

Subject	Year	Term
Chemistry	13	1 and 2
Topic		
6.2.4 Carbon–carbon bond formation & 6.3.1 Chromatography and qualitative analysis		
Content (Intent)		
<p>Prior Learning (Topic) 1. Practical skills, 2.1, Atoms and reactions, 4.1.1 Basic concepts, 4.2.1 Alcohols, 4.1.3 alkenes, 4.2.2 haloalkanes, 4.2.3 Practical skills and synthesis, 6.1.1 Aromatics, 6.1.2 Carbonyls, 6.1.3 Carboxylic acids, 6.2.5 Organic synthesis</p>		
<p>Extending carbon chain length</p> <p>(a) the use of C–C bond formation in synthesis to increase the length of a carbon chain (see also 6.1.1 d, 6.1.2 b)</p> <p>(b) formation of C–C/N by reaction of:</p> <ul style="list-style-type: none"> (i) haloalkanes with CN[–] and ethanol, including nucleophilic substitution mechanism (see also 4.2.2 c) (ii) carbonyl compounds with HCN, including nucleophilic addition mechanism (see also 6.1.2 b–c) <p>(c) reaction of nitriles from (b):</p> <ul style="list-style-type: none"> (i) by reduction (e.g. with H₂/Ni) to form amines (ii) by acid hydrolysis to form carboxylic acids <p>(d) formation of a substituted aromatic C–C by alkylation (using a haloalkane) and acylation (using an acyl chloride) in the presence of a halogen carrier (Friedel–Crafts reaction) (see also 6.1.1 d).</p>		
<p>Types of chromatography</p> <p>(a) interpretation of one-way TLC chromatograms in terms of R_f values</p> <p>(b) interpretation of gas chromatograms in terms of:</p> <ul style="list-style-type: none"> (i) retention times (ii) the amounts and proportions of the components in a mixture. 		
<p>Tests for organic functional groups</p> <p>(c) qualitative analysis of organic functional groups on a test-tube scale; processes and techniques needed to identify the following functional groups in an unknown compound:</p> <ul style="list-style-type: none"> (i) alkenes by reaction with bromine (see also 4.1.3 f) (ii) haloalkanes by reaction with aqueous silver nitrate in ethanol (see also 4.2.2 a) (iii) phenols by weak acidity but no reaction with CO₃^{2–} (see also 6.1.1 h) (iv) carbonyl compounds by reaction with 2,4- DNP (see also 6.1.2 d) (v) aldehydes by reaction with Tollens' reagent (see also 6.1.2 e) (vi) primary and secondary alcohols and aldehydes by reaction with acidified dichromate (see also 4.2.1 c, 6.1.2a) (vii) carboxylic acids by reaction with CO₃^{2–} (see also 6.1.3 b). 		
<p>Future Learning (Topic) Final topic for paper 2.</p>		
How will knowledge and skills be taught? (Implementation)	How will your understanding be assessed & recorded (Impact)	
<p>Practical work</p> <p>Carry out a TLC</p> <p>PAG 7</p> <p>PAG 6</p> <p>Written</p>	<p>- 1 x standard homework (Level given. Written feedback. Response expected.)</p> <p>-1 x Paper 2 (Level given. Verbal feedback to class and individuals.)</p> <p>PAG 6</p> <p>PAG 7</p>	

<p>Presentations</p> <p>Explanation of how to carry out and interpret a TLC.</p> <p>Description of the tests and observations used to identify a functional group.</p> <p>Explanation of how to extend the carbon chain length</p> <p>Past paper question examples and answers</p> <p>Modelled answers with key points/terms</p>	
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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
<p>Text book: A level chemistry for OCR by Rob Ritchie and Dave Gent. Chapter 28 p.490-493 and Chapter 29 506-511</p> <p>The Science of Everyday Life by Marty Jopson</p> <p>Why Chemical Reactions Happen by Keeler and Wothers</p>	<p>C–C bond formation</p> <p>Nitrile</p> <p>Hydrolysis</p> <p>Nucleophilic substitution</p> <p>Nucleophilic addition</p> <p>Alkyation</p> <p>Acylation</p> <p>halogen carrier</p> <p>Rf value</p> <p>Retention time</p> <p>TLC (thin layer chromatography)</p> <p>Functional group</p>	<p>Medicine</p> <p>Veterinary science</p> <p>Material science</p> <p>Biomedical sciences</p> <p>Environmental science</p> <p>Toxicologist</p> <p>Pharmacist</p> <p>Dentist</p> <p>Patent law</p> <p>Forensic science</p>