14.3 HOMLOGOUS SERIES

What is a homologous series?

→ a series or family of organic compounds that have similar features and chemical properties due to them having the same functional group

SIMILARITIES BETWEEN COMPOUDS IN A HOMOLOGOUS SERIES:

1. The same general formula
2. Same functional group
3. Similar chemical properties - due to them having the same functional group

DIFFERENCES BETWEEN MEMBERS IN A HOMOLOGOUS SERIES:

1. Different chain lengths
2. Different physical properties – due to increasing molecular size

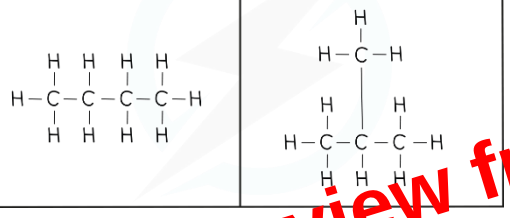
Structural isomers

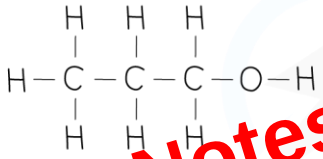
WHAT ARE THEY?

Compounds with the SAME MOLECULAR FORMULA but a DIFFERENT STRUCTURAL FORMULA
- due to different arrangement of atoms in space
- the longer the carbon chain, the more structural isomers

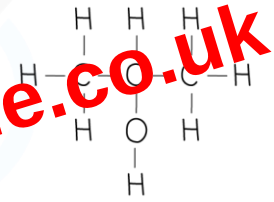
EXAMPLES

BUTANE	METHYLPROPANE
C_4H_{10}	C_4H_{10}





Propan – 1 – ol



Propan – 2 – ol

(from the number in between start counting from the right to where the OH is)

ISOMERS & BOILING POINTS

➢ The compounds with branched chains have LOWER boiling points
WHY? Because the branches prevent the molecules from getting close together – attractive forces between them are weaker – less energy needed to form a gas

14.4 ALKANES

General characteristics

1. They are hydrocarbons
2. Each carbon forms 4 single covalent bonds
3. General formula: C_nH_{2n+2}
4. Functional group: C – C
5. All are generally unreactive (except in terms of burning)
6. Are classified as saturated hydrocarbons (all the bonds in alkanes are single bonds)

Reactions of alkanes

1. COMBUSTION

Reactants	alkane + oxygen (incomplete combustion happens if there is not enough oxygen)
Other requirements	a flame to ignite the fuel
Products	carbon dioxide (would be carbon monoxide if it was incomplete combustion) + water + heat
Equation for methane	$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$