



## Structural Models and Diagrams

A variety of models exist to communicate how atoms are bonded to form molecules. These types of models include:

**Molecular formula** - works well for small, simple molecules.

As the number of atoms increase, less is known about the structure of the molecule.

Ex.  $\text{H}_2\text{O}$ ,  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$  **Count the atoms!**

**Expanded molecular formula** - shows the arrangement of atoms within a molecule

Ex.  $\text{CH}_3\text{CH}_3$

**Complete structural diagram** - shows all atoms and bonds

Ex.

[Bonding Capacity Review](#)

**Condensed structural diagram** - shows the C-C bonds, but omits the C-H bonds

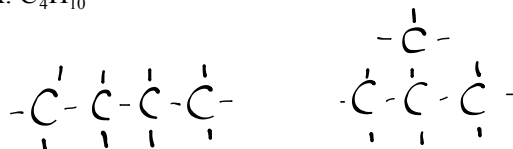
Ex.

**Line Diagram** - shows bonds, but no atoms. The end of each line segment represent a C atom.

Ex.

**\*\* Isomers - compounds with the same molecular formula, but different structures\*\***

Ex.  $\text{C}_4\text{H}_{10}$

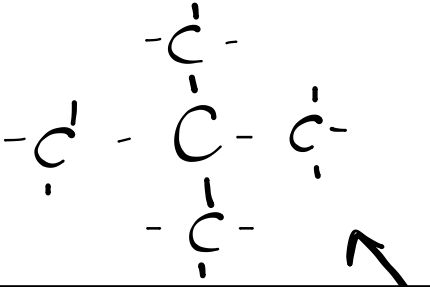
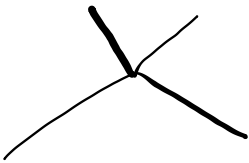
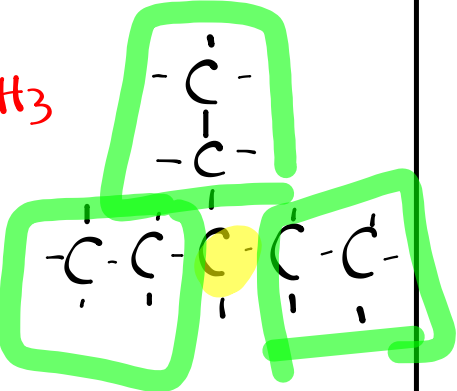
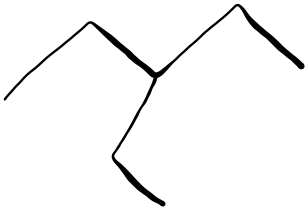


How many isomers can be drawn for  $\text{C}_2\text{H}_6$ ?

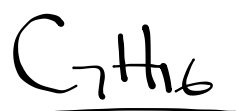
For  $\text{C}_5\text{H}_{12}$ ?

# Homework

## Structural Diagram worksheet

Expanded Molecular Formula	Complete Structural Diagram	Line Diagram
$C(CH_3)_4$	 <p style="text-align: center;"><math>C_5H_{12}</math></p>	
<p><math>CH_3CH_2CH(CH_2CH_3)CH_2CH_3</math></p> <p><math>CH_3CH_2CH(C_2H_5)CH_2CH_3</math></p> <p><math>CH(CH_2CH_3)_3</math></p> <p><math>CH(C_2H_5)_3</math></p>		





The prefixes for compounds or alkyl groups with one to 10 carbons are shown in the chart on p. 695.

<u>FORMULA</u>	<u>IUPAC NAME</u>	<u>ALKYL GROUP</u>	<u>ALKYL NAME</u>
CH <sub>4</sub>	methane	-CH <sub>3</sub>	methyl
C <sub>2</sub> H <sub>6</sub>	ethane	-C <sub>2</sub> H <sub>5</sub>	ethyl
C <sub>3</sub> H <sub>8</sub>	propane	-C <sub>3</sub> H <sub>7</sub>	propyl
C <sub>4</sub> H <sub>10</sub>	butane	-C <sub>4</sub> H <sub>9</sub>	butyl

The remaining 6 follow latin naming.