Subject	Year	Term
Chemistry	12	3

Topic

4.1.1 Basic concepts.

Content (Intent)

Prior Learning (Topic) KS4 Y9 C7 Organic chemistry

Naming and representing the formulae of organic compounds

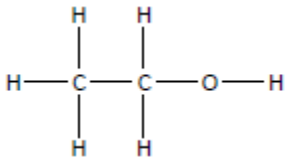
(a) application of IUPAC rules of nomenclature for systematically naming organic compounds

(b) interpretation and use of the terms:

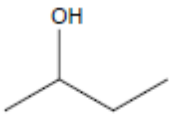
(i) general formula (the simplest algebraic formula of a member of a homologous series) e.g. for an alkane: C_nH_{2n+2}

(ii) structural formula (the minimal detail that shows the arrangement of atoms in a molecule) e.g. for butane: $CH_3CH_2CH_2CH_3$ or $CH_3(CH)_2CH_3$

(iii) displayed formula (the relative positioning of atoms and the bonds between them) e.g. for ethanol:



(iv) *skeletal formula* (the simplified organic formula, shown by removing hydrogen atoms from alkyl chains, leaving just a carbon skeleton and associated functional groups) e.g. for butan-2-ol:



Functional groups

(c) interpretation and use of the terms:

(i) homologous series (a series of organic compounds having the same functional group but with each successive member differing by CH2)

(ii) functional group (a group of atoms responsible for the characteristic reactions of a compound)

(iii) alkyl group (of formula CnH2n+1)

(iv) aliphatic (a compound containing carbon and hydrogen joined together in straight chains, branched chains or non-aromatic
rings)

(v) alicyclic (an aliphatic compound arranged in non-aromatic rings with or without side chains)

(vi) aromatic (a compound containing a benzene ring)

(vii) saturated (single carbon–carbon bonds only) and unsaturated (the presence of multiple carbon–carbon bonds, including C=C, C≡C and aromatic rings)

(d) use of the general formula of a homologous series to predict the formula of any member of the series

Isomerism

(e) explanation of the term structural isomers (compounds with the same molecular formula but different structural formulae) and determination of possible structural formulae of an organic molecule, given its molecular formula

Reaction mechanisms

(f) the different types of covalent bond fission:
(i) homolytic fission (in terms of each bonding atom receiving one electron from the bonded pair, forming two radicals)
(ii) heterolytic fission (in terms of one bonding atom receiving both electrons from the bonded pair)

(g) the term radical (a species with an unpaired electron) and use of 'dots' to represent species that are radicals in mechanisms

(h) a 'curly arrow' described as the movement of an electron pair, showing either heterolytic fission or formation of a covalent bond

(i) reaction mechanisms, using diagrams, to show clearly the movement of an electron pair with 'curly arrows' and relevant dipoles.

Future Learning (Topic) KS5 Y12 4.2.1 Alkanes 4.1.3 Alkenes 4.2.1 Alcohols 4.2.2 Haloalkanes 4.2.3 organic synthesis 4.2.4 Analytical techniques **Y13** 6.1.1 Aromatic compounds 6.1.2 Carbonyl compounds 6.1.3 Carboxylic acids and esters 6.2.1 Amines 6.2.2 Amino acids, amide and chirality 6.2.3 Poly amides and polyesters 6.2.4 Carbon-carbon bond formation 6.2.5 Organic synthesis

How will knowledge and skills be taught? (Implementation)	How will your understanding be assessed & recorded (Impact)
Presentation, notes, worked examples, molymods, model answers and exam style questions.	- 1 x standard homework (Level given. Written feedback.) -1 x end of topic test (Level given. Verbal feedback to class and individuals.)

How can parents help at home?

Look at the topic specific resources on the VLE
Use appropriate websites: MachemGuy, Allery Chemistry, Chemistry World – by Royal Society of Chemistry, ChemGuide.
Take an interest! Ask your children what they have learnt and be curious about their learning.

Helpful further reading/discussion

Reading	Vocabulary Lists	Careers Links
Textbook pages 172-187 The Science of Everyday Life by Marty Jopson Why Chemical Reactions Happen by Keeler and Wothers	nomenclature general formula a homologous series structural formula displayed formula *skeletal formula* functional group alkyl group aliphatic alicyclic aromatic Saturated unsaturated Isomerism homolytic fission heterolytic fission	Analytical chemist Chemical engineer Clinical biochemist Forensic scientist Pharmacologist Process chemist Quality control analyst Research scientist Science writer Site chemist Teacher or lecturer Degrees; Chemistry Biochemistry Biomedical science Biological sciences

	radical a ‘curly arrow’	Medicine Research chemist Veterinary medicine