



# YEAR 13 - Teacher 1

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning - Topic: Organic Chemistry

### Curriculum Intent

In addition to working further on objectives from Y12, pupils will be taught, following National Curriculum guidelines, the following this term:

### Skills/Assessment Objective Links

Unit Title	Spec	Knowledge	Skills developed from learning knowledge
Optical isomersism	3.3.7	Definition. Identification.	Defining an <b>optical isomer</b> in terms of <b>groups</b> attached and it's effect on <b>plane polarised light</b> . Identify an optical isomer in a large compound
Carbonyl chemistry	3.3.8	Oxidation and reduction reactions. Identification tests. Nucleophilic addition reaction	Suggesting <b>suitable reagents</b> for <b>oxidation</b> and <b>reduction</b> . Drawing reaction mechanism for <b>nucleophilic addition</b> (reduction by <b>hydride ions</b> )
Carboxylic acids	3.3.9	Reactions of <b>acids</b> . Fatty acids. Saponification. Manufacturing <b>biodiesel</b>	Describe reactions of <b>acids</b> . Explaining <b>formation</b> of soap and <b>biodiesel</b> from <b>triglycerides</b> .
Esters	3.3.9	<b>Synthesis</b> of <b>esters</b> . Reactions	Suggesting reagents for <b>formation/hydrolysis</b> of <b>esters</b> .
Acyl compounds	3.3.9	Nucleophilic addition-elimination reactions	Drawing reaction mechanisms and suggesting reagents for <b>nucleophilic addition-elimination</b> reactions.
Benzene	3.3.10	Structure - delocalisation. Electrophilic substitution. Nitration. Friedel-Crafts reaction.	Explaining the reactivity of <b>benzene</b> by drawing the structure and the <b>delocalised</b> nature of <b>pi electrons</b> . Drawing the mechanism for <b>electrophilic substitution</b> . Drawing the <b>nitration</b> of <b>benzene</b> from the <b>nitronium ion</b> . Drawing mechanisms for <b>halogenation</b> using <b>friedel-crafts</b> reactions
Amines	3.3.11	<b>Synthesis</b> of <b>amines</b> , properties	Drawing mechanisms for reactions of formation of <b>amines</b> . Describing <b>basic properties</b> of primary, secondary and tertiary <b>amines</b> in terms of <b>inductive effect</b> .
Polymers	3.3.12	Formation of <b>condensation</b> polymers. Uses. <b>Biodegradability</b>	Suggesting how <b>polymers</b> could be made and drawing <b>repeating units</b> . Comparing with <b>addition polymers</b> .
Amino acids	3.3.13	Amino acids structure. Proteins. Enzymes. DNA. Zwitterions.	Drawing <b>zwitterions</b> and structures of <b>amino acids</b> in different <b>pH</b> solutions. Describing how <b>amino acids</b> form <b>proteins</b> . Recalling that <b>enzymes</b> are <b>biological catalysts</b> and work because of the shape of their <b>active sites</b> . Structure of <b>DNA</b> as a <b>polymer</b> and how <b>cisplatin</b> is an anti-cancer drug

	Chromatography	3.3.16	Thin layer chromatography. Column chromatography. Gas chromatography. Rf values	Explaining the processes interactions between stationary and mobile phases involved in chromatography. Calculating Rf values.
	NMR	3.3.15	Chemical shifts. Proton NMR. C13 NMR. Uses of standards. Interpreting spectra.	Identification of number of peaks and referencing to data table in C13 and proton NMR. Using integration and splitting data in proton NMR. Combining information from Mass spectra, IR and NMR to identify unknown substances.
	Organic synthesis	3.3.14	Synthetic pathways	Devising synthetic pathways that can utilise any of the reaction mechanisms learnt during A level chemistry.
Spiritual, moral, social, and cultural development	SMSC: Importance of recycling PSHE/British Values: Links to research in UK Skills Builder: Links to practical applications at University and research			
Numeracy	Interpreting spectra			
Literacy	Vocabulary Tier 2: Highlighted above Vocabulary Tier 3: Highlighted above Reading: Exam questions, Textbooks Writing: Correct usage of key terms in exam responses Oracy: Use of subject specific language			
Becoming future ready	Careers/Employability: Chemist. Pharmacist. Medic. Vet. Biological science. Sports sciences.			
Adaptation	Throughout this topic, quality first teaching will provide differentiation: <b>By product:</b> <b>By resource:</b> Doodle powerpoints, homework books, exam papers, textbooks <b>By Intervention:</b> by providing different levels of supervision and support <b>By Progressive Questioning:</b> exploring pupils' understanding through interactive dialogue. <b>By Grouping:</b> according to prior attainment, gender, social preference, preferred learning style. <b>By Task:</b> Pupils should be involved in the identification of targets which are meaningful to them and in the selection of an appropriate task from the given range. <b>By Offering Optional Activities:</b> In class or as homework, to extend learning. This QFT/SEND provision will be explicit within the lesson-by-lesson schemes of work.			
Implementation Curriculum Delivery	Unit Title	Spec	Knowledge	Skills developed from learning knowledge
Learning Outcomes (Knowledge) <u>Core Knowledge</u>	Optical isomersism	3.3.7	<u>Definition.</u> Identification.	Defining an optical isomer in terms of groups attached and it's effect on plane polarised light. Identify an optical isomer in a large compound
	Carbonyl chemistry	3.3.8	Oxidation and reduction reactions. Identification tests. <u>Nucleophilic addition</u> reaction	Suggesting suitable reagents for oxidation and reduction. Drawing reaction mechanism for nucleophilic addition (reduction by hydride ions)
	Carboxylic acids	3.3.9	Reactions of acids. Fatty acids. Saponification. <u>Manufacturing biodiesel</u>	Describe reactions of acids. Explaining formation of soap and biodiesel from triglycerides.

	Esters	3.3.9	Synthesis of esters. <b>Reactions</b>	Suggesting reagents for formation/hydrolysis of esters.
	Acyl compounds	3.3.9	<b>Nucleophilic addition-elimination reactions</b>	Drawing reaction mechanisms and suggesting reagents for nucleophilic addition-elimination reactions.
	Benzene	3.3.10	Structure - delocalisation. <b>Electrophillic substitution.</b> Nitration. Friedel-Crafts reaction.	Explaining the reactivity of benzene by drawing the structure and the delocalised nature of pi electrons. Drawing the mechanism for electrophillic substitution. Drawing the nitration of benzene from the nitronium ion. Drawing mechanisms for halogenation using friedel-crafts reactions
	Amines	3.3.11	<b>Synthesis of amines,</b> properties	Drawing mechanisms for reactions of formation of amines. Describing basic properties of primary, secondary and tertiary amines in terms of inductive effect.
	Polymers	3.3.12	<b>Formation of condensation polymers.</b> Uses. Biodegradability	Suggesting how polymers could be made and drawing repeating units. Comparing with addition polymers.
	Amino acids	3.3.13	Amino acids structure. Proteins. Enzymes. DNA. <b>Zwitterions.</b>	Drawing zwitterions and structures of amino acids in different pH solutions. Describing how amino acids form proteins. Recalling that enzymes are biological catalysts and work because of the shape of their active sites. Structure of DNA as a polymer and how cisplatin is an anti-cancer drug
	Chromatography	3.3.16	<b>Thin layer chromatography.</b> Column chromatography. Gas chromatography. Rf values	Explaining the processes interactions between stationary and mobile phases involved in chromatography. Calculating Rf values.
	NMR	3.3.15	Chemical shifts. Proton NMR. C13 NMR. Uses of standards. <b>Interpreting spectra.</b>	Identification of number of peaks and referencing to data table in C13 and proton NMR. Using integration and splitting data in proton NMR. Combining information from Mass spectra, IR and NMR to identify unknown substances.
	Organic synthesis	3.3.14	<b>Synthetic pathways</b>	Devising synthetic pathways that can utilise any of the reaction mechanisms learnt during A level chemistry.
<b>Current learning to be developed in the future within:</b>	Chemical/biochemical sciences at degree level			
<b>Assessment</b>	Regular assessment using past exam questions. Classwork and homework based on exam papers and self marking so pupils become familiar with how work is assessed.			

**Impact**

Pupils will be confident and competent at answering a wide range of exam questions that explore their vast knowledge and apply it to unfamiliar situations and practical applications.