Announcements

Monday, April 20, 2009

Experiment 16 moved to next Monday after the exam. During lab time tonight we will finish Ch 12.

Discussion assignment 2:

- Phase 2: 6-8 paragraph essay - due before class Monday, Apr 27.

Lec 10 post assignment will be in MC Tuesday before noon - due before class next Mon, Apr 27

Exam 3 is next Monday, Apr 27, covering chapters 9, 10, 18, and 12.

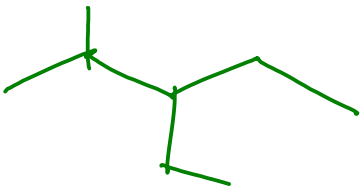
Practice:

- Electron configurations worksheet
- Lewis structures worksheet
- Blank lab 5 on webpage, key in D2L - draw the molecules with correct shapes and all dipole arrows, predict if each molecule is polar or nonpolar.
- Organic chemistry worksheet - I will post an updated version tomorrow. It's a bit outdated now.

Alkanes: hydrocarbons with only C-C **single bonds**

- **straight-chain** alkanes

- **branched** alkanes

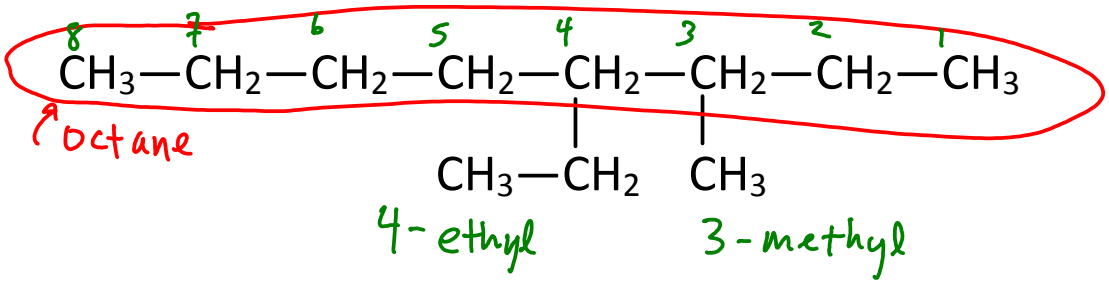


Series of straight-chain alkanes 1C through 10C

molecular formula	condensed formula	name
CH_4	CH_4	methane
C_2H_6	CH_3CH_3	ethane
C_3H_8	$CH_3(CH_2)CH_3$	propane
C_4H_{10}	$CH_3(CH_2)_2CH_3$	butane
C_5H_{12}	$CH_3(CH_2)_3CH_3$	pentane
C_6H_{14}	$CH_3(CH_2)_4CH_3$	hexane
C_7H_{16}	$CH_3(CH_2)_5CH_3$	heptane
C_8H_{18}	$CH_3(CH_2)_6CH_3$	octane
C_9H_{20}	$CH_3(CH_2)_7CH_3$	nonane
$C_{10}H_{22}$	$CH_3(CH_2)_8CH_3$	decane

memorize these.

Naming branched alkanes

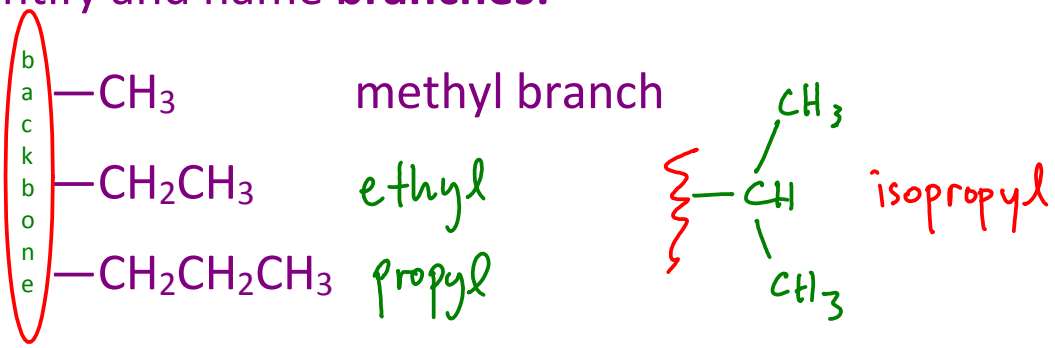


To name branched alkanes:

1. Circle backbone (longest continuous chain of carbons)

2. Number backbone from end nearest a branch

3. Identify and name **branches:**

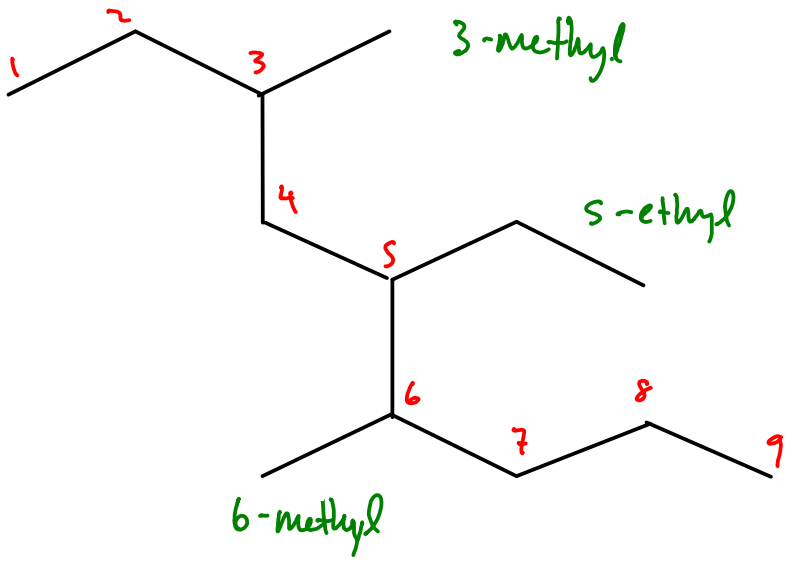


4. Name with branches first, alphabetically

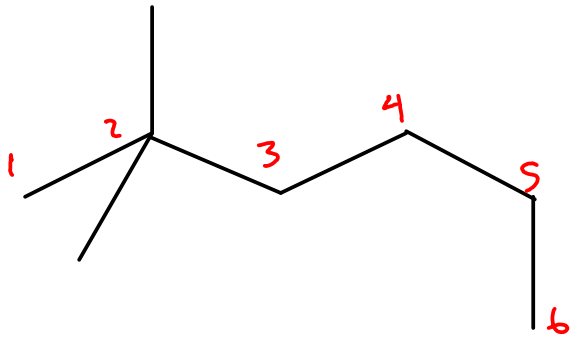
4-ethyl-3-methyloctane

branches backbone

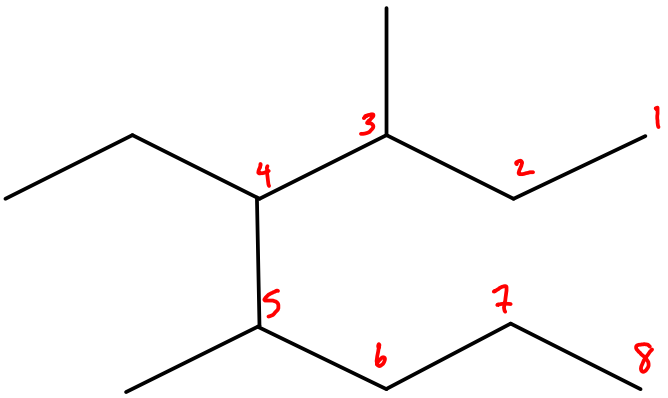
Naming branched alkanes



5-ethyl – 3,6-dimethylnonane

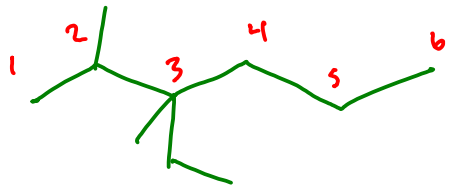


2,2-dimethylhexane



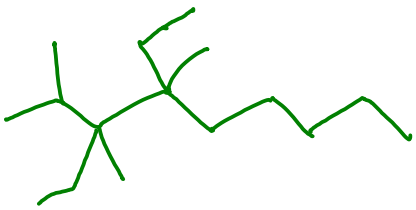
4-ethyl-3,5-dimethyloctane

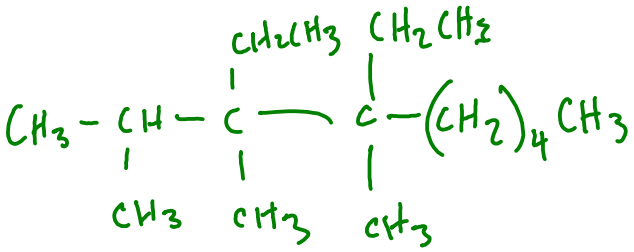
Draw the line and condensed structures for 3-ethyl-2,3-dimethylhexane.



$CH_3\,CH(CH_3)\,C(CH_3)(CH_2CH_3)(CH_2)_2\,CH_3$

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





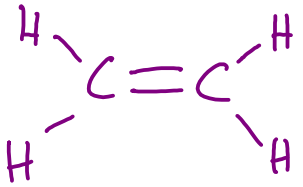
Alkenes

Alk**a**nes: C–C single bonds only

Alk**e**nes: at least 1 C=C double bond

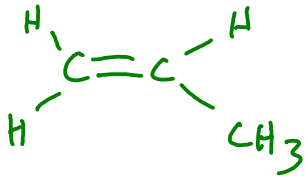
Alk**y**nes: " " 1 C≡C triple bond

The simplest alkene is **ethene:**

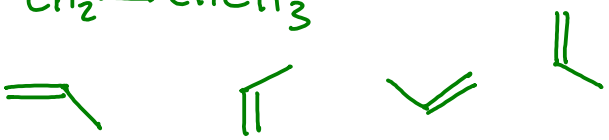


or $CH_2=CH_2$

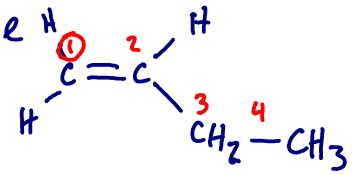
propene



$CH_2=CHCH_3$

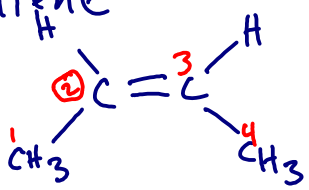


1-butene

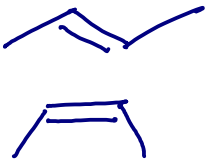


$CH_2=CHCH_2CH_3$

2-butene



$CH_3CH=CHCH_3$



2 - heptene

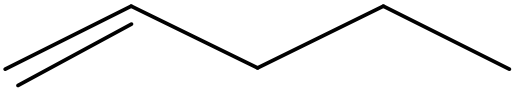
3 - hexene

$CH_3CH_2CH{=}CHCH_2CH_3$

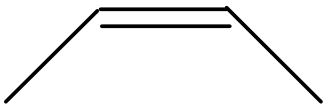
2-methyl-2-octene

$(CH_3)_2C{=}CH(CH_2)_4CH_3$

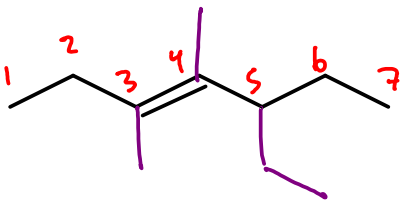
★ backbone must contain the dbl bond.



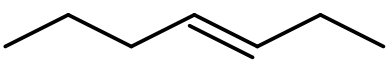
1 - pentene



2 - butene



5-ethyl - 3,4-dimethyl-3-heptene



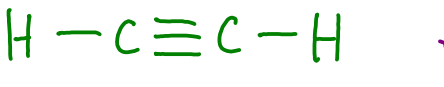
3 - heptene

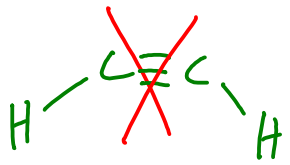
Draw 2-hexene:

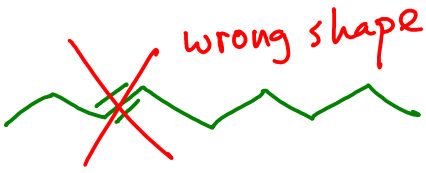
Draw 4-octene:

Alkynes

linear at C



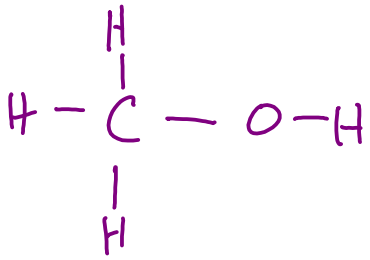




3-nonyne

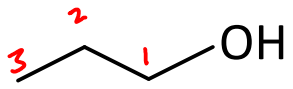
Alcohols contain a —O—H bonding group (-OH group)

name ends in -anol

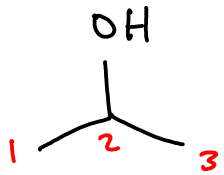


CH_3OH methanol

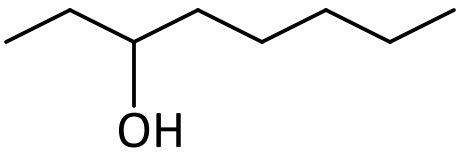
CH_3CH_2OH ethanol



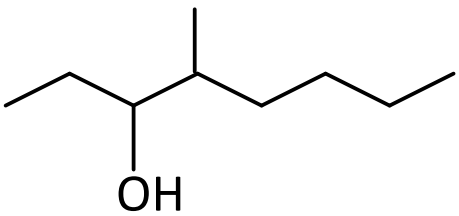
1-propanol



2-propanol (isopropyl alcohol)



3-octanol



4-methyl-3-octanol

Functional group: molecule fragment attached to a hydrocarbon that defines a type of organic molecule.

R: placeholder for any hydrocarbon group.

TABLE 18.7 Functional Groups

Family	General Formula	Condensed General Formula	Example	Name
alcohols	R—OH	ROH	CH_3CH_2—OH	ethanol (ethyl alcohol)
ethers	R—O—R	ROR	CH_3—O—CH_3	dimethyl ether
aldehydes	R—C(=O)—H	RCHO	H_3C—C(=O)—H	ethanal (acetaldehyde)
ketones	R—C(=O)—R	RCOR	H_3C—C(=O)—CH_3	propanone (acetone)
carboxylic acids	R—C(=O)—OH	RCOOH	H_3C—C(=O)—OH	acetic acid
esters	R—C(=O)—OR	RCOOR	H_3C—C(=O)—OCH_3	methyl acetate
amines	R—N(R)—R	R_3N	H_3CH_2C—N(H)—H	ethyl amine

We discussed naming and drawing of:

- Alkanes (with backbone up to 10 carbons)
- Alkenes (ignore *cis* and *trans*)
- Alkynes
- Alcohols