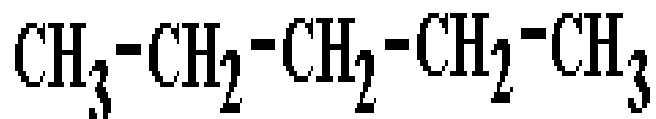


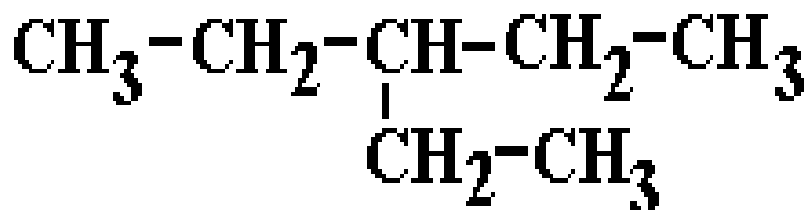
Structure & nomenclature of non-cyclic alkane hydrocarbons

C_nH_{2n+2} n =	1	2	3	4	5	6	7	8	9	10
formula of alkane	CH ₄	C ₂ H ₆	C ₃ H ₈	C ₄ H ₁₀	C ₅ H ₁₂	C ₆ H ₁₄	C ₇ H ₁₆	C ₈ H ₁₈	C ₉ H ₂₀	C ₁₀ H ₂₂
name of alkane	methane	ethane	propane	butane	pentane	hexane	heptane	octane	nonane	decane

- The primary suffix name is based on the longest carbon chain and ending in ...**ane**.
 - 1 carbon, **methane**;
 - 2 carbons, **ethane**;
 - 3 carbons in chain, **propane**;
 - 4 carbons in chain, **butane**. After these four preserved 'old trivial' names, the name is 'numerically' systematic e.g.
 - C₅ carbon chain **pentane**;
 - C₆ chain **hexane**,
 - C₇ chain **heptane**,
 - C₈ chain **octane**,
 - C₉ chain **nonane**,
 - C₁₀ chain **decane** etc.
 - The table above lists the molecular formula and names of the first ten linear alkanes (the term linear applies to butane onwards, i.e. from whence chain isomerism is possible)
- If all the carbon atoms of the molecule are in one **continuous chain**, it is referred to as un-branched or **linear**.



- Example: pentane is **linear** or un-branched.
- If another chain of carbon atoms starts out of the main carbon chain, it is referred to as **branching**, giving rise to 'branched' alkane, one with a **side-chain**.



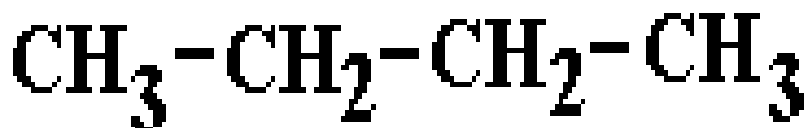
- Example: 3-ethyl-pentane is **branched**,
- Because it has an 'ethyl branch' from the 3rd carbon atom in the main chain.
- The longest continuous chain of 5 carbon atoms forms the basis of the name.
- The 3- denotes the position of the carbon chain branch i.e. the lowest number possible for the start of the side-chain.



- propane

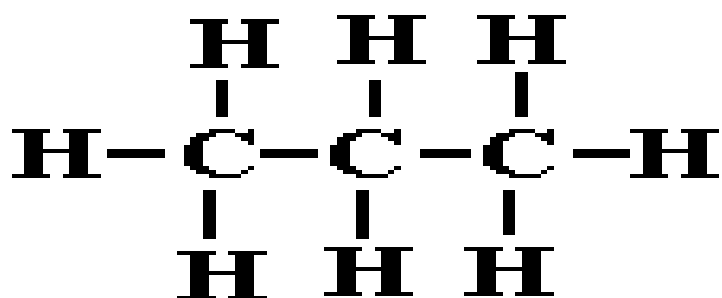
- methyl-propane $(\text{CH}_3)_3\text{CH}$

-



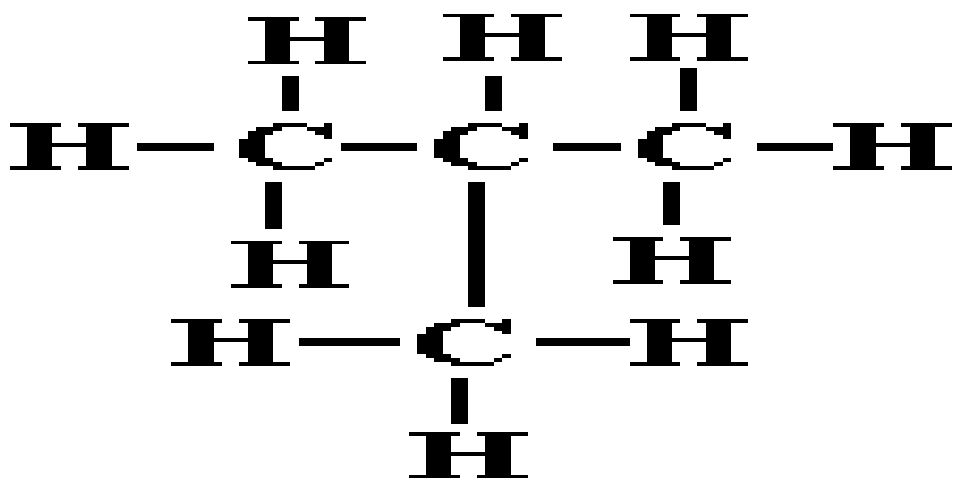
- butane

- Note that methyl-propane and butane can now be distinguished, BUT, you must be able to envisage these correctly into a full structure that shows how all the atoms are 'connected', and this is explained next.
- A **full structural/graphic/displayed formula** gives a '2D' projection-representation of the molecule and must clearly show how all the atoms are connected i.e. in this case all the C-C and C-H covalent bonds, but does it not give the full 3D structural, or spatial arrangement, of the atoms, though for most purposes, this level of detail is quite sufficient.

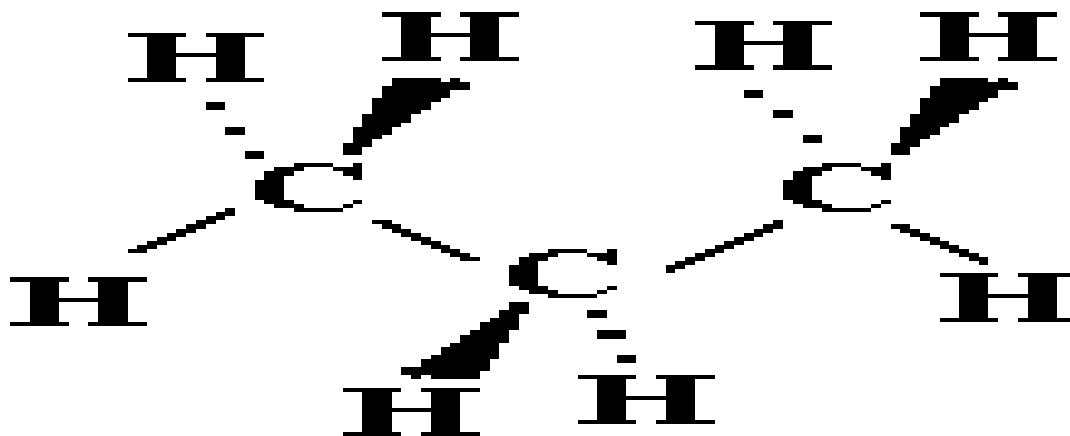


- propane

- methyl-butane



○ propane



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