

## Naming Hydrocarbons (nomenclature)

## Organic Compounds

- **Compounds** - any covalently bonded compound containing carbon (except           ,            and           )

## Hydrocarbons

- - Organic compounds that contain only carbon & hydrogen
- - contain only single covalent bonds
- - contain one or more carbon - carbon double bond
- - contain one or more carbon-carbon triple bond

## Saturated & Unsaturated Hydrocarbons

- Saturated hydrocarbons – contain only            carbon-carbon bonds (          )
- Unsaturated hydrocarbons – contain double carbon-carbon bonds (          ) or triple carbon-carbon (          ) bonds

## Formulas

- Alkanes =  $C_nH_{2n+2}$
- Alkenes =  $C_nH_{2n}$
- Alkynes =  $C_nH_{2n-2}$

## Nomenclature

- Must memorize prefixes
- To name, look at the formula for the hydrocarbon
- Determine if it is an alkane, alkene, or alkyne
- Use the prefix for the number of carbons
- Add ending (ane, ene, yne)

Prefix	# of carbon atoms
Meth-	1
Eth-	2
Prop-	3
But-	4
Pent-	5
Hex-	6
Hept-	7
Oct-	8
Non-	9
Dec-	10

## Example

- Name  $C_3H_8$

## Mnemonic for first four prefixes



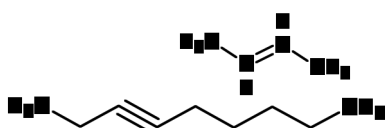
### First four prefixes

- Meth-      Monkeys
- Eth-      Eat
- Prop-     Peeled
- But-      Bananas

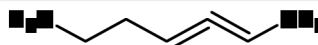
## Numbering carbons

Draw 1-pentene

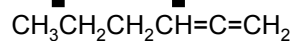
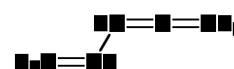
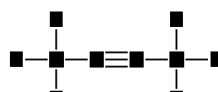
Name these



## Multiple multiple bonds



- Give 1<sup>st</sup> bond (1<sup>st</sup> point of difference) lowest #
- include di, tri, tetra, penta, etc. before ene/yne
- Comma between #s, hyphen between #-letter

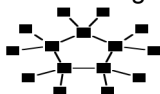


## Cyclic structures

- Cyclic structures are circular
- Have "cyclo" in name

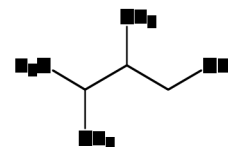
Draw the following:  
cyclobutene 1,3-cyclopentadiene cyclopropane

Name the following:



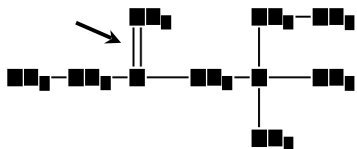
## Naming side chains

- Root is the longest possible HC chain
- Must contain multiple bonds if present
- Add -yl to get name of side chain
- Common side chains include:
  - $CH_3$ - methyl
  - $CH_3CH_2$ - ethyl
  - $CH_3CH_2CH_2$ - propyl
  - $(CH_3)_2CH$ - isopropyl
  - Br- (bromo)
  - Cl- (chloro)
  - F- (fluoro)
  - I- (iodo)



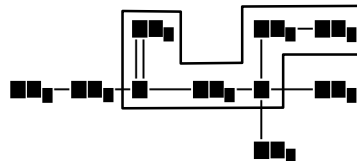
## Naming side chains

Example: name the following structure



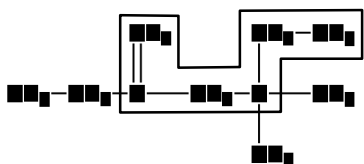
Step 1 - choose the correct ending

## Naming side chains



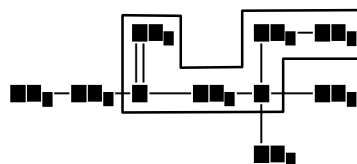
Step 2 - find the longest chain

## Naming side chains



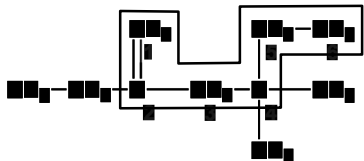
Step 3 - add the prefix naming the longest chain

## Naming side chains



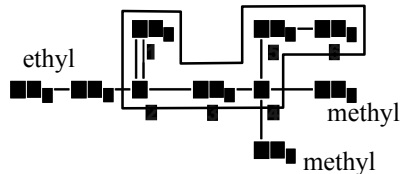
Step 4 - number the longest chain with the lowest number closest to the double bond

## Naming side chains



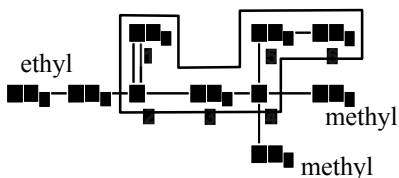
Step 5 - add that number to the name

## Naming side chains



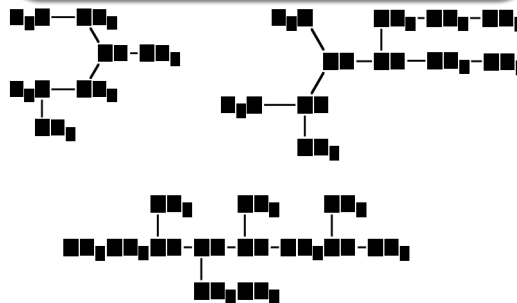
Step 6 - Name the side chains

## Naming side chains



Step 7 - Place the side chains in alphabetical order & name the compound

## Name

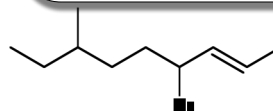


Draw the structures below

3-ethyl-2-methylpentane

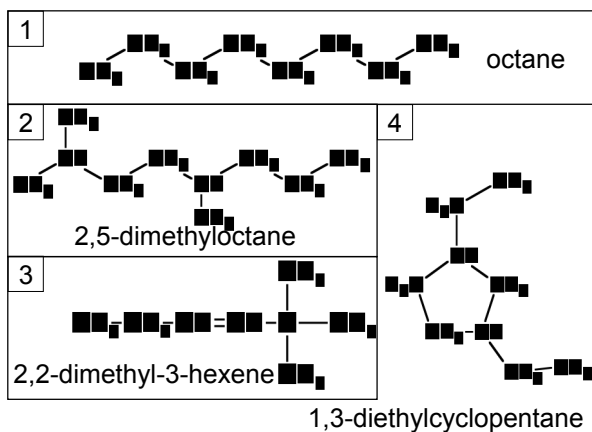
3-ethyl-1,5,5-trimethylcyclohexene

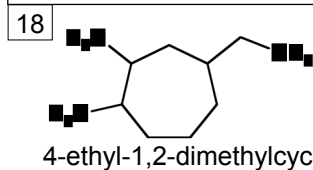
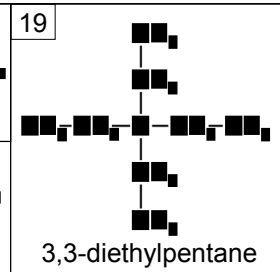
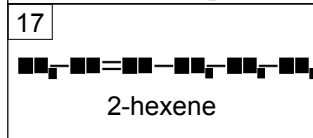
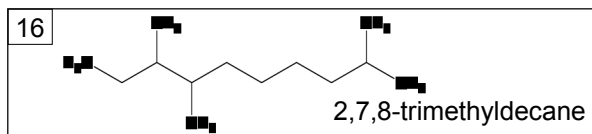
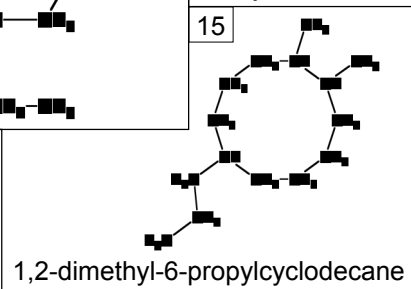
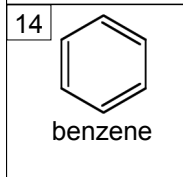
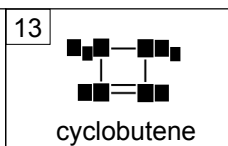
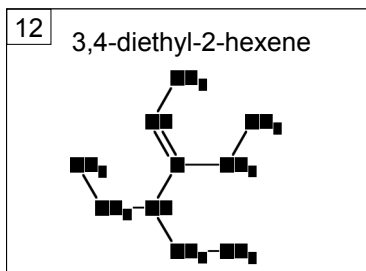
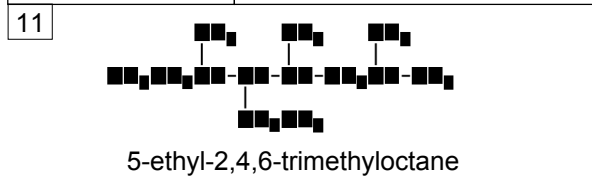
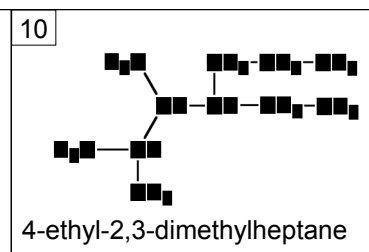
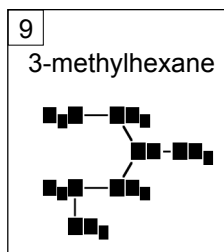
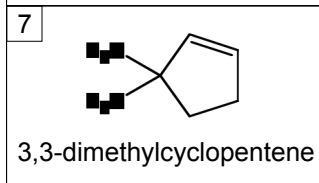
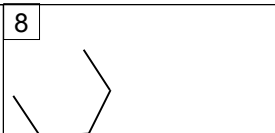
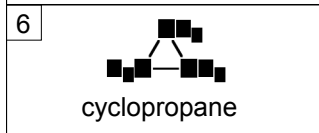
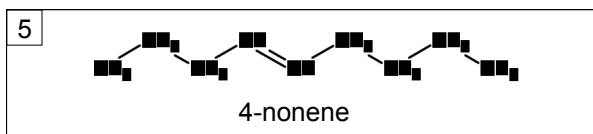
More practice



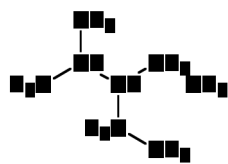
Functional Groups

Class	Functional group
Alcohol	R - OH
Ether	R - O - R'
Aldehyde	$\begin{array}{c} \text{O} \\    \\ \text{R} - \text{C} - \text{H} \end{array}$
Ketone	$\begin{array}{c} \text{O} \\    \\ \text{R} - \text{C} - \text{R}' \end{array}$
Carboxylic acid	$\begin{array}{c} \text{O} \\    \\ \text{R} - \text{C} - \text{OH} \end{array}$
Ester	$\begin{array}{c} \text{O} \\    \\ \text{R} - \text{C} - \text{O} - \text{R}' \end{array}$
Amine	$\begin{array}{c} \text{R}' \\   \\ \text{R} - \text{N} - \text{R}'' \end{array}$



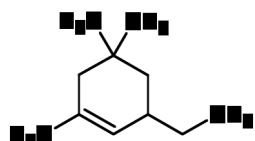


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3-ethyl-2-methylpentane

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3-ethyl-1,5,5-trimethylcyclohexene