Alkanes

-saturated (all single bonds) 

General formula: C_nH_{2n+2}

Naming Alkanes:

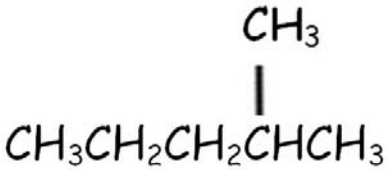
IUPAC name	Number of Carbon Atoms	Molecular formula
Methane	1	CH_4
Ethane	2	C_2H_6
Propane	3	C_3H_8
Butane	4	C_4H_{10}
Pentane	5	C_5H_{12}
Hexane	6	C_6H_{14}
Heptane	7	C_7H_{16}
Octane	8	C_8H_{18}
Nonane	9	C_9H_{20}
Decane	10	$C_{10}H_{22}$

*These names serve as parent names for all non-aromatic compounds

Systemic nomenclature devised by IUPAC for any acyclic compound:

1)Identify the longest un-branched carbon chain. This establishes the parent name (based on the alkane)

2)Everything else on the carbon chain is treated as a substituent

ex. 

Parent chain has 5 carbons so the parent name is pentane. A substituent is also present.

How do we name substituents?

<u>Naming Substituents</u>

a)halogens

F	fluoro	Cl	chloro
Br	bromo	I	iodo

Subtract "ine" from the end of the name and add "o"

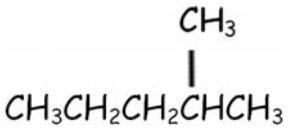
b)carbon substituent (alkyl group)

To name a substituent alkyl group you substitute the "ane" from the end of its parent alkane name with "yl"

1 carbon	$-CH_3$	methyl
2 carbons	$-CH_2CH_3$	ethyl
3 carbons	$-CH_2CH_2CH_3$	propyl
	CH_3CHCH_3 (CH₃ branch)	isopropyl

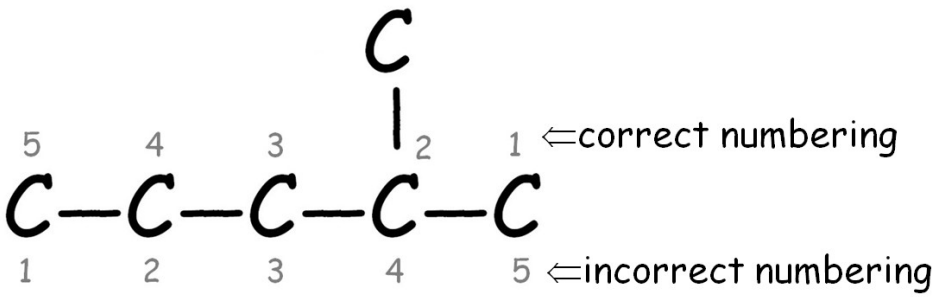
} two possibilities

return to the compound:



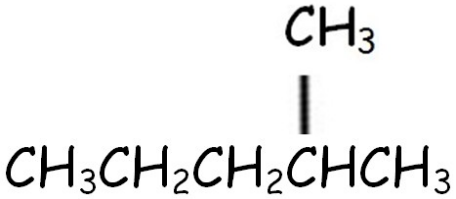
∴ methylpentane but the name is not unique.

Where is the methyl?



numbering begins at the end nearest the branch

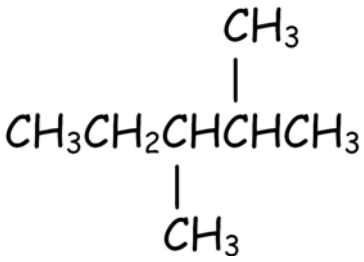
back to the compound



2-methylpentane

The 2 identifies the carbon of the parent chain that the methyl substituent is attached to.

ex.



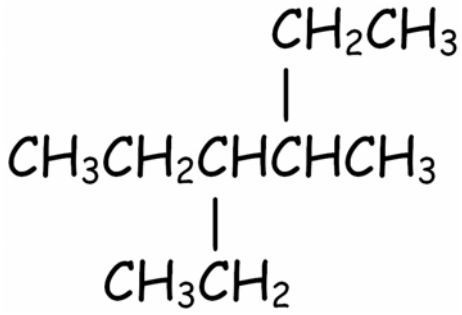
parent: pentane

substituents: 2 methyls

2,3-dimethylpentane

note: numbers are separated from letters by a hyphen and numbers are separated from each other by a comma

ex.



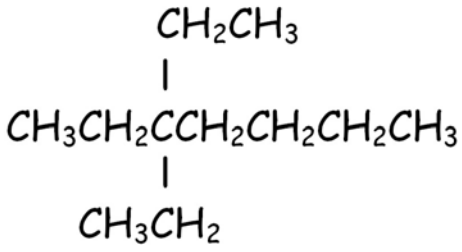
parent: hexane

substituents: methyl, ethyl

3-ethyl-4-methylpentane

note: when two or more substituents are present the order they appear in the name is determined alphabetically

ex.



3,3-diethylheptane

Organic Nomenclature

note:-separate numbers with commas

-separate numbers and words with hyphens

-a number must appear for every branch

-number the chain so that the lowest set of numbers appear in the name