

Organic Chemistry

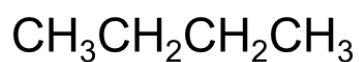
Introduction To Hydrocarbons

Apr 25-10:04 AM

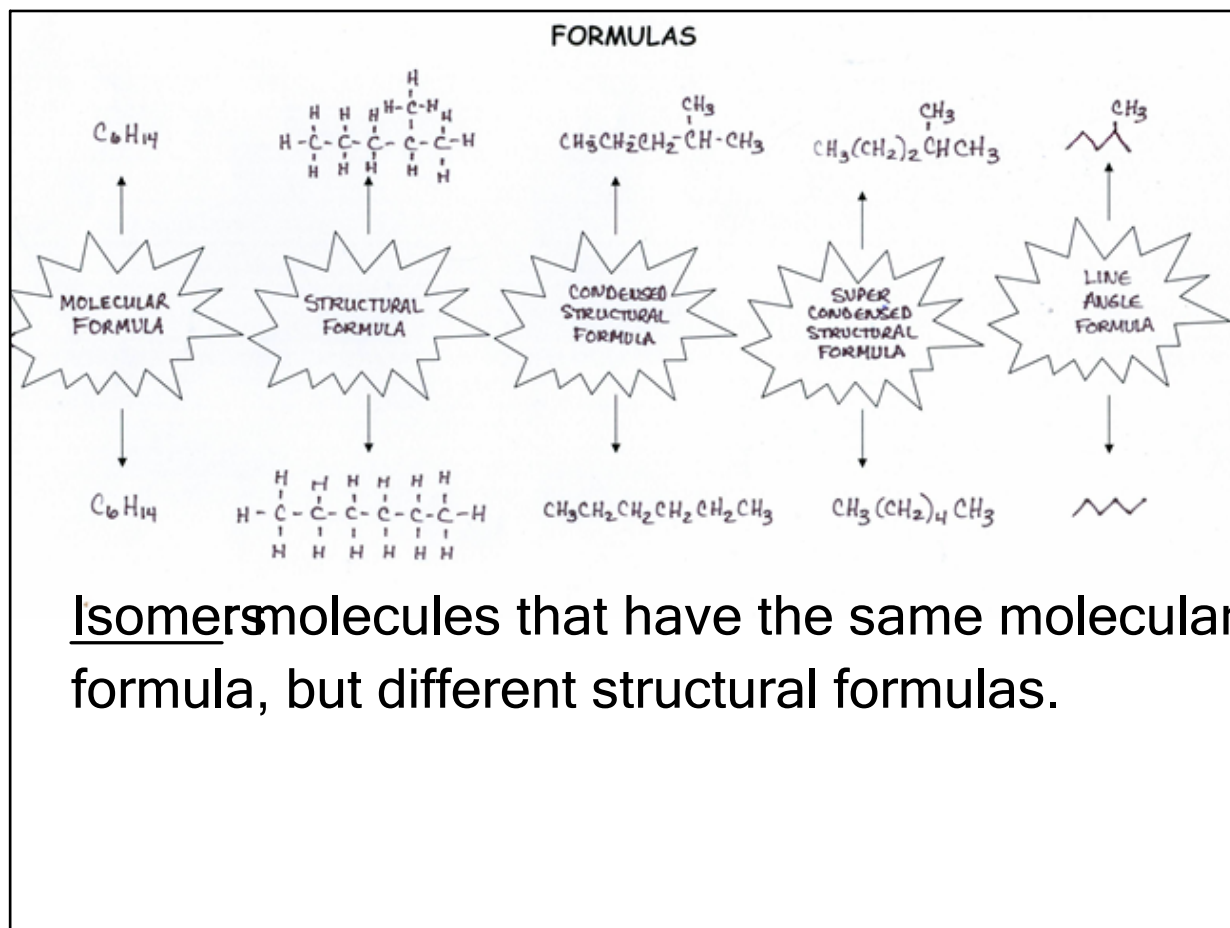
Carbon atoms must always have four bonds. When drawing the structure for a hydrocarbon, start with a carbon skeleton:



Count the bonds on each carbon and add hydrogen until you have four bonds on each carbon.



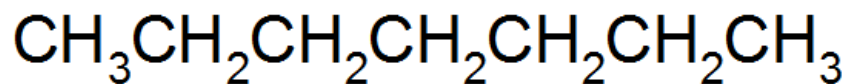
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Alkanes

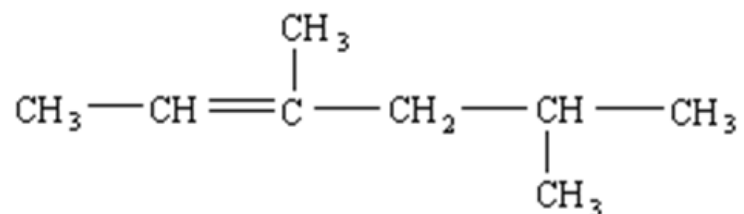
A group of hydrocarbons made up of molecules where each carbon is bonded to four other atoms. All bonds are single covalent bonds.



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Alkenes

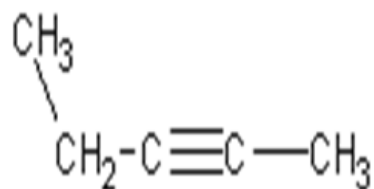
A group of hydrocarbons made up of molecules which contain at least one double bond.



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Alkynes

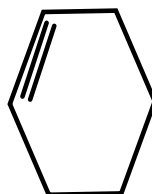
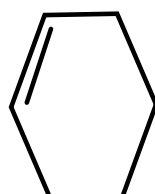
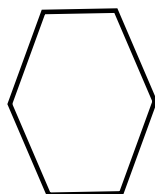
A group of hydrocarbons made up of molecules which contain at least one triple bond.



Apr 25-10:08 AM

Cycloalkanes, -enes-ynes

Hydrocarbons that have the carbons arranged in at least one ring structure.



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Nomenclature of Alkanes, Alkenes & Alkynes (The rules for naming)

IUPAC Rules

International Union of Pure & Applied Chemistry

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First identify the longest carbon chain in the hydrocarbon and use a prefix from below to indicate the number of carbons in the chain.

Propane, used in gas grills, is an alkane with *three* carbon atoms

Octane, a component of gasoline, is a(n) _____ which contains _____ carbon atoms.

Table 2.6 Word Stems Indicating the Number of Carbon Atoms in Simple Organic Molecules

Stem	Number of C Atoms
<i>meth-</i>	1
<i>eth-</i>	2
<i>prop-</i>	3
<i>but-</i>	4
<i>pent-</i>	5
<i>hex-</i>	6
<i>hept-</i>	7
<i>oct-</i>	8
<i>non-</i>	9
<i>dec-</i>	10

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Nomenclature of Alkanes, Alkenes & Alkynes

Next, identify the type of bonding in the chain or ring of carbons.

All single bonds in the carbon chain = add *-an-* to the stem.
 One or more double bonds in the carbon chain = add *-en-* to the stem.
 One or more triple bonds in the carbon chain = add *-yn-* to the stem.

Next, identify the functional group joined to the chain or ring. For now, we will only recognize compounds with hydrogen attached to the carbons and so we will only have alkanes, alkenes, or alkynes. For all three of these we will add *-e* to the end of the name.

Lastly, numbers are used to give the positions of groups or bonds along the chain.

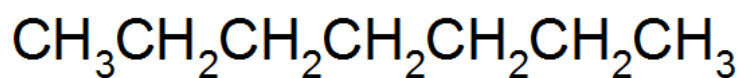
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Functional Groups

Haloalkane		Bromoethane	Ethyl bromide	RX	
Alcohol		Ethanol	Ethyl alcohol	ROH	
Ether		Methoxymethane	Dimethyl ether	ROR	
Amine		Methanamine	Methylamine	RNH ₂ R ₂ NH R ₃ N	
Aldehyde		Ethanal	Acetaldehyde		
Ketone		Propanone	Acetone		
Carboxylic Acid		Ethanoic Acid	Acetic Acid		
Ester		Methyl ethanoate	Methyl acetate		

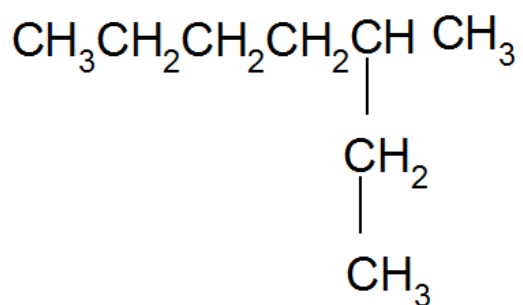
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Name This Alkane:



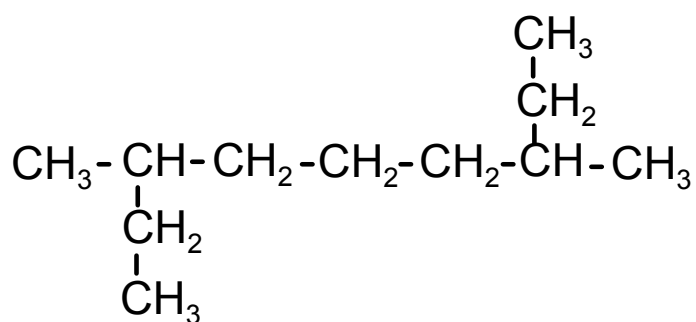
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Name This Alkane:



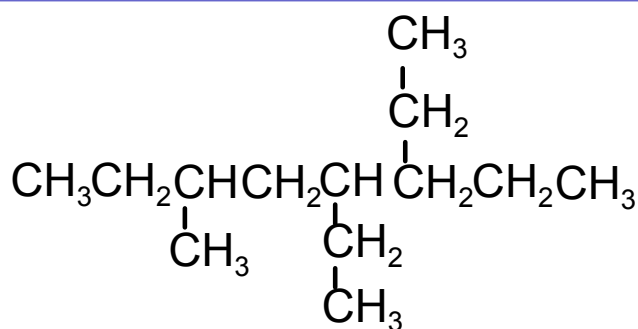
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Name This Alkane:



Apr 25-10:12 AM

Name This Alkane



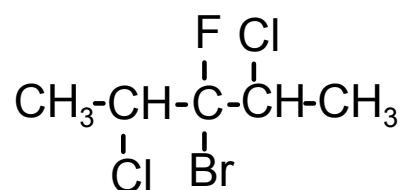
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Halogenoalkanes (Alkyl Halides)

- An alkyl halide is a compound that contains carbon, hydrogen, halogens and only single covalent bonds.
- The four halogens will be named by prefixes.
- F fluoro Cl chloro
- Br bromo I iodo

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Name This Alkyl Halide:



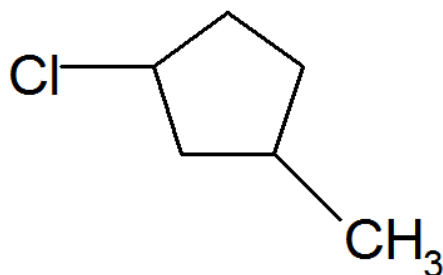
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CYCLOALKANES

- Cycloalkanes are alkanes where the carbon atoms are connected together in a ring.
- To name a cycloalkane you simply put the prefix cyclo- in front of the stem that indicates the number of carbons in the ring.

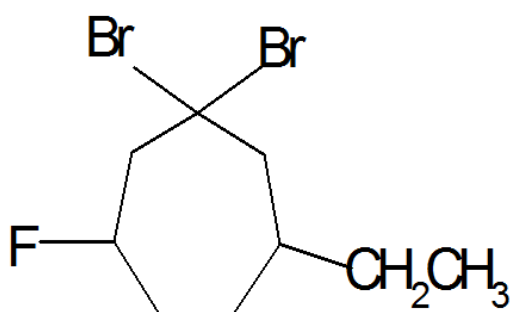
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Name This Cycloalkane:



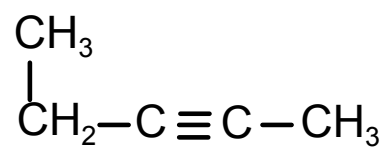
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Name This Cycloalkane:



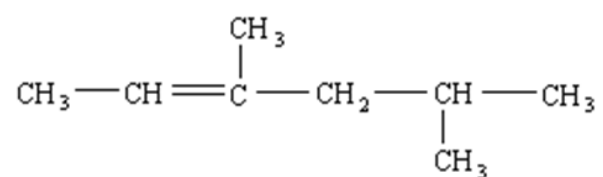
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Name the Following:



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Name the following:



Apr 25-10:15 AM

Draw the following:

2,4-diiodo-3,3-dimethylheptane

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Draw the following:

5-ethyl-5,6-difluorooct-2-ene

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Draw the following:

Cyclobutane

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