(8) **Today**

Sections 1.12
Drawing Chemical Structures

Next Class (9)

Sections 1.12
Drawing Chemical Structures

Sections 2.1 - 2.4
Polar Covalent Bonds, Formal Charges,
Resonance/Electron Delocalization

Bring Modeling Kits

(10) **Second Class from Today**

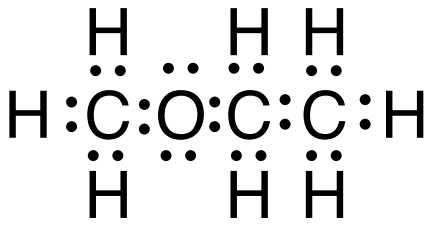
Sections 2.4 – 2.6
Resonance/Electron Delocalization

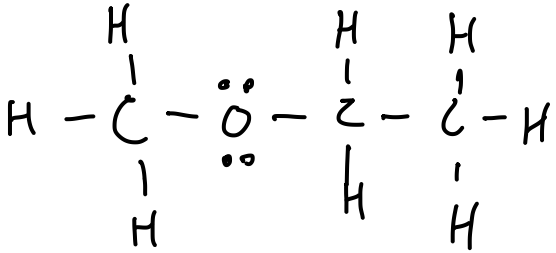
Bring Modeling Kits

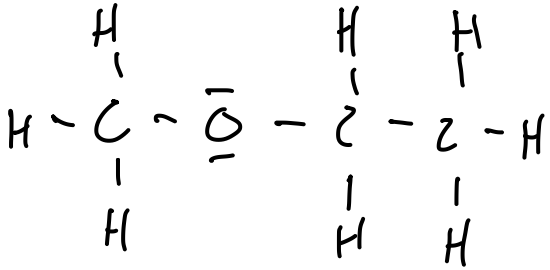
Third Class from Today (11)

Sections 2.4 – 2.6
Resonance/Electron Delocalization

Sections 2.7 – 2.11
Acids and Bases





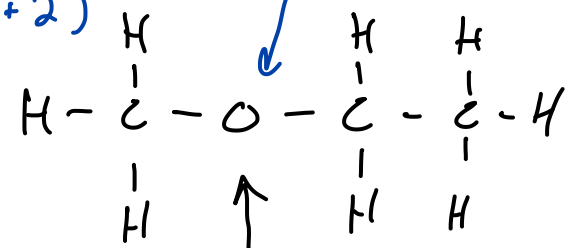


Kekulé

$FC_O = 0$

$0 = 6 - (? + 2)$

$4 = ?$



is there a charge indicate? No o charge

there are lone pairs e⁻'s here ... we just aren't emphasizing them so we aren't drawing them

Chemists use different drawings to place emphasis on different aspects of a molecule.

Representations are used to solve typographical issues.

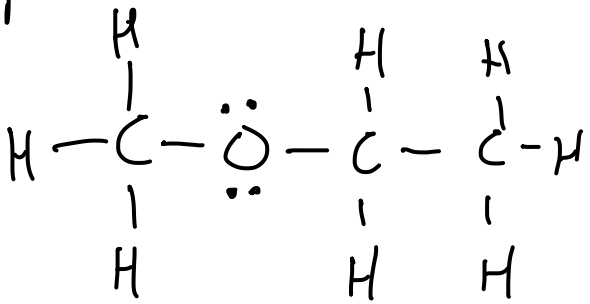
Is this the formula for 1 molecule or are there isomers with this same formula?

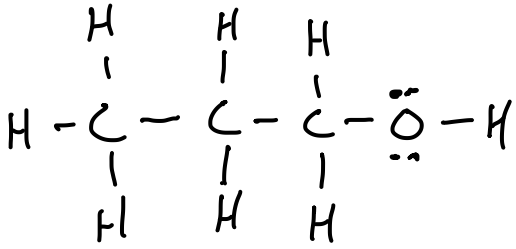
C_3H_8O

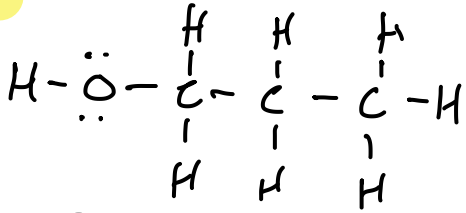
In organic, condensed structures typically start with a C, and everything immediately to the right of the C is connected to that first C. When the the first C is finally connected to the second C, now that atoms right of the second C are connected to second C. In acyclic unbranched molecules atoms to the right of the second C are not connected to the first C.

C_3H_8O $CH_3OCH_2CH_3$ $CH_3CH_2OCH_3$ $CH_3CH_2CH_2OH$ $CH_3CHOHCH_3$

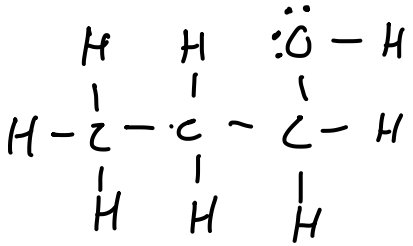
subscript







same



Structural isomers are molecules with the same formula but different connectivity between the atoms

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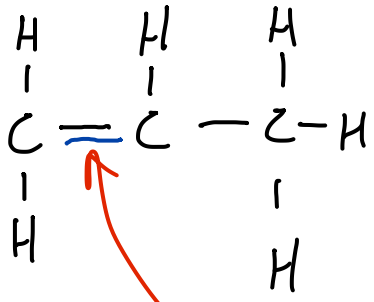
CH_2CHCH_3

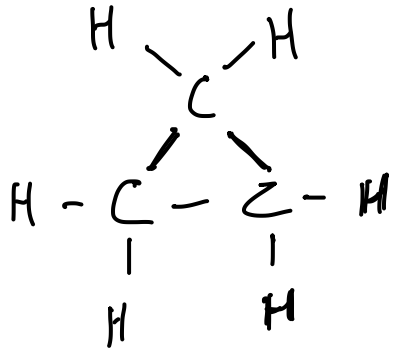


CH_2 doesn't give me 4 bonds

there is no charge indicated on the molecule so we must have complete octets for every atom... 4 bonds for C

Because bonds are not drawn, condensed structures require the reader to bring some chemical knowledge to their interpretation.

emphasizing connectivity



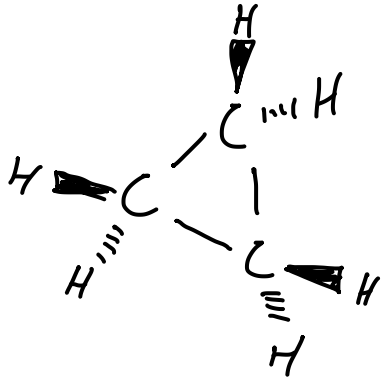
$CH_2CH_2CH_2$

this "bracket" is showing us that the 1st CH_2 is connected to the 3rd CH_2

ignoring stereochem

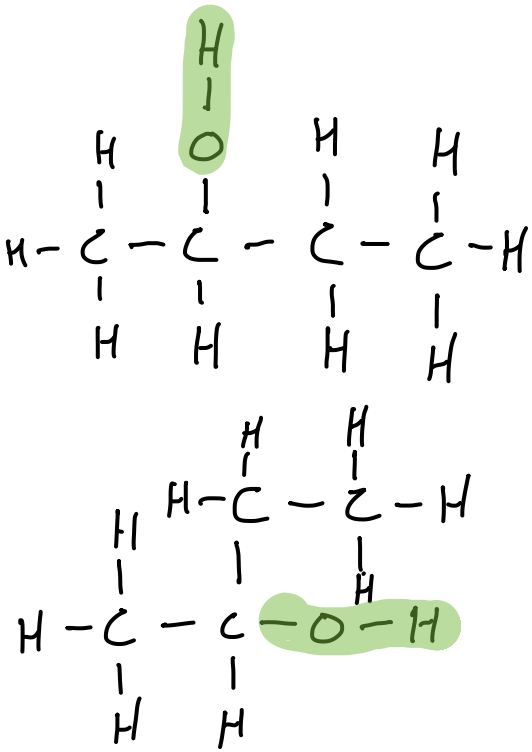
cyclopropane

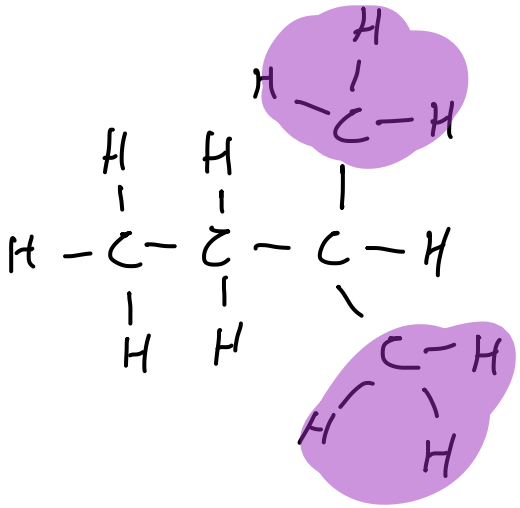
emphasize stereochemisty

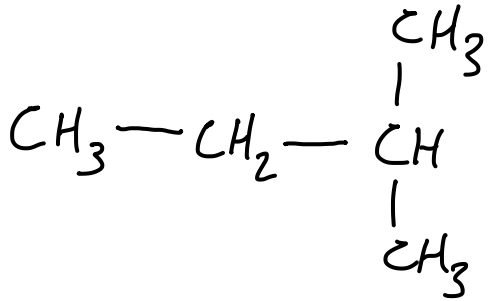


$CH_3CH(OH)CH_2CH_3$ $CH_3(CH_2)_3CH_3$ $CH_3CH_2CH(CH_3)_2$

Parentheses **( )** in structures are typically used to set off side chains, to indicate a repeating unit, or to indicate multiple groups of the same structure.







Often, chemists omit parentheses when they are not absolutely necessary,

$CH_3(CH_2)_3CH_3$

parantheses required, $CH_3CH_2CH_2CH_3$ makes no chemical sense

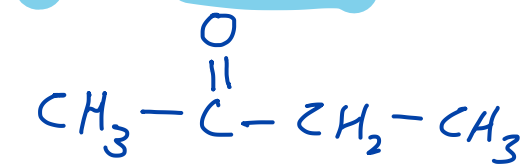
$CH_3CHOHCH_3$

$CH_3CH(OH)CH_3$

structurally the same

$CH_3COCH_2CH_3$

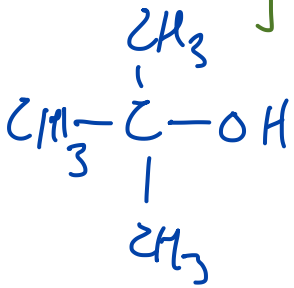
$CH_3C(O)CH_2CH_3$



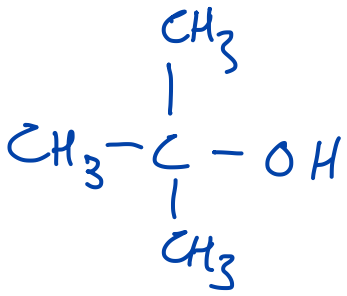
parentheses are not actually necessary to create the structure

and sometimes chemists do things for aesthetic reasons.

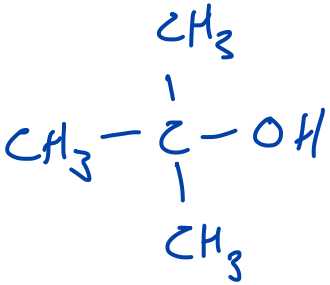
$C(CH_3)_3OH$ most technically correct



$CH_3C(CH_3)_2OH$



$(CH_3)_3COH$ most often used



Typically ... H's Follow C

CH_3-CH_3

but sometimes H's are appear to the left

H_3C-CH_3

On the other hand ...

OH's are always drawn with the bond drawn to O

CH_3-OH ✓

H_3C-OH ✓

$HO-CH_3$ ✓

~~CH_3-HO~~ 😢

$CH_3CHOHCH_2CH_3$ $CH_3C(O)CH(CH_3)_2$ CH_3CHO

When a bond ends and the atom isn't labeled it is assumed to be C.

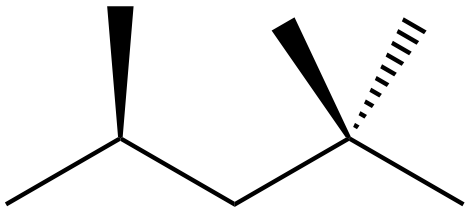
When there aren't enough bonds drawn to a C atom, the "missing" bonds are C atom to H atom bonds.

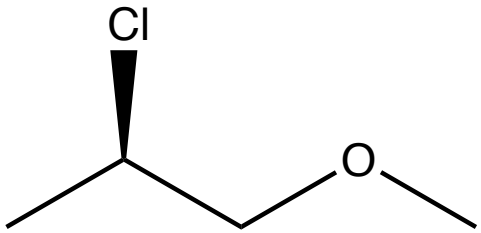
All other atoms are labeled.

Heptane

2-heptanol

Different structures serve different purposes, but they represent the same things





$CH_3CH(OH)CH_2CH(CH_3)CH_2CH_3$