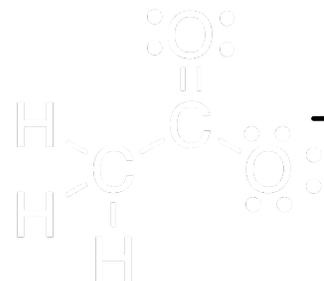
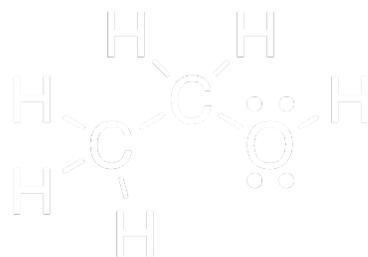
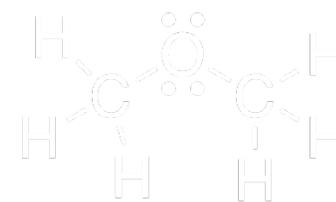
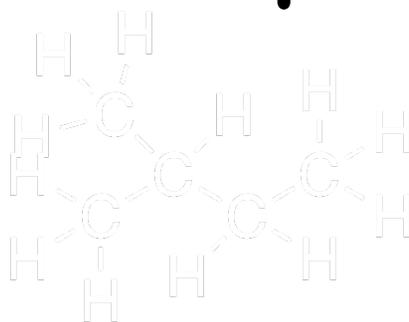
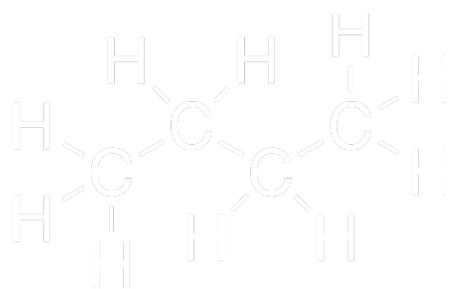
⦿ How to draw:

- ⦿ 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

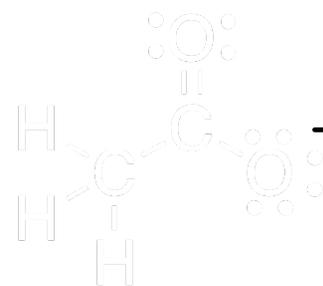
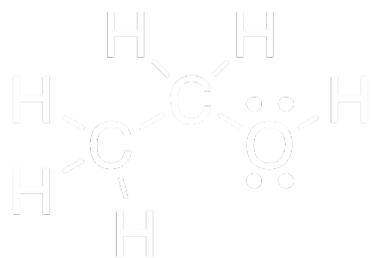
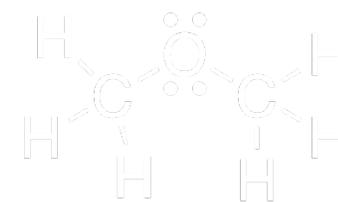
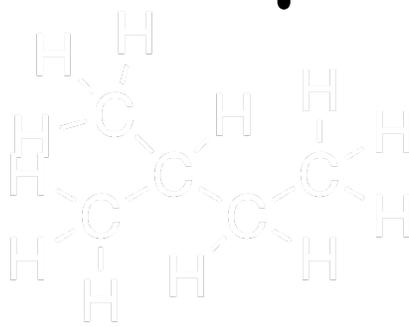
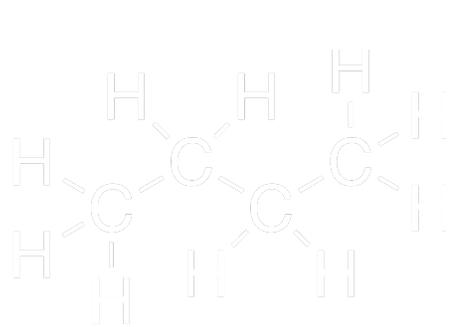
- ⊕ H can't be in the middle!
- ⊕ C must be tetravalent



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

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