

Chapter 8.6.1

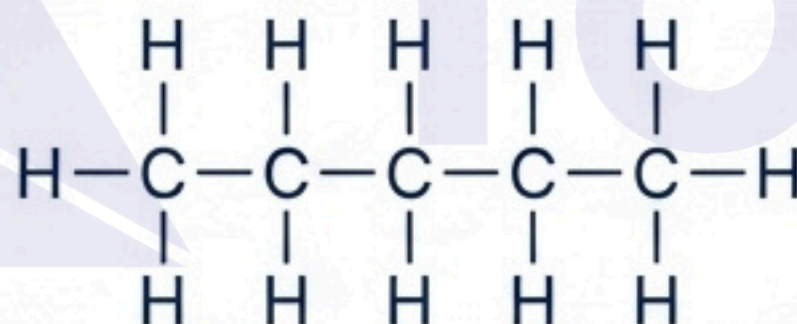
The Molecular Blueprint: Structural Isomerism

Same formula, different architecture.
A visual guide for Class 11 Chemistry.

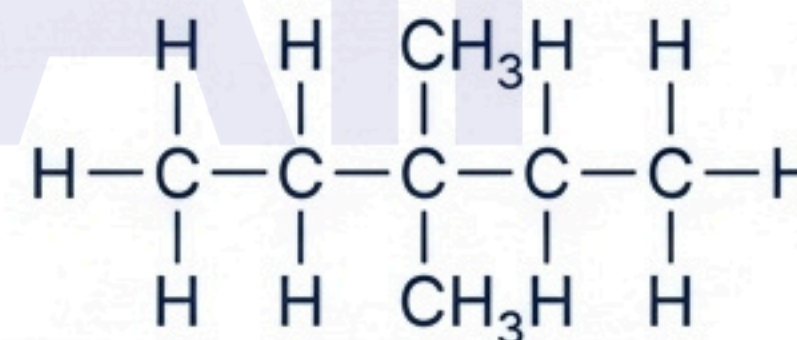
One pile of materials, distinct architectural realities.

Compounds having the same molecular formula but different structures (manners in which atoms are linked) are classified as structural isomers.

Formula: C_5H_{12}



Pentane

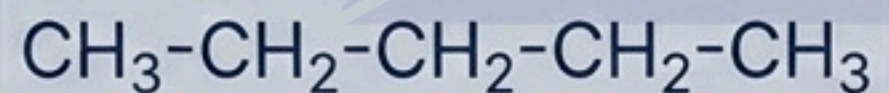


Isopentane

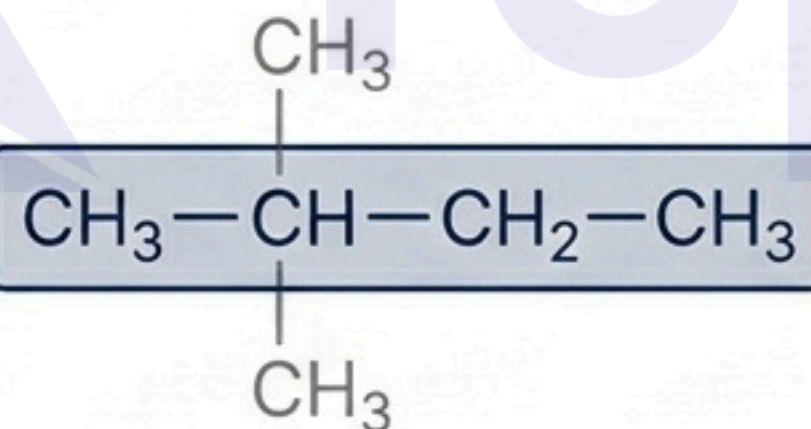
Both use exactly 5 Carbons and 12 Hydrogens, but their architectural linkage creates entirely different molecules.

Chain Isomerism: Shifting the Skeleton

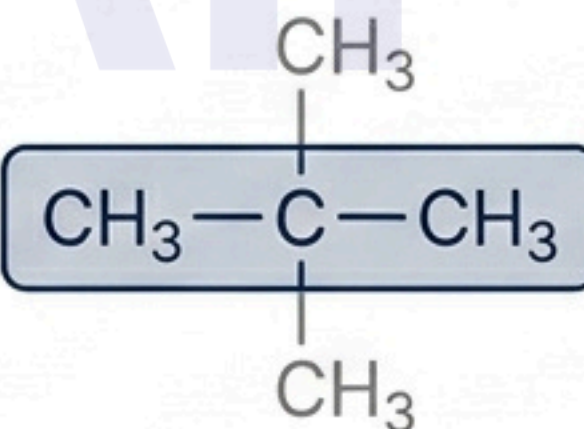
When compounds have the same molecular formula but different carbon skeletons, they are **chain isomers**. Notice how the primary skeleton shrinks as branching increases.



5-Carbon Skeleton



4-Carbon Skeleton



3-Carbon Skeleton



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$$E=mc^2$$



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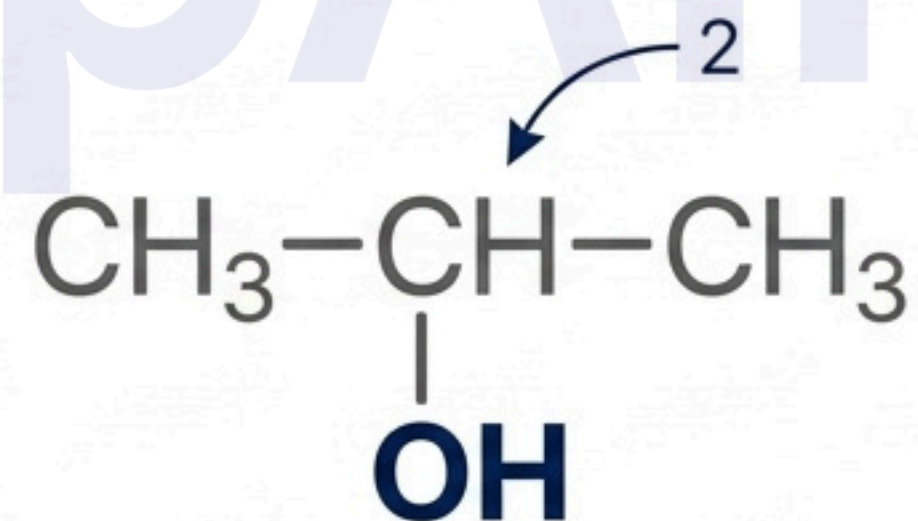
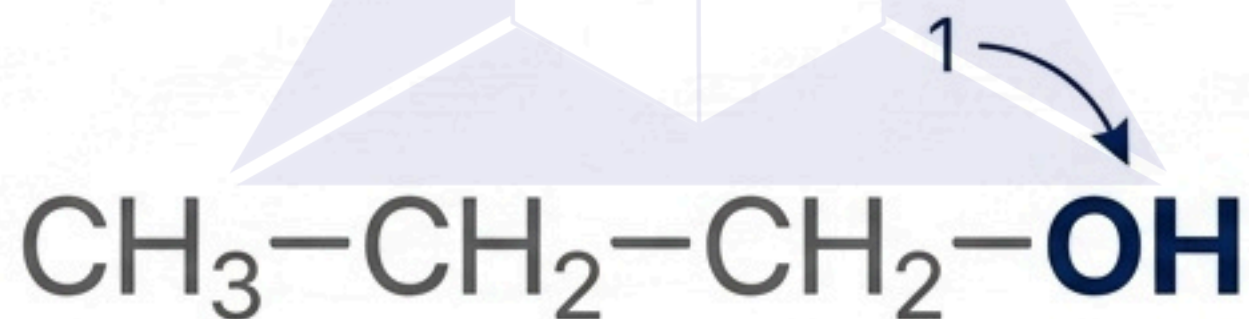
Key Highlights

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Position Isomerism: Relocating the Group

The carbon skeleton stays identical. Only the address (position) of the substituent or functional group changes.

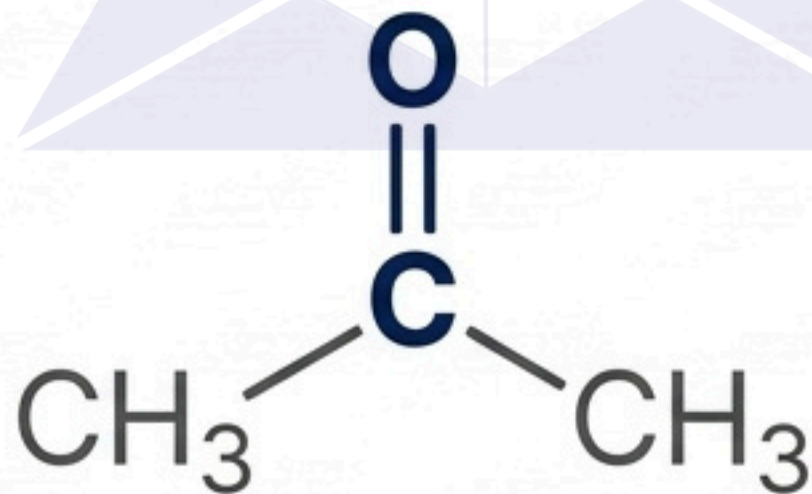


Functional Group Isomerism: Changing the Identity

Same molecular formula, completely different functional groups. The molecules belong to entirely different chemical families.



Ketone Family ($>\text{C}=\text{O}$)



Aldehyde Family ($-\text{CHO}$)



Metamerism: Shifting the Weight

Arises due to different alkyl chains on either side of the **polyvalent functional group** (like Oxygen).



Methoxypropane



Methyl
(1 unit of weight)

Propyl
(3 units of weight)

Ethoxyethane



Ethyl
(2 units of weight)

Ethyl
(2 units of weight)

The Molecular Blueprint Matrix

Master these 4 structural variations. You are ready.

Isomer Type	What Changes?	Same Formula	Text Example
Chain	Carbon skeleton length	C ₅ H ₁₂	Pentane vs. Isopentane
Position	Functional group "address"	C ₃ H ₈ O	Propan-1-ol vs. Propan-2-ol
Functional	Entire chemical family	C ₃ H ₆ O	Propanone vs. Propanal
Metamerism	Alkyl weight across central atom	C ₄ H ₁₀ O	Methoxypropane vs. Ethoxyethane



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