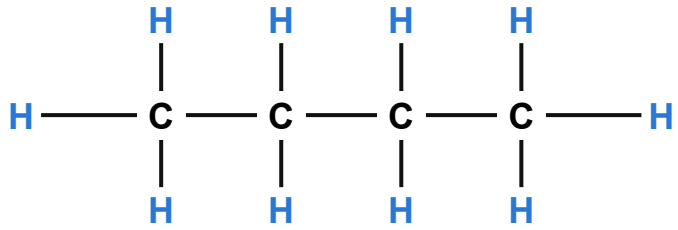
▶ Video explanation (YouTube Short) · Instagram · PDF with diagrams

Drawing Organic Molecules: Four Ways

One molecule can be written in several ways. The molecule stays the same; only the drawing changes. Butane, C_4H_{10}, is the example here.

1. Complete structural formula

Every atom and every bond is shown. It is clear, but long for big molecules.

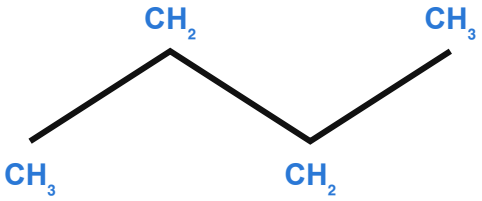


2. Condensed formula

Bonds are dropped: **$CH_3CH_2CH_2CH_3$**. Repeated groups go in a bracket: **$CH_3(CH_2)_2CH_3$**.

3. Bond-line formula

- Every **corner** and every **line end** is a carbon.
- H atoms on carbon are not written.
- H on a carbon = 4 − the bonds you can see. A double bond counts as 2.
- Other atoms are written as letters, such as OH.



4. 3D drawing

Line	Meaning
Solid wedge	Comes towards you
Dashed wedge	Goes away from you
Normal line	In the plane of the paper

Solved example

Q. A zigzag has 4 points and its first bond is double. Find the formula.
A. 4 carbons. H atoms: end carbon with a double bond 2, next carbon 1, next carbon 2, end carbon 3. Total 8. The formula is C_4H_8, but-1-ene: $CH_2{=}CHCH_2CH_3$.

Practice questions

1. (MCQ) A corner in a bond-line formula is: (a) H (b) C (c) O (d) a lone pair
2. (Very short) Expand $CH_3(CH_2)_3CH_3$.
3. (Very short) What does a dashed wedge show?
4. (Short) How many H atoms does a middle carbon with 2 single bonds carry? Why?
5. (Short) Give the molecular formula of cyclohexane from its hexagon.
6. (Short) Write the condensed formula of propan-1-ol.

Answer key

1. (b).
2. $CH_3CH_2CH_2CH_2CH_3$.
3. A bond going away from you.
4. 2, because 4 − 2 = 2.
5. C_6H_{12}.
6. $CH_3CH_2CH_2OH$.

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