

Announcements

Wednesday, April 15, 2009

Ch 10 MasteringChemistry due Monday, Apr 20.

Ch 18 MC due Mon, Apr 27.

Quiz 3 will be next Wed, Apr 22 covering Ch 10 and 18

Discussion assignment 2:

- Phase 2 due Monday, Apr 27.

Organic chemistry is chemistry of carbon-containing compounds

Organic compounds: contain C
Inorganic compounds: do not contain C (for the most part)

Natural compounds: made in nature
Synthetic compounds: made in lab

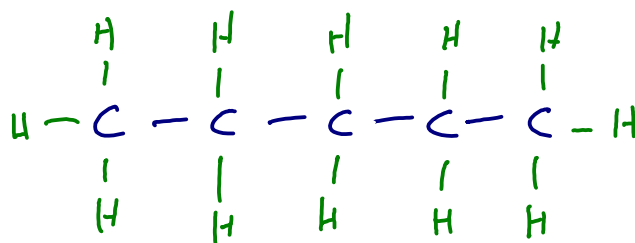
Hydrocarbons contain only hydrogen and carbon, and can be drawn several different ways:

1. Carbon backbone / carbon skeleton



not a finished structure

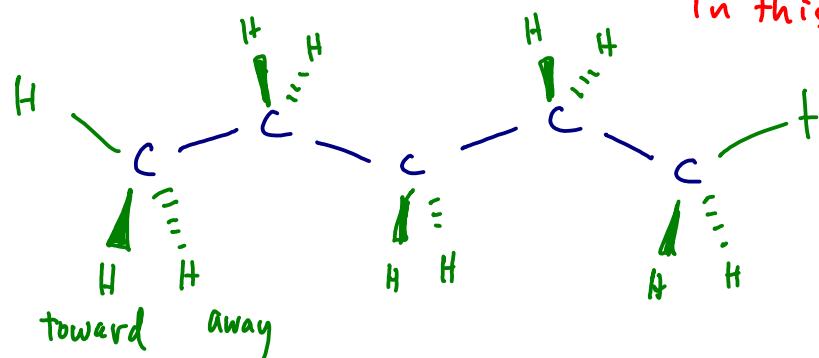
2. Structural formula (flat Lewis structure)



C needs 4 bonds

(Draw in Mastering Chem)

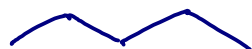
3. 3-dimensional structure



all C's are tetrahedral in this molecule

Drawing hydrocarbons

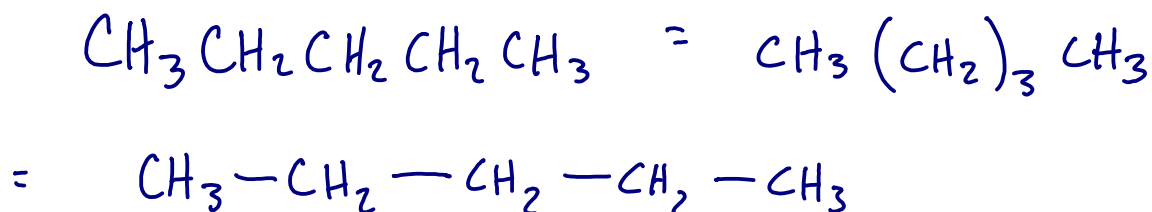
*4. Line structure



C implied @ ends & joints

H also implied - enough to give C 4 bonds

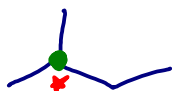
*5. Condensed formula (symbols and subscripts, but shows some structure)



6. Molecular formula (just a count of atoms - no structural information)

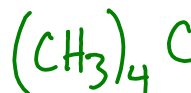


One molecular formula may have multiple isomers



all are C_5H_{12}

can combine identical grps attached to single atom



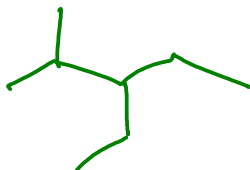
Alkanes

Alkanes: hydrocarbons with only C-C single bonds

- **straight-chain alkanes**



- **branched alkanes**



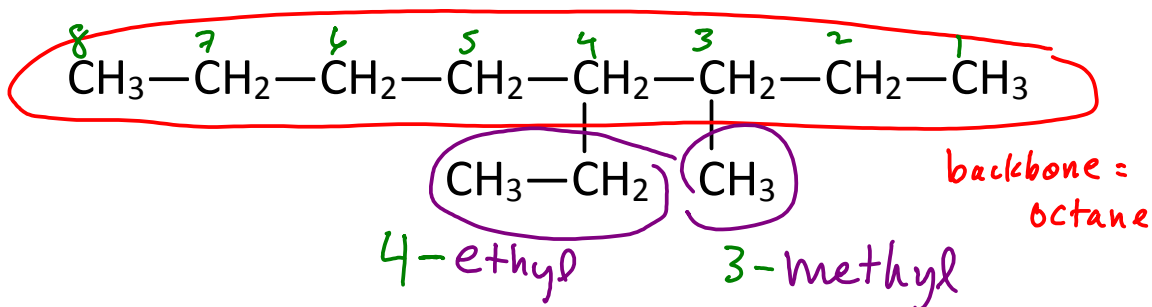
Series of straight-chain alkanes 1C through 10C

memorize these names.

<u>molecular formula</u>	<u>condensed formula</u>	<u>name</u>
CH ₄	CH ₄	<u>methane</u> (natural gas)
C ₂ H ₆	CH ₃ CH ₃	<u>ethane</u>
C ₃ H ₈	CH ₃ CH ₂ CH ₃	<u>Propane</u> (liquid petroleum, compressed)
C ₄ H ₁₀	CH ₃ (CH ₂) ₂ CH ₃	<u>butane</u> (lighter fuel)
C ₅ H ₁₂	CH ₃ (CH ₂) ₃ CH ₃	pentane
C ₆ H ₁₄	CH ₃ (CH ₂) ₄ CH ₃	hexane
C ₇ H ₁₆	CH ₃ (CH ₂) ₅ CH ₃	heptane
C ₈ H ₁₈	CH ₃ (CH ₂) ₆ CH ₃	octane
C ₉ H ₂₀	CH ₃ (CH ₂) ₇ CH ₃	nonane
C ₁₀ H ₂₂	CH ₃ (CH ₂) ₈ CH ₃	decane

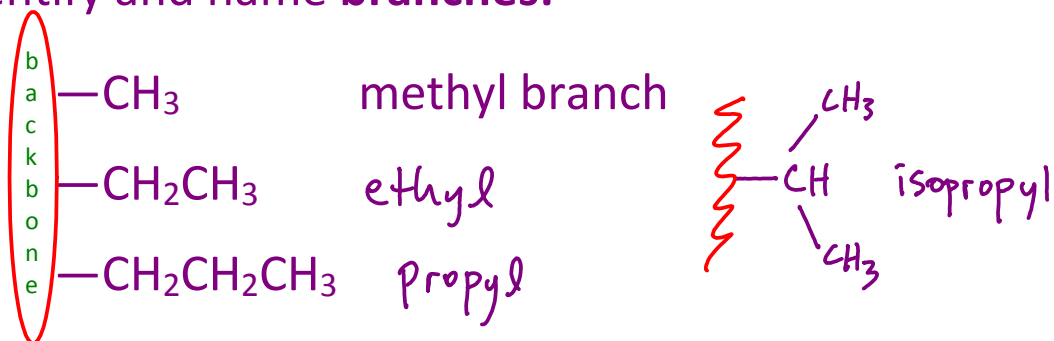
↑
in gasoline
↓

Naming branched alkanes

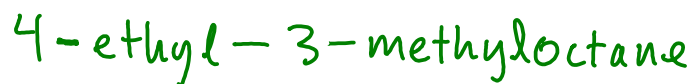


To name branched alkanes:

1. Circle backbone (longest continuous chain of carbons)
2. Number backbone from end nearest a branch
3. Identify and name **branches**:

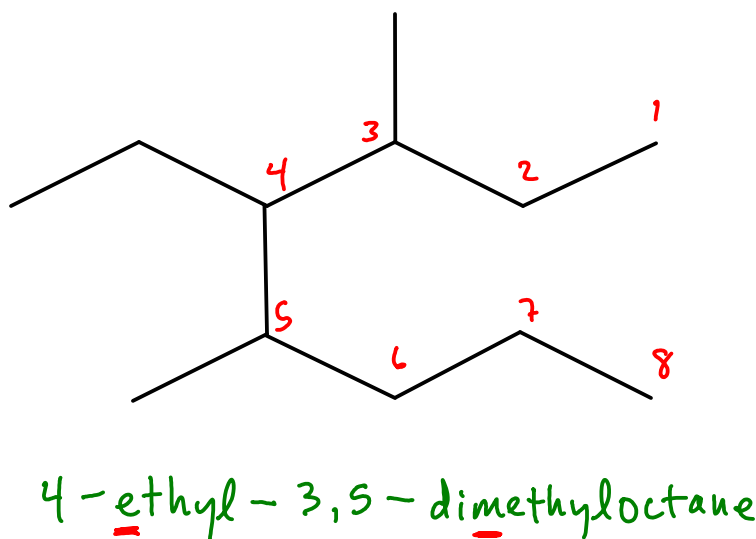
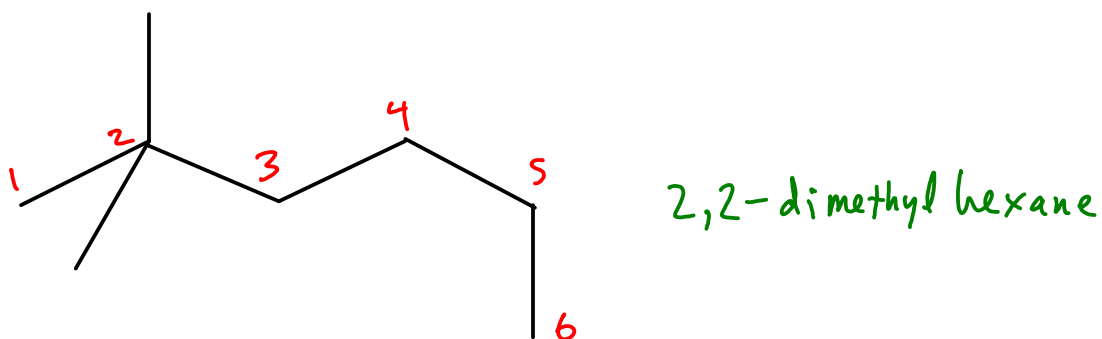
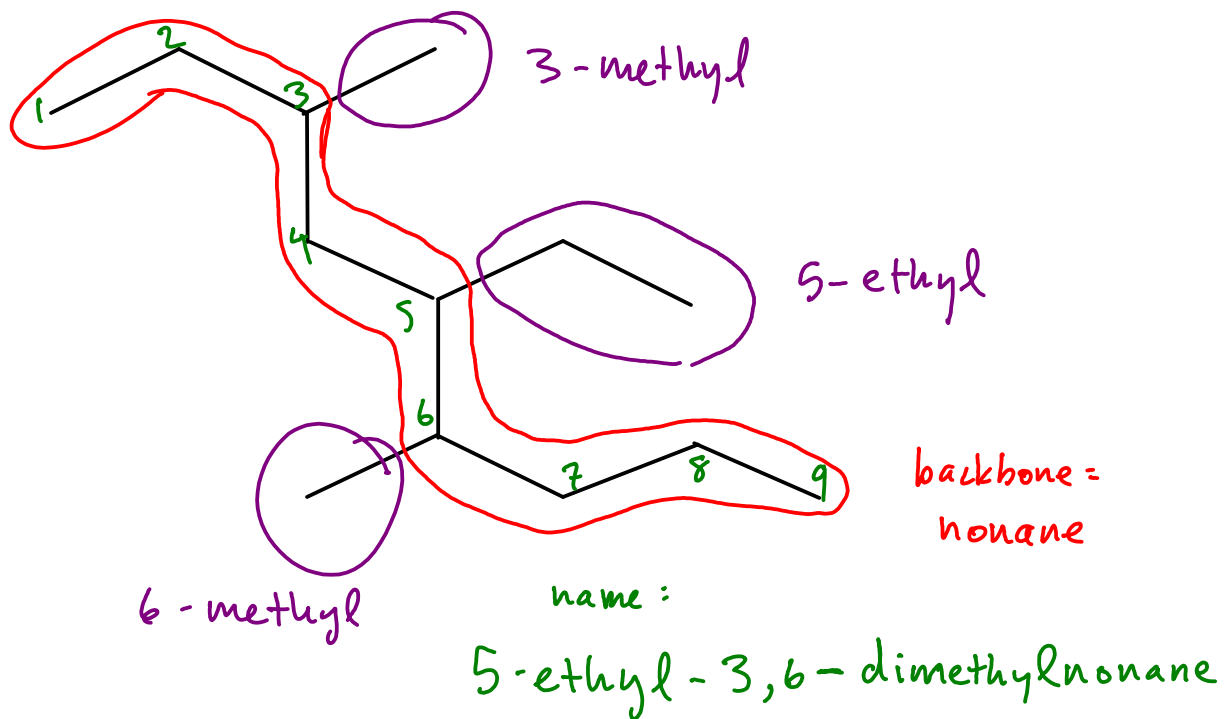


4. Name with branches first, alphabetically



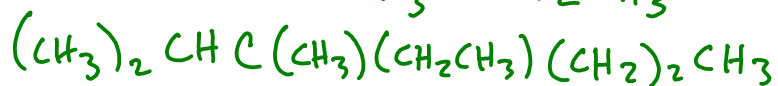
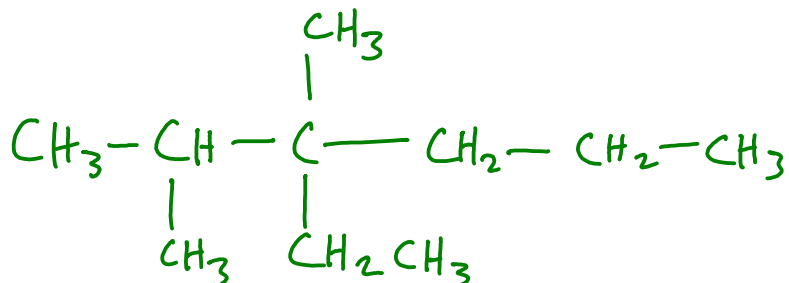
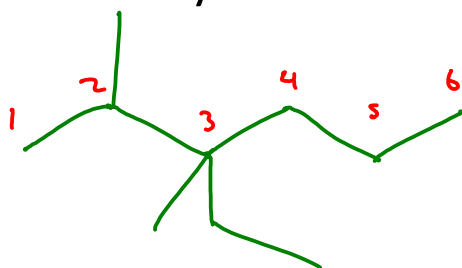
branch - branch backbone

Naming branched alkanes

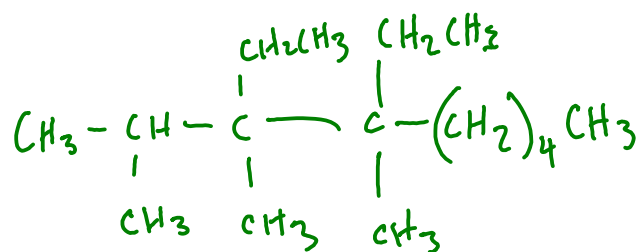
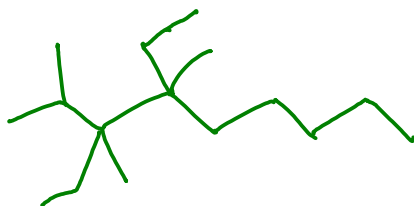


Drawing branched alkanes

Draw the line and condensed structures for 3-ethyl-2,3-dimethylhexane.



Draw the line and condensed structures for 3,4-diethyl-2,3,4-trimethylnonane.



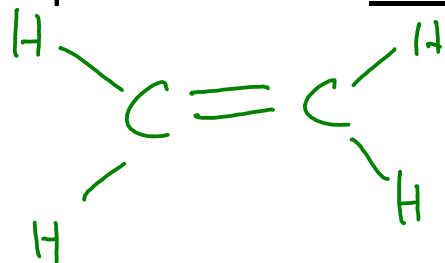
Alkenes

Alkanes: C-C single bonds only

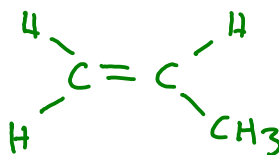
Alkenes: at least 1 C=C double bond

Alkynes: " " 1 C≡C triple bond

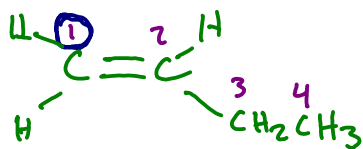
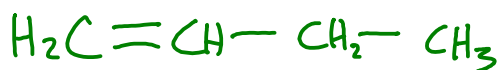
The simplest alkene is ethene:



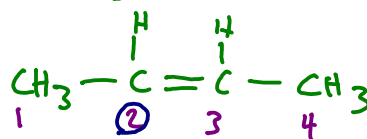
propene: 3 C, 1 double bond



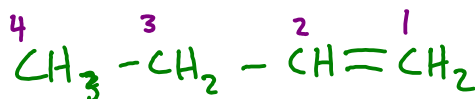
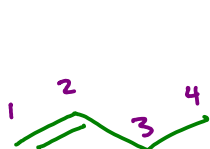
butene 4 C



1-butene

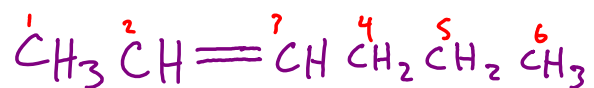


2-butene

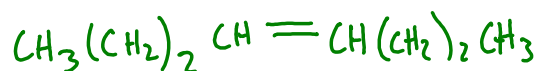


Alkenes and alkynes

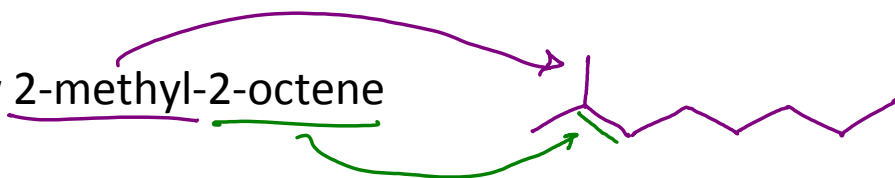
Draw 2-hexene:



Draw 4-octene:



Draw 2-methyl-2-octene



backbone
must contain the double bond

Alkynes