Alkanes

Alkanes are aliphatic hydrocarbons that only contain single bonds. Since each carbon is bonded to the maximum possible number of atoms, alkanes are described as being saturated compounds. Alkanes vary by the repeated unit CH_2, and have the general formula C_nH_{2n+2}

Naming Alkanes

Scientists use the "Prefix + Root + Suffix" method for naming all organic chemicals. The root describes how many carbons are in your main chain or backbone. The suffix indicates what organic family the molecule is in. The prefix describes the type, number and location of any branches. The naming rules for organics use alkanes as the base molecule then add special rules for other families. Use the following steps to name an alkane:

1. Find the main chain (longest consecutive chain of C's). Use the appropriate organic prefix for your root name (1 = meth, 2 = eth, 3 = prop, 4 = but, 5 = pent, 6 = hex, 7 = hept, 8 = oct, 9 = non, 10 = dec).

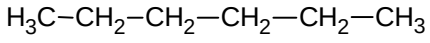
2. Determine your suffix based on family. Alkane = suffix "ane"

3. Number the main chain. Start at the end that gives branches the lowest numbers.

4. Write the prefix by naming each branch as an alkyl group (organic prefix for # of carbons than "yl"), and placing a position number in front. If there is more than one type of branch, write them in alpha order. If there is multiple of the same type of branch, use a molecular prefix. Always put commas between numbers, and hyphens between numbers and letters.

Examples:

a)



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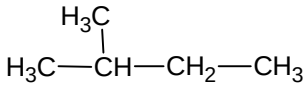

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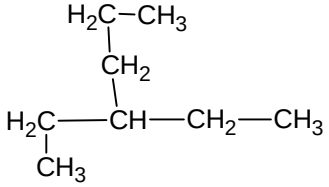

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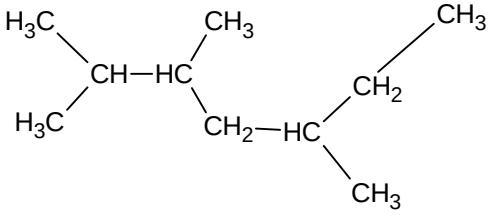

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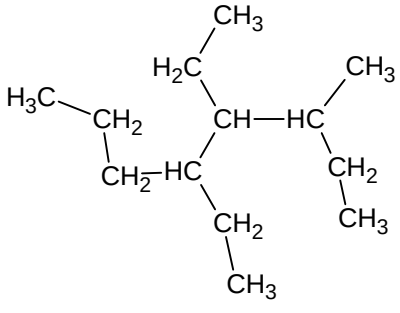


Drawing Structural Diagrams from Names

1. Draw the main chain horizontal across page.
3. Add branches on appropriate carbons.
4. Add enough hydrogens so each carbon has four bonds.

Ex 1. 3-ethyl-3,4-dimethylhexane

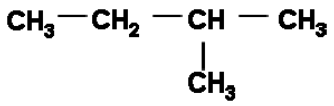
Ex 2. 3-ethyl-5-propyldecane

Properties of Alkanes

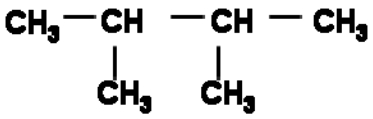
Property	**Description**
Melting Point	
Solubility in Water	
Other:	Mainly used as a fuel source. They undergo combustion reactions which release large amounts of energy.

Alkanes Worksheet

1. Name the following molecules:



a) _____



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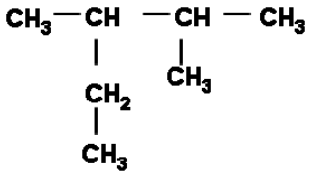

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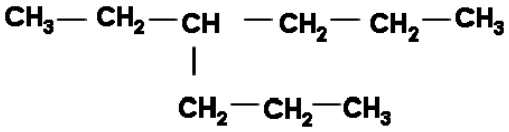

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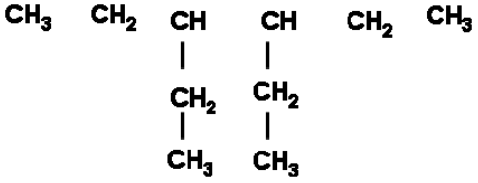

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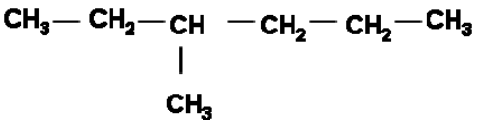

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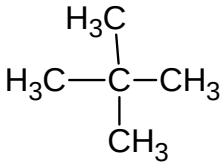

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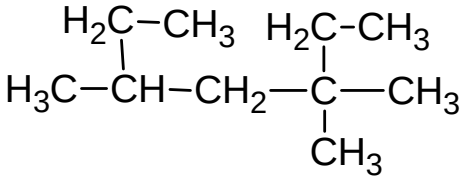

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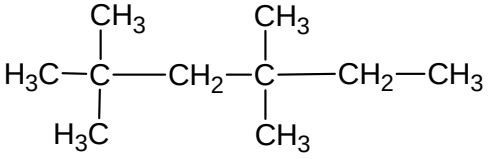
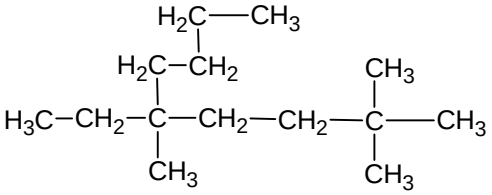


i) _____



j) _____

2. Draw condensed structural diagrams showing the appropriate number of hydrogens. Then provide the expanded molecular formula for each compound.

Name	Diagram	Expanded Molecular Formula
a) 3-ethyl-3,4-dimethylhexane		

Name	Diagram	Expanded Molecular Formula

b) 2,3,4-trimethylpentane

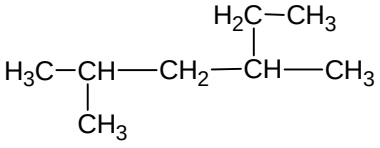
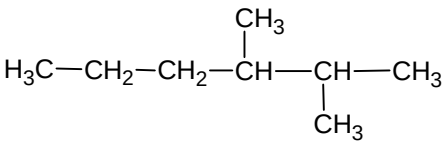
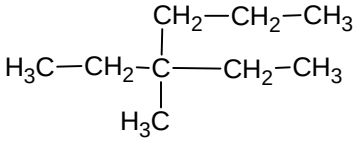
c) 5-ethyl-3,3-dimethylheptane

d) 2,3-diethyl-4-propyloctane

e) 3,4-diethyl-2,2-dimethyl-3-propyldecane

f) 4-butyl-6-ethyl-2,5-dimethylnonane

3. Identify any mistakes and correct the name

	Name	Describe Mistakes
	4-ethyl-2-methylpentane	
	4,5-methylhexane	
	3-methyl-3-ethylpentane	