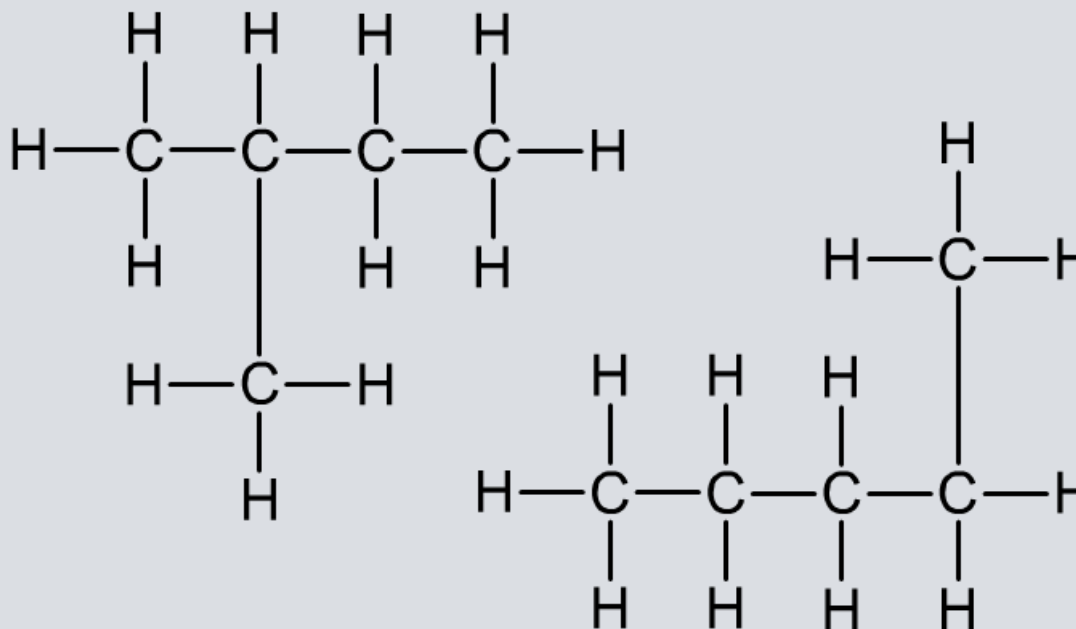


Isomers



What is isomerism?

Isomers are molecules with the same molecular formula (i.e. the same number and type of atoms) but in which the atoms are arranged in a different way.

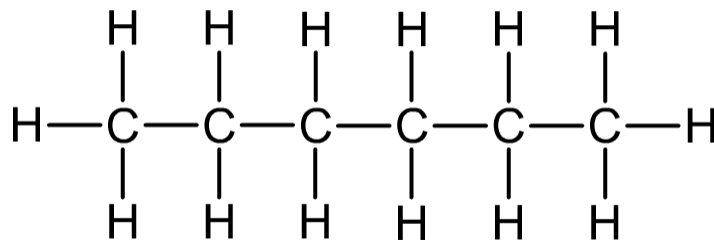
There are two main categories of isomerism: **structural isomerism** and **stereoisomerism**.

- Structural isomers have different structural formulae. Three types of structural isomerism are **chain isomerism**, **positional isomerism** and **functional group isomerism**.
- Stereoisomers have the same structural formula, but the 3D arrangement of atoms is different. Two types are **cis–trans isomerism** and **optical isomerism**.

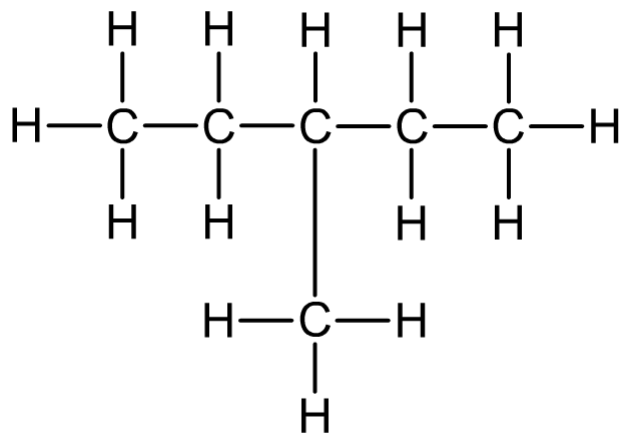


Chain isomerism in alkanes

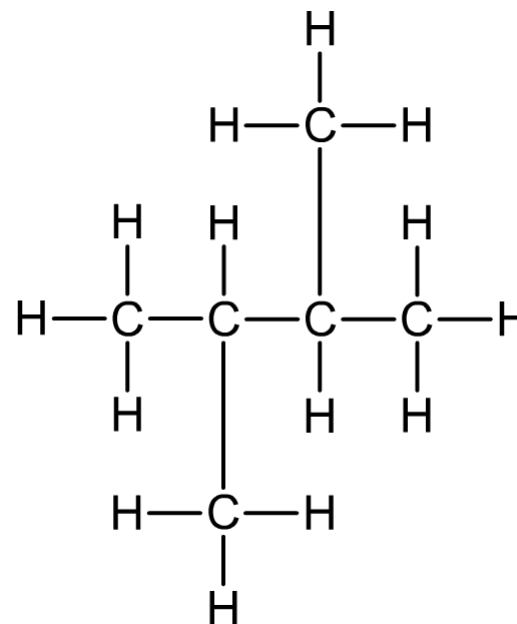
In **chain isomers**, the carbon chain is arranged differently. For example, hexane has several chain isomers, all with the molecular formula C_6H_{14} :



hexane



3-methylpentane

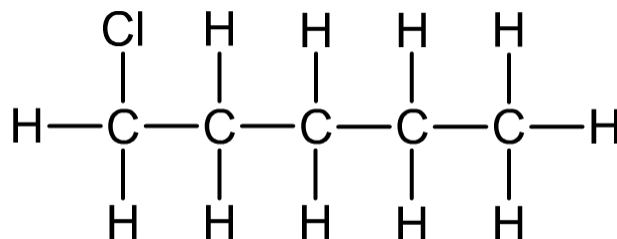


2,3-dimethylbutane

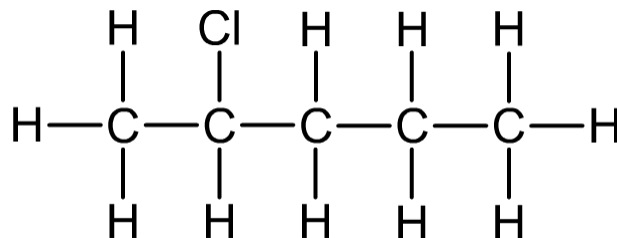
Positional isomerism

In **positional isomers**, the functional group is attached to a different carbon atom.

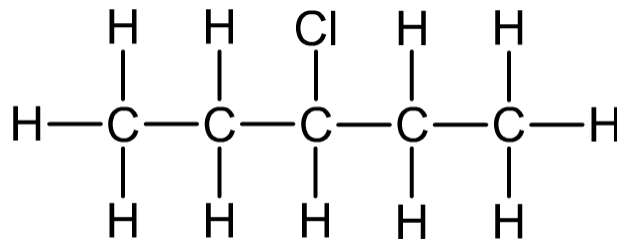
For example, chloropentane has several positional isomers, all with the molecular formula $C_5H_{11}Cl$:



1-chloropentane



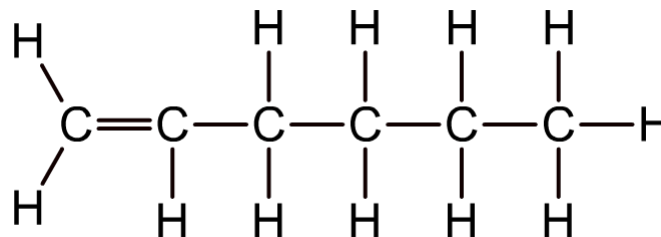
2-chloropentane



3-chloropentane

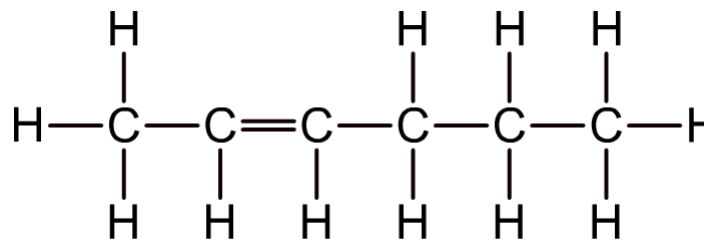
Positional isomerism in alkenes

Positional isomerism also exists in alkenes with four or more carbon atoms.

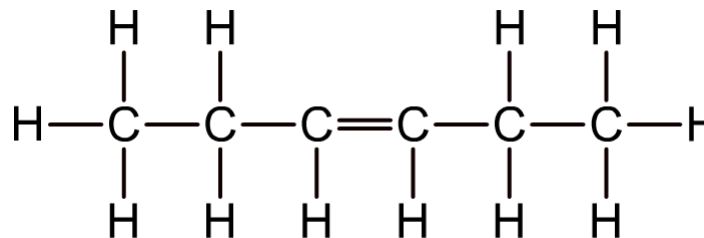


hex-1-ene

For example, hexene has several positional isomers, all with the molecular formula C_6H_{12} :



hex-2-ene

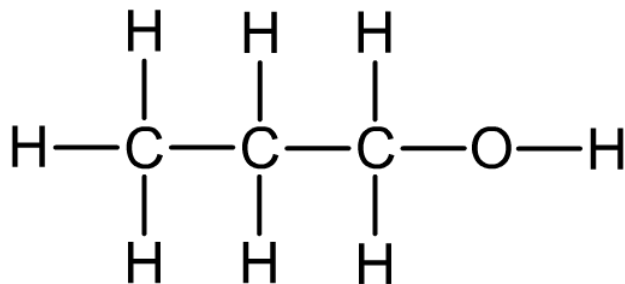


hex-3-ene

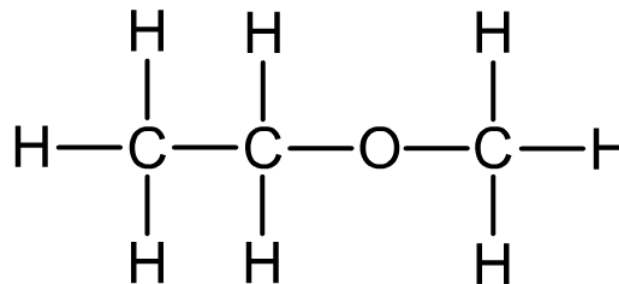
Functional group isomerism

Functional group isomers contain different functional groups, and so are members of different homologous series.

For example, both alcohols and ethers have the general formula $C_nH_{2n+2}O$, so they may be functional group isomers:



propanol (C_3H_8O)
an alcohol



methoxyethane (C_3H_8O)
an ether

What type of structural isomers are these pairs of molecules?

Structural isomers have the same molecular formula but different structural formulae.

There are three different types: functional group isomers, positional isomers and chain isomers.

Click "**start**" to see which ones you can identify.

start

