Organic chemistry is chemistry of carbon-containing compounds

Organic compounds:
Inorganic compounds

Natural compounds:
Synthetic compounds:

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

1. Carbon backbone / carbon skeleton

2. Structural formula (flat Lewis structure)

3. 3-dimensional structure

4. Line structure

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

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

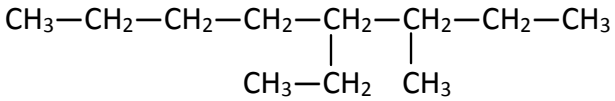
One molecular formula may have multiple **isomers**

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

- **straight-chain** alkanes
- **branched** alkanes

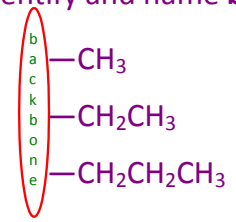
Series of straight-chain alkanes 1C through 10C

molecular formula	condensed formula	name
CH_4	CH_4	
C_2H_6	CH_3CH_3	
C H	$CH_3(CH_2)CH_3$	
C H	$CH_3(CH_2)_2CH_3$	
C H	$CH_3(CH_2)\ CH_3$	
C H	$CH_3(CH_2)\ CH_3$	
C H	$CH_3(CH_2)\ CH_3$	
C H	$CH_3(CH_2)\ CH_3$	
C H	$CH_3(CH_2)\ CH_3$	
C H	$CH_3(CH_2)\ CH_3$	



To name branched alkanes:

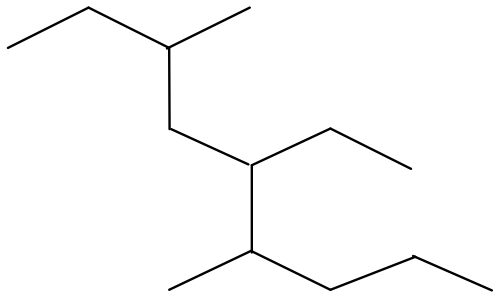
1. Circle backbone (longest continuous chain of carbons)
2. Number backbone from end nearest a branch
3. Identify and name **branches:**

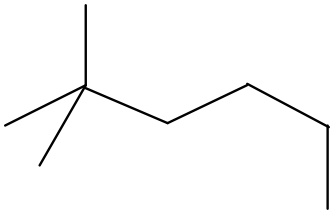


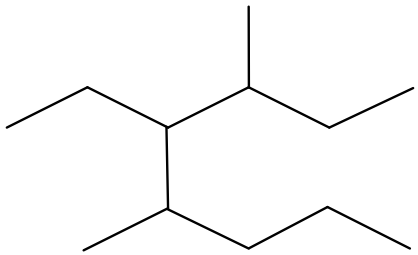
methyl branch

4. Name with branches first, alphabetically

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.

Alk**a**nes:

Alk**e**nes:

Alk**y**nes:

The simplest alkene is **ethene:**

Draw 2-hexene:

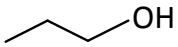
Draw 4-octene:

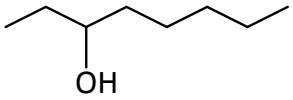
Draw 2-methyl-2-octene

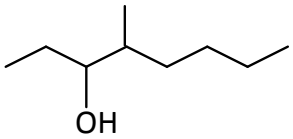
Alkynes

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

CH_3CH_2OH







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