

NOMENCLATURE



Name Form

Some definitions

Term	Definition	Example
Organic chemistry		
Molecular formula		e.g. butane
Empirical formula		e.g. butane
Structural formula		e.g. butane
Displayed formula		e.g. butane
Functional group		
Homologous series		

Some nomenclature rules

- The name is based around the name of the longest carbon chain (which contains the functional group):
1 C = meth, 2C = eth, 3C = prop, 4C = but, 5C = pent, 6C = hex, 7C = hept, 8C = oct, etc.
- The functional group is indicated by a prefix or suffix. *e.g. chloroethane*
- The position of the functional group is given by a number – counting from the end that gives the functional group the lowest number.
- We only include numbers if they are needed.
- Where there are two or more of the same groups, *di-*, *tri-* or *tetra* are used.
- If there is more than one functional group/substituent, numbers are separated by commas and the groups are listed in alphabetical order (ignoring *di*, *tri*, etc.). *e.g. 3-bromo-1-chlorobutane, 2,2-dibromo-1-chlorobutane.*
- The suffix for alkenes can go in front of other suffixes, *e.g. 2-chlorobut-3-enal.*

1) Alkanes

Complete the table to show the following alkanes.

	displayed formula	structural formula	molecular formula
methane			
ethane			
propane			
butane			
pentane			
hexane			

The following groups are often attached to organic molecules – these groups are derived from alkanes with an H missing. They are called **alkyl** groups.

methyl	ethyl	propyl	butyl
$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}- \\ \\ \text{H} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{C}-\text{C}- \\ \quad \\ \text{H} \quad \text{H} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}- \\ \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	$\begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ \quad \quad \quad \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}- \\ \quad \quad \quad \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array}$
CH ₃ -	CH ₃ CH ₂ -	CH ₃ CH ₂ CH ₂ -	CH ₃ CH ₂ CH ₂ CH ₂ -

2) Naming alkanes

	Structural formula	Name
$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$		
$\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$		
$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$		
$(\text{C}_2\text{H}_5)_2\text{CHCH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$		
$\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)_2\text{CH}(\text{CH}_3)_2$		

3) Naming alkenes

These end in **-ene** with a number (if needed) to show the position of the double bond.

	Structural formula	Name
$\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2$		
$\text{CH}_3\text{CH}=\text{CHCH}_3$		
$(\text{CH}_3)_2\text{C}=\text{CHCH}_3$		
$\text{CH}_3\text{CH}=\text{CH}_2$		
$(\text{CH}_3)_3\text{CC}(\text{CH}_3)=\text{CHCH}_3$		

4) Naming haloalkanes

These start with **fluoro-**, **chloro-**, **bromo-** or **iodo-** in **-ene** with a number (if needed) to show the position of the group.

	Structural formula	Name
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$		
$\text{CH}_3\text{CH}_2\text{Br}$		
$\text{CH}_3\text{CHICH}_3$		
$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CHFCH}_3$		
$(\text{CH}_3)_2\text{CFCHBrCH}_2\text{CH}_3$		

5) Exercises for practice

For each of the following compounds, draw the structure if the name is given or *vice versa*.

- | | |
|----------------------------|--------------------------------|
| 1) 3-methylhexane | 11) 2-chloro-3-methylbutane |
| 2) 2,2-dimethylpentane | 12) 2,3-dimethylbut-1-ene |
| 3) 2-methyl-3-ethylpentane | 13) 2,2-dibromo-3-fluorobutane |
| 4) pent-1-ene | 14) methylpropene |
| 5) methylbut-2-ene | 15) 1-iodo-2-methylpentane |

