



# ORGANIC NOMENCLATURE 1

## 1) Some nomenclature rules

- The name is based around the name of the longest carbon chain (which contains the functional group):

number of C atoms	1 C	2 C	3 C	4 C	5 C	6 C	7 C	8 C	9 C	10 C
stem	meth	eth	prop	but	pent	hex	hept	oct	non	dec

- 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-, tetra-, penta-, hexa-*, etc. 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-ene*.

## 2) Alkanes

	displayed formula	structural formula	skeletal formula
methane CH <sub>4</sub>		CH <sub>4</sub>	not used
ethane C <sub>2</sub> H <sub>6</sub>		CH <sub>3</sub> -CH <sub>3</sub>	—
propane C <sub>3</sub> H <sub>8</sub>		CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>3</sub>	
butane C <sub>4</sub> H <sub>10</sub>		CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>	
pentane C <sub>5</sub> H <sub>12</sub>		CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>	
hexane C <sub>6</sub> H <sub>14</sub>		CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub>	

### 3) Alkyl groups

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
CH <sub>3</sub> -	CH <sub>3</sub> CH <sub>2</sub> -	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> -	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> -

### 4) AS functional groups

homologous series	functional group	prefix / suffix (* = usual use)	example
alkenes		suffix <b>-ene</b>	ethene
alcohols		suffix* <b>-ol</b> prefix <b>hydroxy-</b>	ethanol
haloalkanes		prefix <b>chloro-</b> <b>bromo-</b> <b>iodo-</b>	1-chloropropane
aldehydes		suffix <b>-al</b>	ethanal
ketones		suffix* <b>-one</b> prefix <b>oxo-</b>	butanone
carboxylic acids		suffix <b>-oic acid</b>	ethanoic acid
nitriles		suffix <b>-nitrile</b>	ethanenitrile
amines		suffix* <b>-amine</b> prefix <b>amino-</b>	propylamine

ALKANES			
Structural formula	$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_3$	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}-\text{CH}_3 \end{array}$	$(\text{C}_2\text{H}_5)_2\text{CHCH}(\text{CH}_3)\text{CH}(\text{CH}_3)_2$
Displayed formula			
Skeletal formula			
Name	methylbutane	2,3-dimethylpentane	4-ethyl-2,3-dimethylhexane

ALKENES			
Structural formula	$\text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}_2$	$(\text{CH}_3)_2\text{C}=\text{CHCH}_3$	$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\   \quad   \\ \text{CH}_3-\text{CH}-\text{C}=\text{CH}-\text{CH}_3 \end{array}$
Displayed formula			
Skeletal formula			
Name	but-1-ene	methylbut-2-ene	3,4-dimethylpent-2-ene

HALOALKANES			
Structural formula	$\text{CH}_3\text{CH}_2\text{Br}$	$\text{CH}_3\text{CH}_2\text{CH}(\text{CH}_3)\text{CH}_2\text{CHFCH}_3$	$\begin{array}{c} \text{CH}_3 \quad \text{Br} \\   \quad   \\ \text{CH}_3-\text{C}-\text{CH}-\text{CH}_2-\text{CH}_3 \\   \\ \text{F} \end{array}$
Displayed formula			
Skeletal formula			
Name	bromoethane	2-fluoro-4-methylhexane	3-bromo-2-fluoro-2-methylpentane

ALCOHOLS			
Structural formula	$\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$	$\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_2-\text{OH}$	$(\text{CH}_3)_3\text{COH}$
Displayed formula			
Skeletal formula			
Name	propan-2-ol	methylpropan-1-ol	methylpropan-2-ol

ALDEHYDES			
Structural formula	$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CHO}$	$(\text{CH}_3)_2\text{CHCHO}$	$\text{CH}_3-\text{CH}=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{H}$
Displayed formula			
Skeletal formula			
Name	pentanal	methylpropanal	but-2-enal

KETONES			
Structural formula	$\text{CH}_3-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$	$\text{CH}_3-\text{CH}_2-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$	$\text{CH}_3\text{COCH}(\text{CH}_3)_2$
Displayed formula			
Skeletal formula			
Name	propanone	pentan-2-one	methylbutanone

CARBOXYLIC ACIDS			
Structural formula	$\text{CH}_3\text{CH}_2\text{COOH}$	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{C}(=\text{O})-\text{OH} \end{array}$	$(\text{CH}_3)_3\text{CCH}_2\text{COOH}$
Displayed formula			
Skeletal formula			
Name	propanoic acid	3-methylbutanoic acid	3,3-dimethylbutanoic acid

AMINES			
Structural formula	$\text{CH}_3\text{NH}_2$	$\text{CH}_3-\text{CH}_2-\text{NH}-\text{CH}_2-\text{CH}_3$	$\begin{array}{c} \text{CH}_3 \\   \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{NH}_2 \end{array}$
Displayed formula			
Skeletal formula			
Name	methylamine	diethylamine	2-methylpropylamine

NITRILES			
Structural formula	$\text{CH}_3-\text{CH}_2-\text{C}\equiv\text{N}$	$\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CN}$	$\begin{array}{c} \text{OH} \\   \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{C}\equiv\text{N} \end{array}$
Displayed formula			
Skeletal formula			
Name	propanenitrile	3-methylbutanenitrile	3-hydroxybutanenitrile