

Long Term Plan: Chemistry Year 13 (Teacher Two)

“Science is simply the word we use to describe a method of organising our curiosity.”

Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Opportunity for stretch for high prior attainers
One	Physical Chemistry - Thermodynamics and pH (This topic spans across 2 half terms)	Born-Haber Cycles Gibbs free energy Bronsted-Lowery definition of an acid Ionic Product of water and pH	Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification Accurate measurement of substances using a variety of equipment including titration Safe handling of corrosive and toxic chemicals Presenting and interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods Mathematical skills, including changing the subject of an equation, multi-step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using standard form, fractions and working with powers.	Difficulty changing the subject of an equation Unit conversion errors Confusion between ΔH , ΔG and ΔS .	This unit extends student's KS4 knowledge of acids and bases by digging down right to the fundamentals and asking, "what actually is pH?" before providing students with the opportunity to investigate this experimentally. The energy side of this topic builds on from calorimetry and Hess Cycle work in Y12. Picking up where students left off to consider more complex cases	Multi step problems. Calculations involving unit conversion and use of more than one learnt equation
SMSC & British Values	The importance of working safely and respecting each other in the lab The importance of disposing of chemical waste in an environmentally friendly and sustainable way.					
Cultural Capital	The ubiquity of chemistry allows examples to be placed in a wide variety of familiar and unfamiliar contexts.					

Career Link	As the central science, chemistry opens doors to a wide range of STEM field careers.					
Two	Physical Chemistry - Thermodynamics and pH (This topic spans across 2 half terms)	The Dissociation Constant Experimental determination of K_a pH curves, including advanced titration Buffer solutions	Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification Accurate measurement of substances using a variety of equipment including titration Safe handling of corrosive and toxic chemicals Presenting and interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods Mathematical skills, including changing the subject of an equation, multi-step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using standard form, fractions and working with powers.	Difficulty changing the subject of an equation Unit conversion errors	This unit extends student's KS4 knowledge of acids and bases by digging down right to the fundamentals and asking, "what actually is pH?" before providing students with the opportunity to investigate this experimentally. The energy side of this topic builds on from calorimetry and Hess Cycle work in Y12. Picking up where students left off to consider more complex cases	Multi step problems. Calculations involving unit conversion and use of more than one learnt equation
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Three	Organic Chemistry (This topic spans across 2 half terms)	Optical isomerism Reducing aldehydes and ketones Extending chains with KCN Esterification reactions and esters Amines, Anhydrides and Acyl chlorides Practical synthesis of Aspirin and a volatile ester.	Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification Accurate measurement of substances using a variety of equipment including titration Safe handling of corrosive and toxic chemicals Presenting and interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods Mathematical skills, including changing the subject of an equation, multi-step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using standard form, fractions and working with powers.	Confusion between optical isomers and other forms of isomerism. Confusion between the reduction and oxidation of alcohols, aldehydes and ketones	This unit continues on directly from the year 12 Organic Chemistry unit. Students will study a number of more complex mechanisms and extend their knowledge of organic compounds with a wide range of additional functional groups. Finally, continuing on from the work that they have done on Mass Spec and IR Spectroscopy, they will consider how NMR and chromatography can also be used to identify compounds.	Complex organic synthesis, involving multiple mechanisms
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Four	Organic Chemistry (This topic spans across 2 half terms)	Aromatic Bonding Electrophilic Substitution Condensation Polymers, DNA, amino acids and enzymes	Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification Accurate measurement of substances using a variety of equipment including titration	Confusion with the term aromatic - and its use relating to electron distribution - students often assume it is a synonym for volatile. Confusion between addition	This unit continues on directly from the year 12 Organic Chemistry unit. Students will study a number of more complex mechanisms and extend their knowledge of organic compounds with a wide range of	Complex organic synthesis, involving multiple mechanisms

		Advanced analysis including NMR and Chromatography	<p>Safe handling of corrosive and toxic chemicals</p> <p>Presenting and interpreting data in graphical and tabular form</p> <p>Extended writing, including producing formal lab write ups with references and citations</p> <p>Following written methods</p> <p>Mathematical skills, including changing the subject of an equation, multi-step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using standard form, fractions and working with powers.</p>	and condensation polymerisation	<p>additional functional groups.</p> <p>Finally, continuing on from the work that they have done on Mass Spec and IR Spectroscopy, they will consider how NMR and chromatography can also be used to identify compounds.</p>	
SMSC & British Values	<p>The importance of working safely and respecting each other in the lab</p> <p>The importance of disposing of chemical waste in an environmentally friendly and sustainable way.</p>					
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Five	<p>Revision and preparation for A-Level exams</p> <p>Revisit to subject knowledge from across the course & use of PLC to ensure that students have a good grasp of all aspects of the specification</p> <p>Use of retrieval quizzes and activities to identify gaps in SK and misconceptions</p> <p>Support students in developing summary notes, flash cards etc to aid retrieval of key facts</p> <p>Ensure that students have the necessary skills for effective revision</p> <p>CPAC</p> <p>Ensure that CPAC evidence is in place for all students for all required practical work</p>					
Six	<p>Revision and preparation for A-Level exams</p> <p>Focus on past exam questions and papers – command words and application of knowledge</p> <p>Practice the application of knowledge that draws upon the practical aspects of the course</p> <p>Timed completion of questions to support with pace through the exam paper</p> <p>SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers</p>					

