Today

32?

Finish Day 3
Section 1.4: Different ways of representing molecules

Section 1.6: An Introduction to MO Theory
Sections 1.7-1.15: An Introduction to Valence Bond Theory

Next Class

Sections 1.7-1.15
An Introduction to Valence Bond Theory

Introduction to Mastering Chemistry for Organic Chemistry is open and due by 11:59 pm on 9/18

Homework Chapter 1 is open and due by 11:59 pm on 9/21

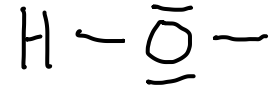
If you do not have access to Mastering Chemistry because your code is on back order, you can sign up for a two week trial and convert that to paid access when you get your code.

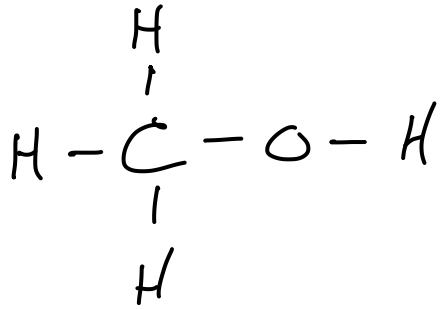
https://support.pearson.com/getsupport/s/article/MyLab-Mastering-for-Learning-Management-Systems-Change-from-Temporary-to-Full-MyLab-Access

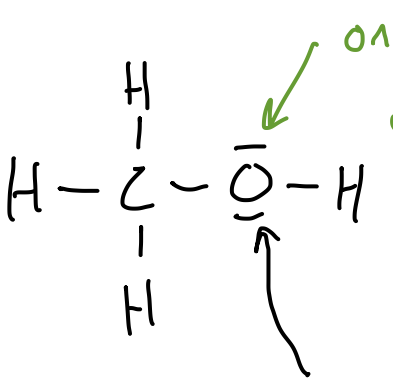
Lewis & Kekulé Structures

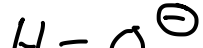
Kekulé

Section 1.4







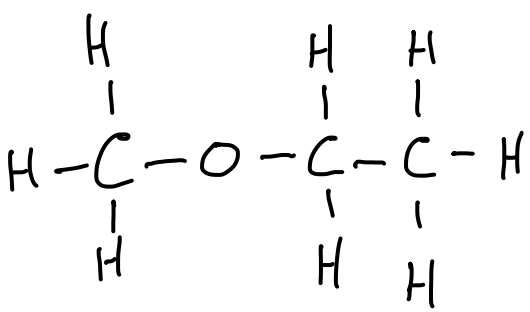


Chemists use different drawings to place emphasis on different aspects of a molecule.

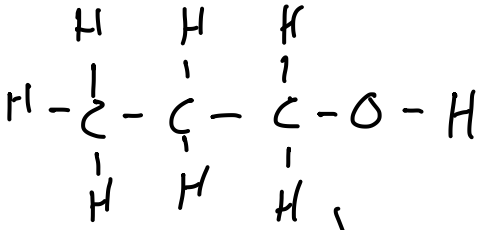
Remember the basics of Lewis Structure (we will practice drawing them as a lab activity)

C_3H_7Cl

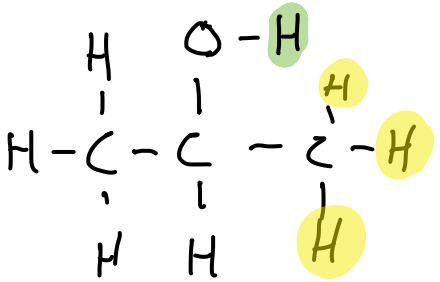
C_3H_8O $CH_3OCH_2CH_3$ $CH_3CH_2OCH_3$ $CH_3CH_2CH_2OH$ $CH_3CHOHCH_3$



Same

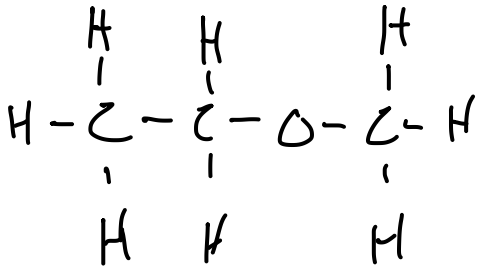


alcohol



2-propanol

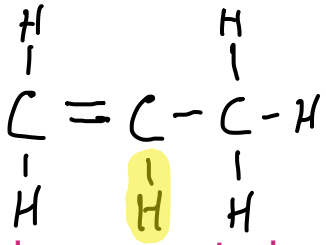
methyl ethyl ether



1-propanol

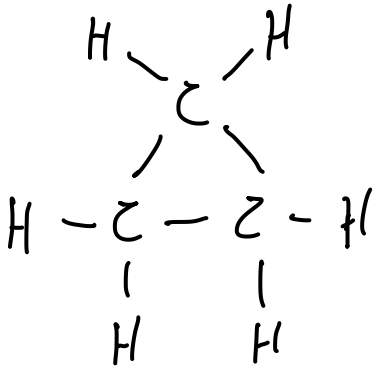
In organic, condensed structures typically start with a C, and everything immediately to the right of the C is connected to that first C. When the the first C is finally connected to the second C, now that atoms right of the second C are connected to second C. In acyclic, molecules atoms to the right of the second C are never connected to the first C.

CH_2CHCH_3



do not move this H to the first C.

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

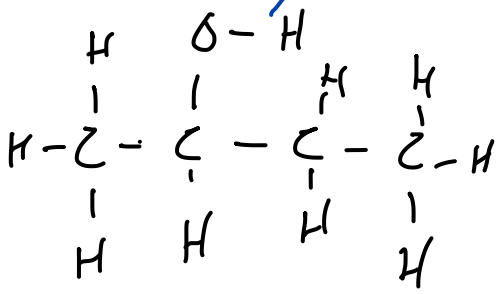


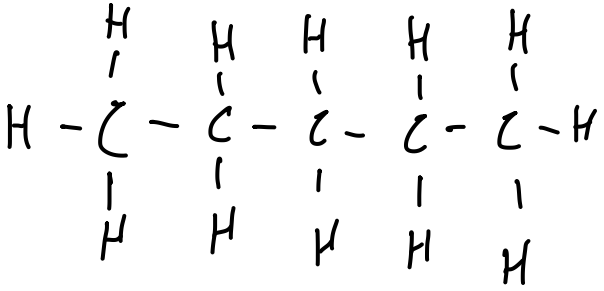
$CH_2CH_2CH_2$

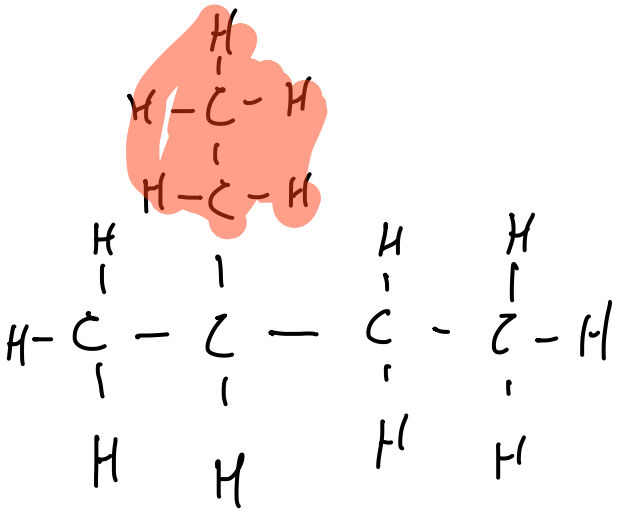
this line is telling us that this molecule forms a ring between the 1st & 3rd C atoms

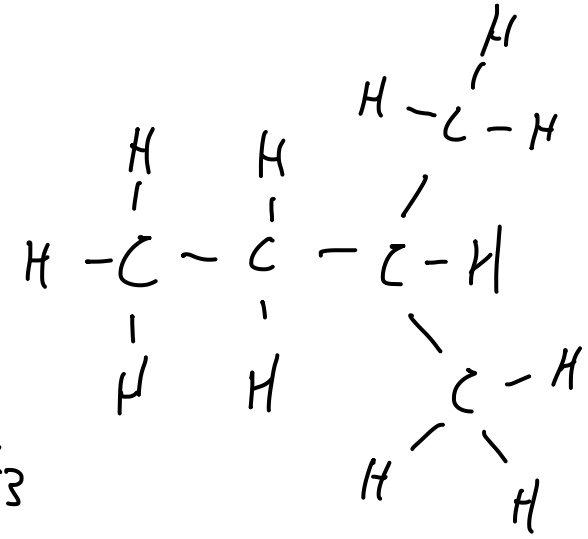
$CH_3CH(OH)CH_2CH_3$ $CH_3(CH_2)_3CH_3$ $CH_3CH_2CH(CH_3)_2$

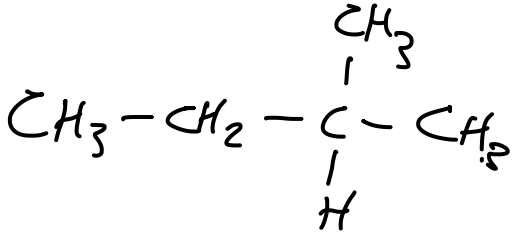
Parentheses **( )** in structures are typically used for to set off side chains, to indicate a repeating unit, or to indicate multiple groups of the same structure.





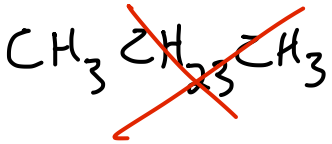






Often, chemists omit parentheses when they are not absolutely necessary,

$CH_3(CH_2)_3CH_3$



$CH_3CHOHCH_3$

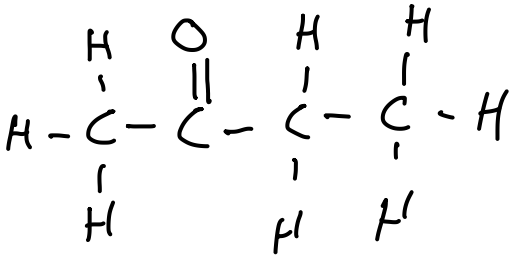
$CH_3CH(OH)CH_3$

you have to figure out that it is a side chain

hint that this is a side chain

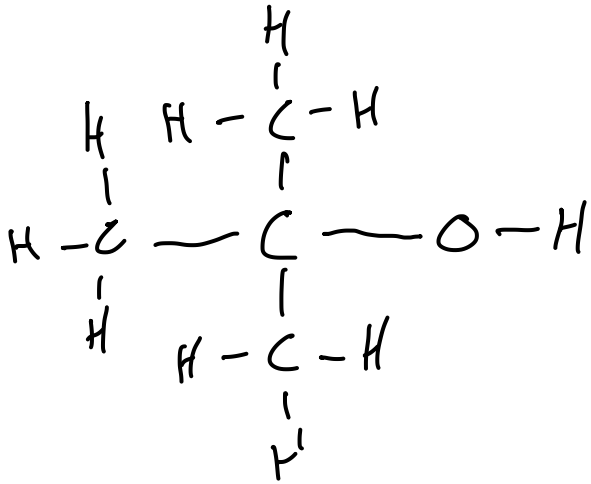
$CH_3COCH_2CH_3$

$CH_3C(O)CH_2CH_3$

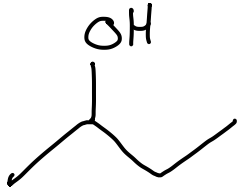


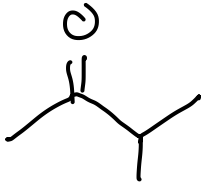
and sometimes chemists do things for aesthetic reasons.

$C(CH_3)_3OH$ $CH_3C(CH_3)_2OH$ $(CH_3)_3COH$



skeletal structures

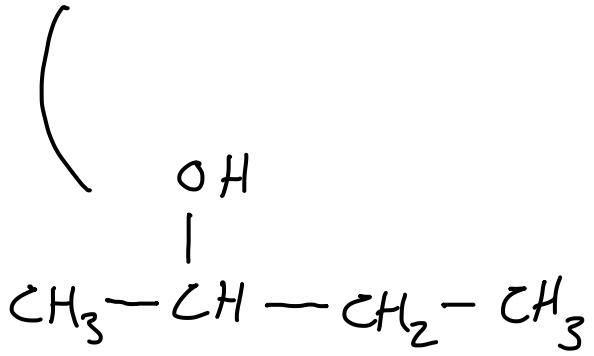


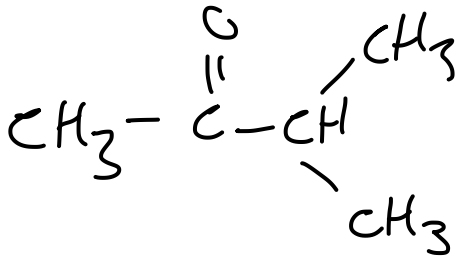


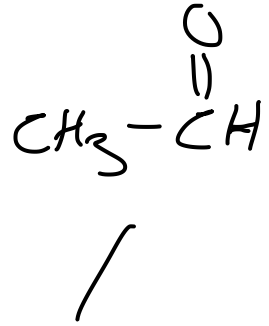
$CH_3CHOHCH_2CH_3$

$CH_3C(O)CH(CH_3)_2$

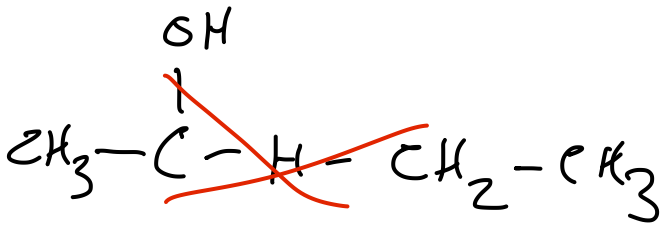
CH_3CHO







aldehyde

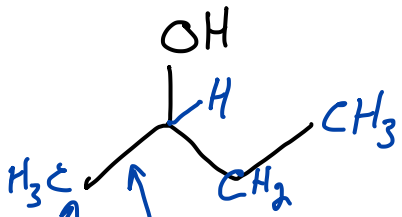


When an atom isn't labeled it is assumed to be C.

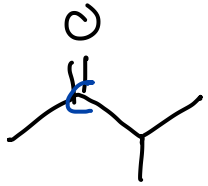
charge on C atom can change the # of bonds needed

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.

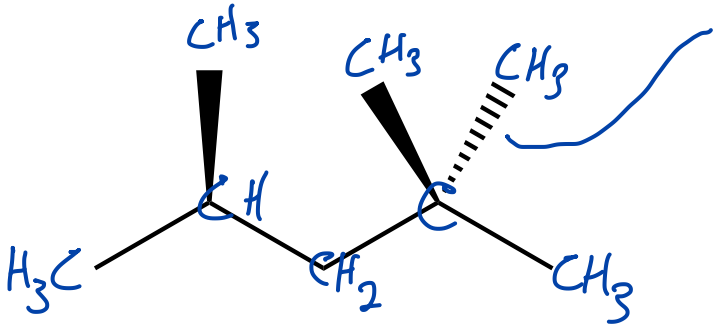


this bond ends here. No label present assume C. Only one bond drawn, so it must be 3 H's bonded to the C.

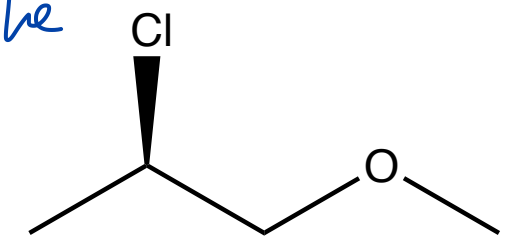


H-O-H

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



the dashed wedge is a way of representing the stereochemistry (3D shape)



//// points away from viewer

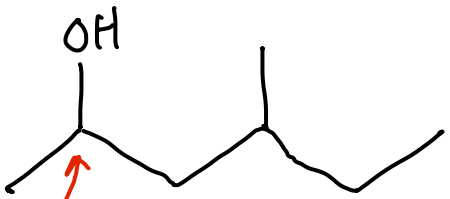
◀ points towards viewer

/ in plane of page/screen

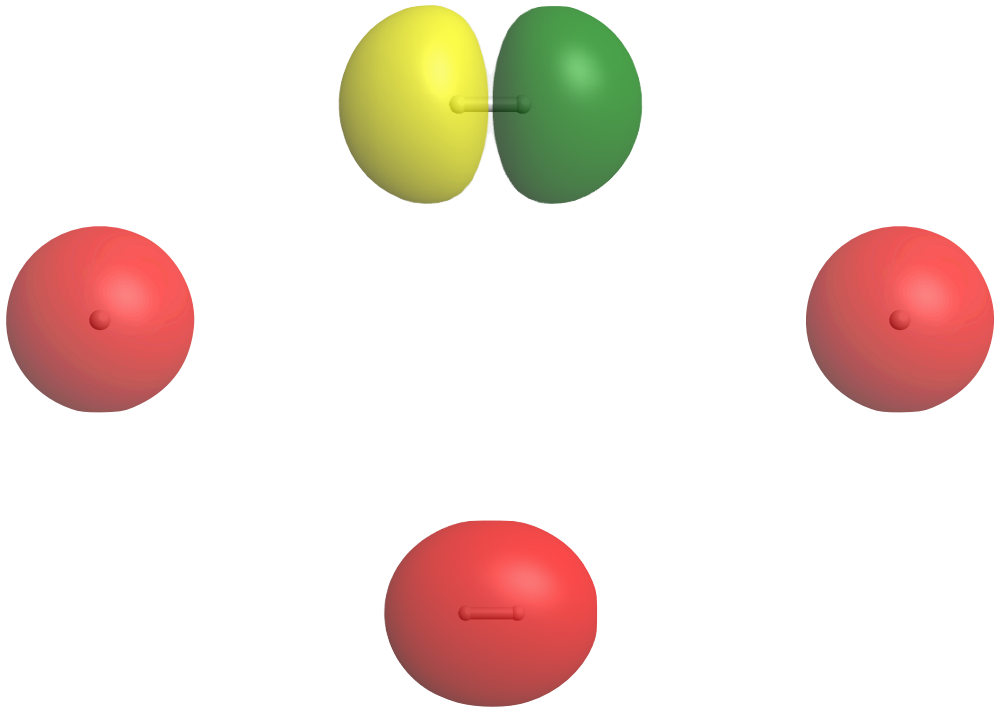
$CH_3CH(OH)CH_2CH(CH_3)CH_2CH_3$

1 2 (3 4) 5 6 — chain of C atoms 6 C's long

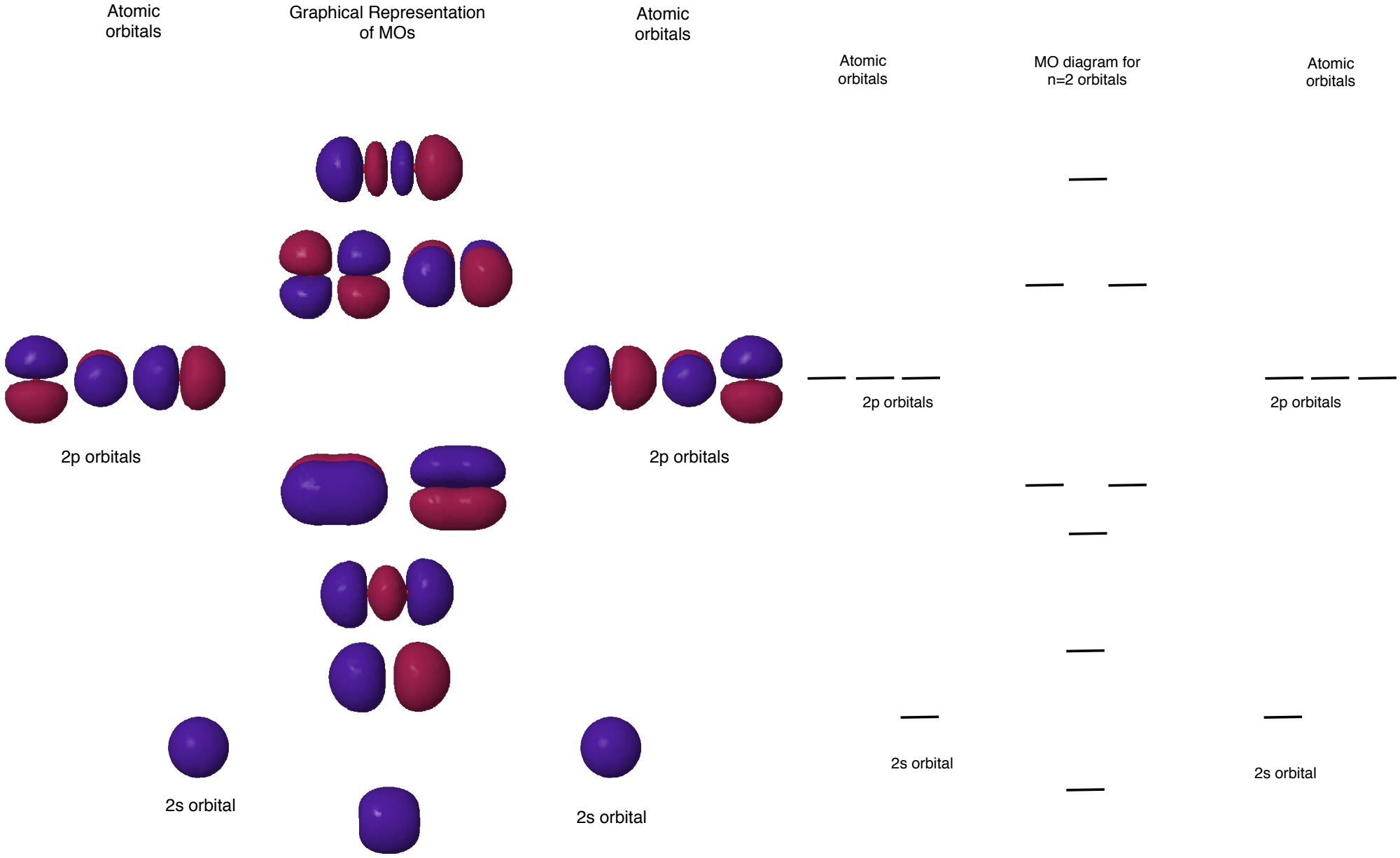
branches



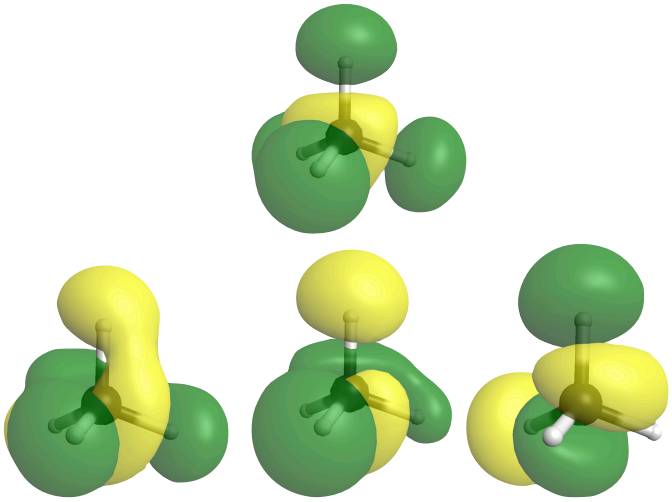
not stereochemically correct, but if you aren't asked to show 3D structure it's ok.

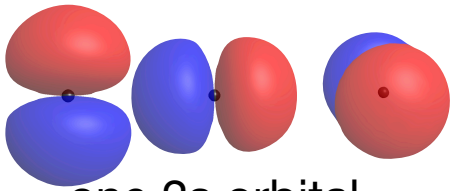


Molecules have orbitals just like atoms have orbitals

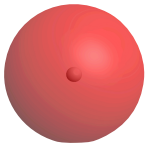


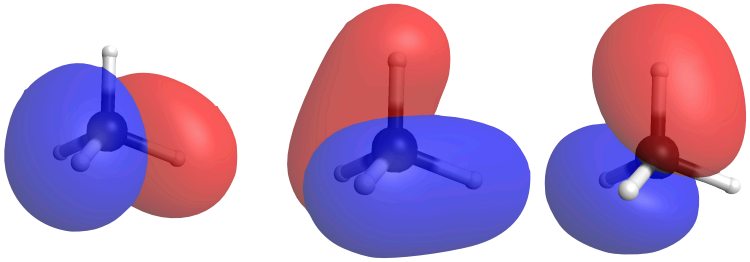
https://www.westfield.ma.edu/PersonalPages/cmasi/organic/mo-plain/mo2.html

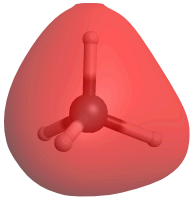




one 2s orbital
and
three 2p orbitals
from
one C atom







four 1s orbitals
from
four H atoms

https://www.westfield.ma.edu/PersonalPages/cmasi/organic/hybrid/hybrid.html
Identify atoms that use sp^3 hybrid orbitals to form bonds and hold lone-pair electrons