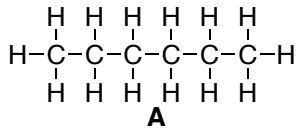
Structural Formulas (Section 1-10)

1. Full Structural Formulas
2. Condensed Formulas
3. Line-Angle Formulas

Since organic structures are large and complex, full Lewis structures are often a hassle. You'll need to be proficient in both condensed and line-angle formulas.

Full, Condensed, and Line-Angle Structures for Hexane, C_6H_{14}



A

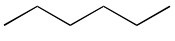
Full

$CH_3CH_2CH_2CH_2CH_2CH_3$ **B**

or

$CH_3(CH_2)_4CH_3$ **C**

Condensed



D

Line-Angle

Condensed Formulas: Central atoms are shown with attached atoms, essentially in sequence

- Challenges:
  1. Handling parentheses
  2. Handling double and triple bonds
  3. Handling branches
  4. Handling ketones/aldehydes/esters/amides/carboxylic acids
  5. In general, recognizing when an oxygen is double-bonded off a carbon, and when it is single bonded both to carbon and to something else.

Line-Angle Formulas:

1. Each vertex represents a carbon
2. C-H bonds are often omitted: assume enough H's to give four bonds or the appropriate formal charge
3. Oxygen and Nitrogen atoms must be specified, and O-H and N-H bonds are **not** omitted

- Line-angle formulas are routinely the fastest and cleanest to draw.
- Line-angle is essential and optimal for showing 3-dimensional organic shape.

Formula Practice (Section 1-10)

3. Time race: Draw as many copies of C_6H_{14} hexane as you can in 20 seconds:

Full:

Condensed:

Line-Angle:

4. Draw the full structure, given the condensed structure. (Note:

CH_3CH_2OH

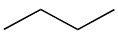
$(CH_3)_2CH_2NH_2$

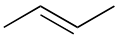
CH_2CHCl

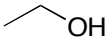
CH_3CHO

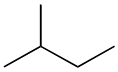
CH_3CO_2H

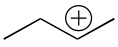
5. Fill in the full structure, including attached hydrogens and attached lone pairs, for the following line-angle structures. If given a condensed structure, convert it to a line-angle.

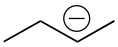












$CH_3CH_2CH_2CH_2CH_3$

CH_3CO_2H