(7) **Today**

Sections 1.12
Drawing Chemical Structures

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

Next Class (8)

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

Sections 2.4 – 2.6
Resonance/Electron Delocalization

(9) **Second Class from Today**

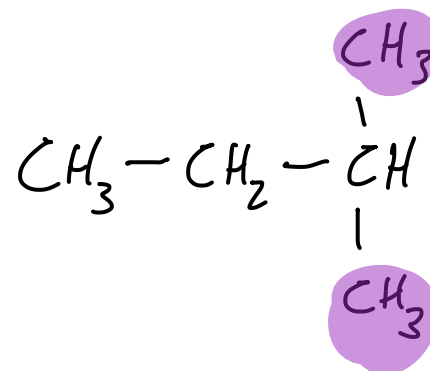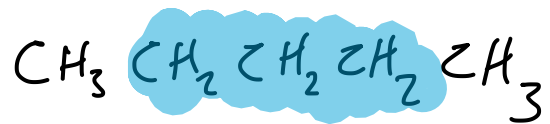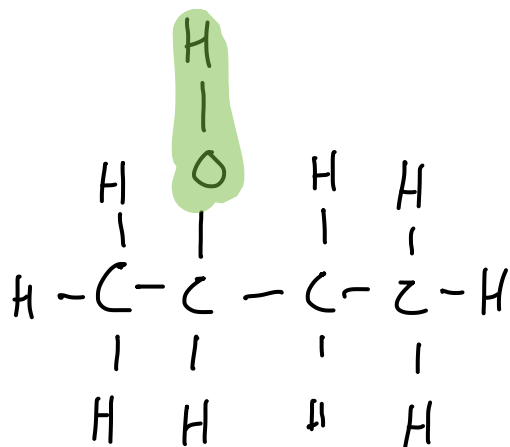Sections 2.4 – 2.6
Resonance/Electron Delocalization

Sections 2.7 – 2.11
Acids and Bases

**Third Class from Today** (10)

Sections 2.7 – 2.11
Acids and Bases

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

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.

$$CH_3 \; CH_2 \; CH_2 \; CH_2 \; CH_3$$

Kekulé structure
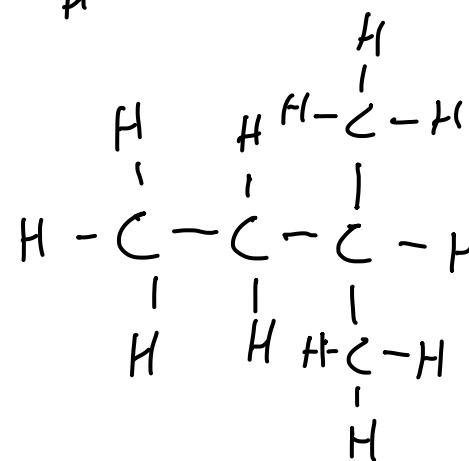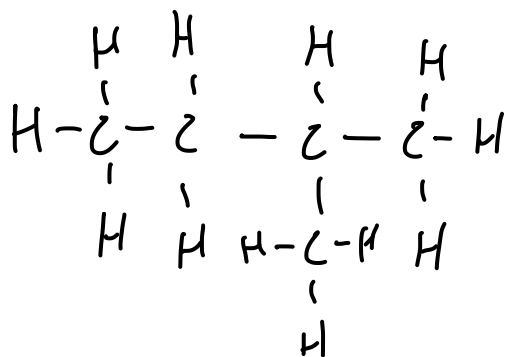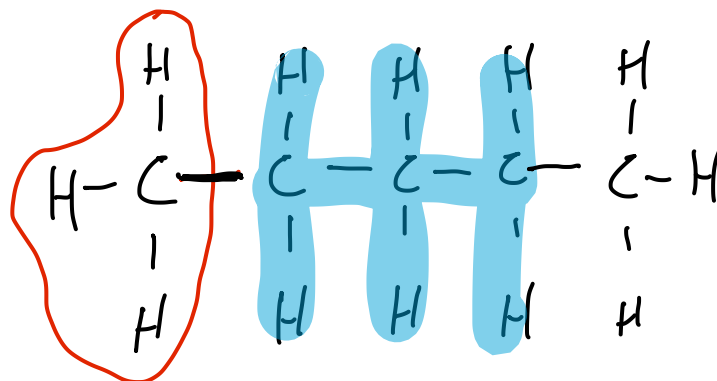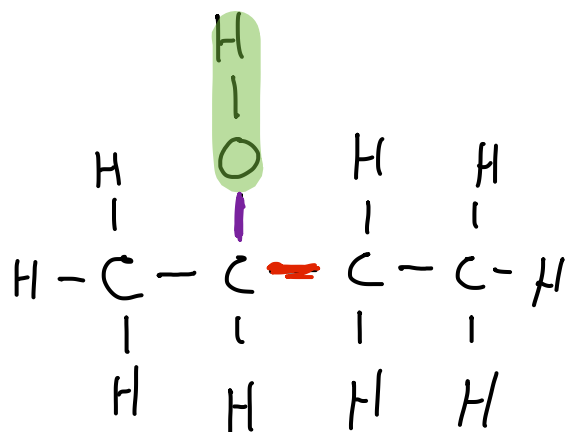
the O has 2 pair
of lone pair e⁻'s
even though they
aren't drawn ...
      if they were missing the
         O would have a ⊕
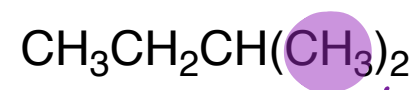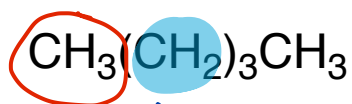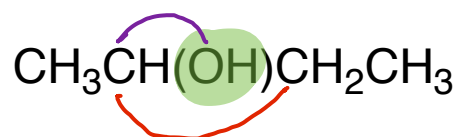
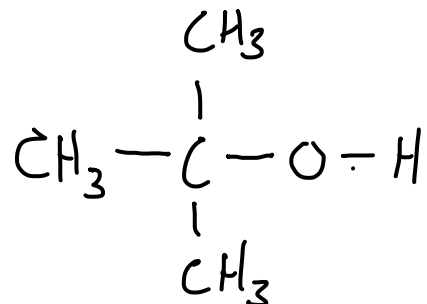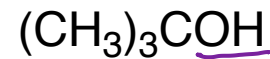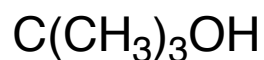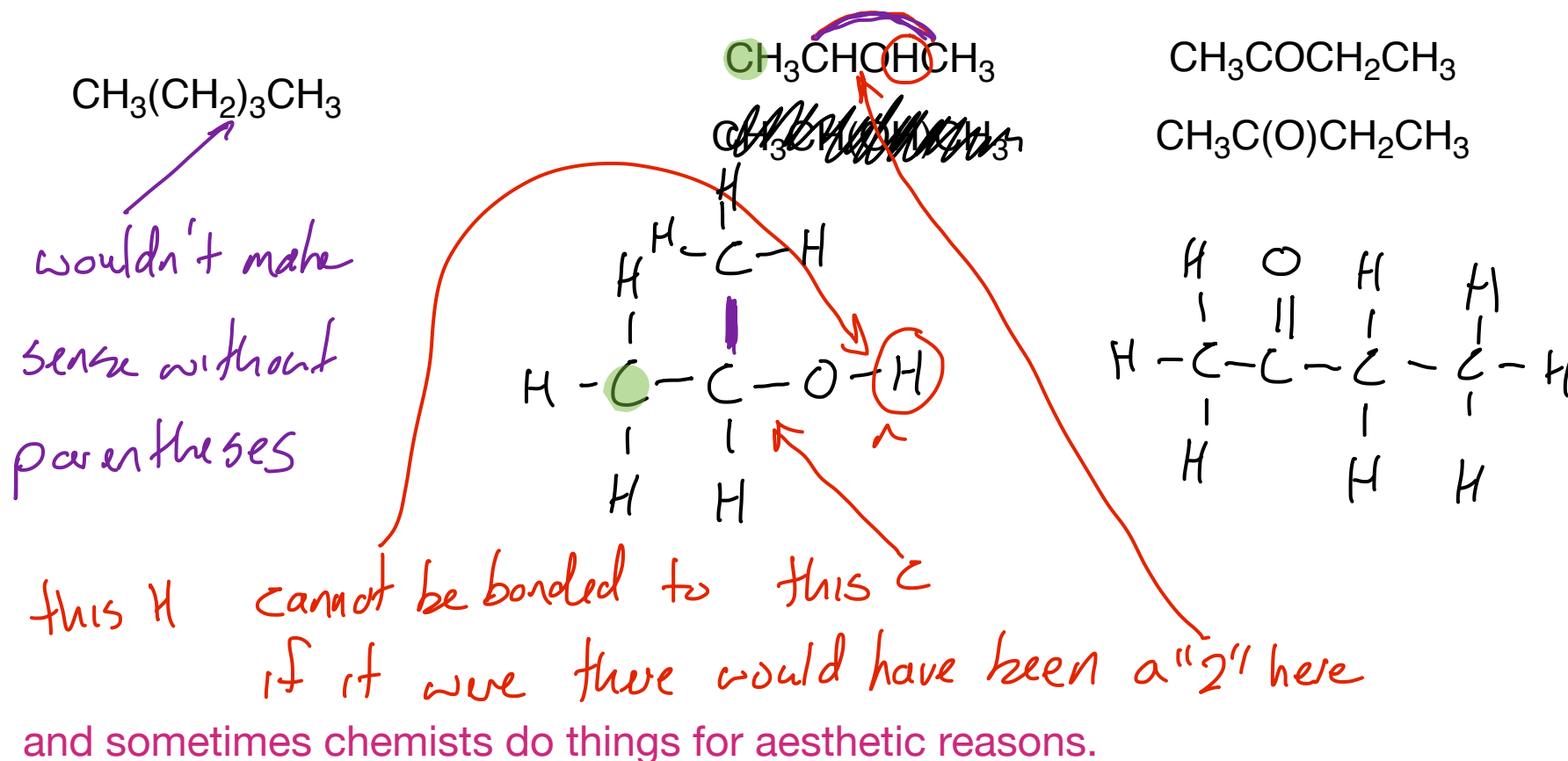$$CH_3CH(OH)CH_2CH_3 \qquad CH_3(CH_2)_3CH_3 \qquad CH_3CH_2CH(CH_3)_2$$

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.

3 CH₂'s in a row

2   –C–H s hanging
      off the end
      of the molecule
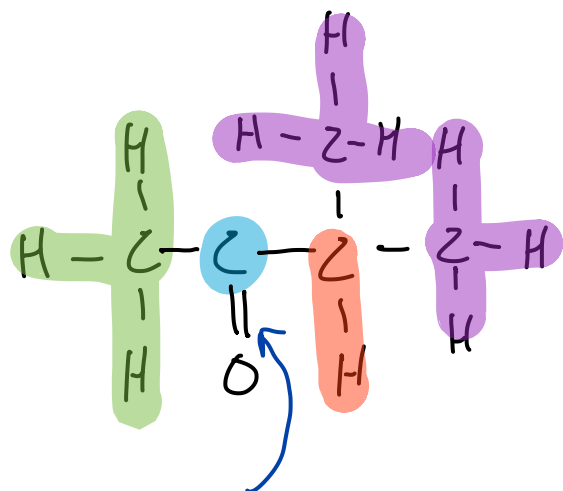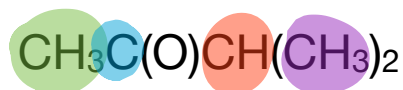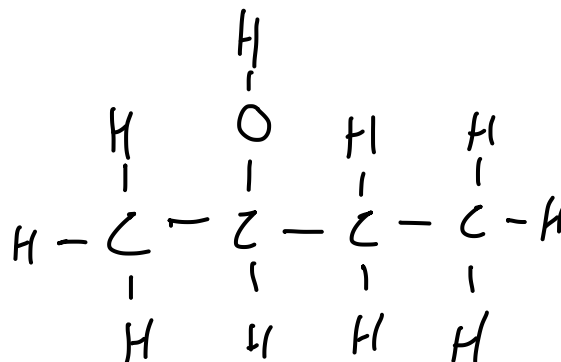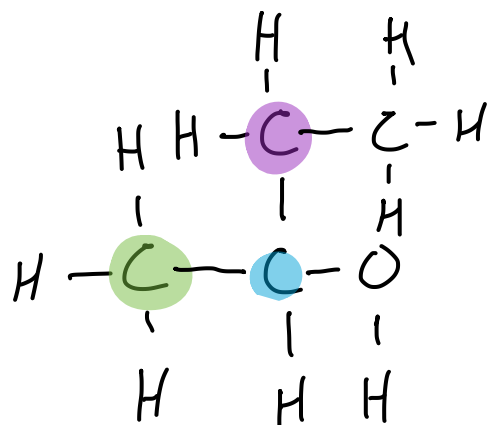
Often, chemists omit parentheses when they are not absolutely necessary,

$CH_3(CH_2)_3CH_3$

(handwritten, purple) wouldn't make sense without parentheses

$CH_3CHCHCH_3$

$CH_3COCH_2CH_3$

$CH_3C(O)CH_2CH_3$

(handwritten structure, teal/green)

$$H - \overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle H}{|}}{C}} - \overset{\overset{\displaystyle H-C-H}{|}}{\underset{\underset{\displaystyle H}{|}}{C}} - O - H$$

(handwritten structure, teal/green)

$$H - \overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle H}{|}}{C}} - \overset{\overset{\displaystyle O}{\|}}{C} - \overset{\displaystyle H}{C} - \overset{\overset{\displaystyle H}{|}}{\underset{\underset{\displaystyle H}{|}}{C}} - H$$

(handwritten, red) this H   cannot be bonded to   this C

if it were there would have been a "2" here

and sometimes chemists do things for aesthetic reasons.

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

(handwritten structure, purple)

$$CH_3 - \overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}} - O - H$$

(handwritten, purple) this version emphasizes the CH_3's on one side and an OH on the other side

cannot be bonded to blue C

$CH_3 CHOHCH_2 CH_3$

$CH_3 C(O)CH(CH_3)_2$

double bond needed so O can have its 2 bonds

CH₃CHOHCH₂CH₃

CH₃C(O)CH(CH₃)₂
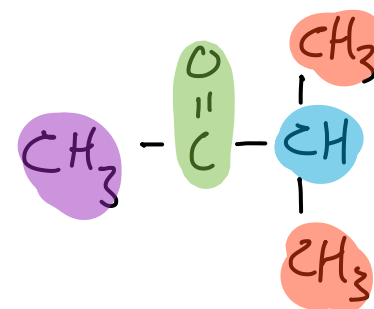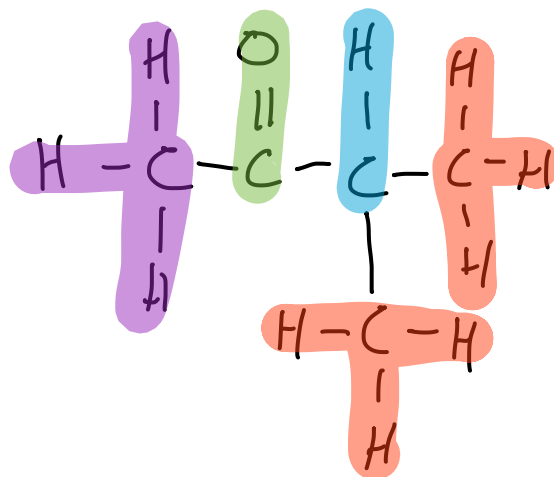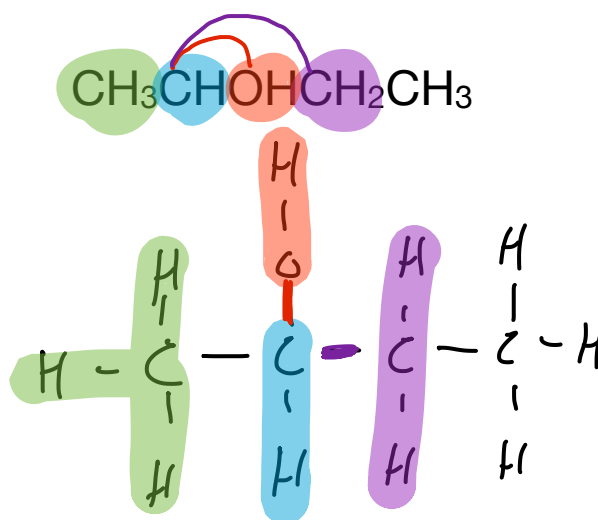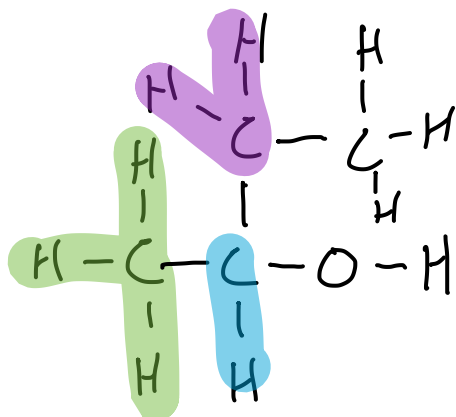
a mix of kekulé
& condensed

Skeletal Structures (The Organic Chemist's best Friend)
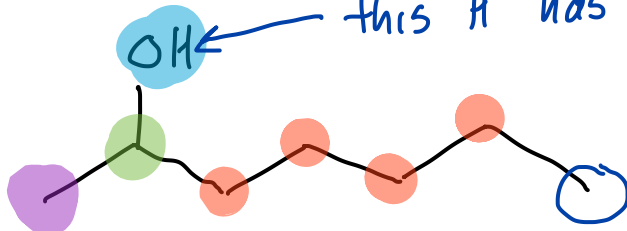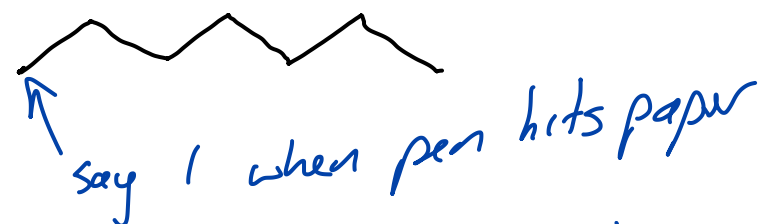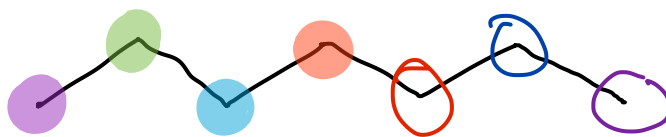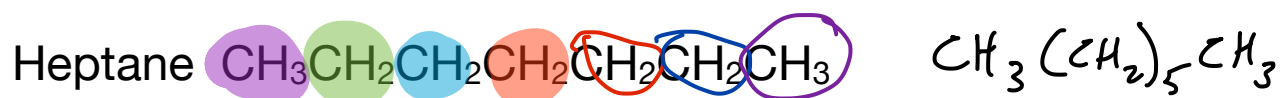
When a bond ends and the atom isn't labeled it is assumed to be C.

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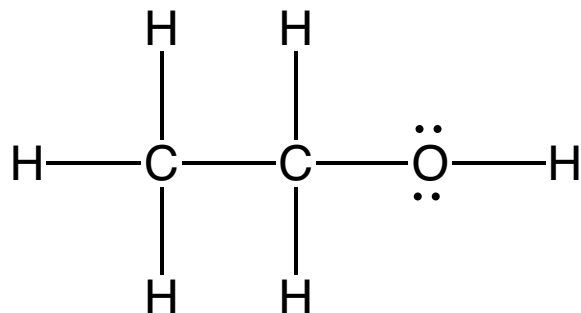
All other atoms are labeled.

Heptane $CH_3CH_2CH_2CH_2CH_2CH_2CH_3$ $CH_3(CH_2)_5CH_3$

say 1 when pen hits paper

2-heptanol $CH_3CHOH(CH_2)_4CH_3$

OH ← this H has to be included because it is not bonded to C

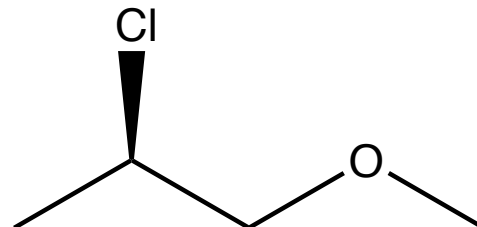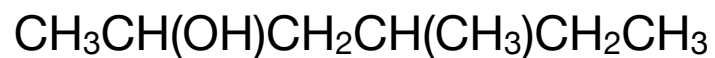Different structures serve different purposes, but they represent the same things

convert Lewis to skeletal

convert skeletal to condensed

convert structural formula to skeletal

$CH_3CH(OH)CH_2CH(CH_3)CH_2CH_3$

convert skeletal to condensed