

# Long Term Plan: Chemistry Year 13 (Teacher Two)

Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Link to subject ethos and driver (rename)	Anticipated misconceptions	Links to previous KS	Opportunity for stretch for high prior attainers	SMSC & British Values	Cultural Capital	Career Link
One	Physical Chemistry - Thermodynamics and pH	<p>Born-Haber Cycles</p> <p>Gibbs free energy</p> <p>Bronsted-Lowry definition of an acid</p> <p>Ionic Product of water and pH</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification</p> <p>Accurate measurement of substances using a variety of equipment including titration</p> <p>Safe handling of corrosive and toxic chemicals</p>		<p>Difficulty changing the subject of an equation</p> <p>Unit conversion errors</p> <p>Confusion between <math>\Delta H</math>, <math>\Delta G</math> and <math>\Delta S</math>.</p>	<p>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.</p> <p>The energy side of this topic builds on from calorimetry and Hess Cycle</p>	<p>Multi step problems.</p> <p>Calculations involving unit conversion and use of more than one learnt equation</p>	<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>	<p>The ubiquity of chemistry allows examples to be placed in a wide variety of familiar and unfamiliar contexts.</p>	<p>As the central science, chemistry opens doors to a wide range of STEM field careers.</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>			<p>work in Y12. Picking up where students left off to consider more complex cases</p>				
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Two	Physical Chemistry - Thermodynamics and pH	<p>The Dissociation Constant</p> <p>Experimental determination of <math>K_a</math></p> <p>pH curves, including advanced titration</p> <p>Buffer solutions</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification</p> <p>Accurate measurement of substances using a variety of equipment including titration</p> <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</p>		<p>Difficulty changing the subject of an equation</p> <p>Unit conversion errors</p>	<p>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.</p> <p>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</p>	<p>Multi step problems.</p> <p>Calculations involving unit conversion and use of more than one learnt equation</p>	<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>	<p>The ubiquity of chemistry allows examples to be placed in a wide variety of familiar and unfamiliar contexts.</p>	<p>As the central science, chemistry opens doors to a wide range of STEM field careers.</p>
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			<p>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>							
Three	Organic Chemistry	<p>Optical isomerism</p> <p>Reducing aldehydes and ketones</p> <p>Extending chains with KCN</p> <p>Esterification reactions and esters</p> <p>Amines, Anhydrides and Acyl chlorides</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification</p> <p>Accurate measurement of substances using a variety of equipment including titration</p> <p>Safe handling</p>		<p>Confusion between optical isomers and other forms of isomerism.</p> <p>Confusion between the reduction and oxidation of alcohols, aldehydes and ketones</p>	<p>This unit continues on directly from the year 12 Organic Chemistry unit.</p> <p>Students will study a number of more complex mechanisms and extend their knowledge of organic compounds with a wide range of additional</p>	<p>Complex organic synthesis, involving multiple mechanisms</p>	<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>	<p>The ubiquity of chemistry allows examples to be placed in a wide variety of familiar and unfamiliar contexts.</p>	<p>As the central science, chemistry opens doors to a wide range of STEM field careers.</p>

		<p>Practical synthesis of Aspirin and a volatile ester.</p>	<p>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>			<p>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>				
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Four	Organic Chemistry	<p>Aromatic Bonding</p> <p>Electrophilic Substitution</p> <p>Condensation Polymers, DNA, amino acids and enzymes</p> <p>Advanced analysis including NMR and Chromatography</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out synthesis and purification</p> <p>Accurate measurement of substances using a variety of equipment including titration</p> <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</p>		<p>Confusion with the term aromatic - and its use relating to electron distribution - students often assume it is a synonym for volatile.</p> <p>Confusion between addition and condensation polymerisation</p>	<p>This unit continues on directly from the year 12 Organic Chemistry unit.</p> <p>Students will study a number of more complex mechanisms and extend their knowledge of organic compounds with a wide range of 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>	Complex organic synthesis, involving multiple mechanisms	<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>	The ubiquity of chemistry allows examples to be placed in a wide variety of familiar and unfamiliar contexts.	As the central science, chemistry opens doors to a wide range of STEM field careers.
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			<p>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>							
Five	Revision of content covered in preparation for AS Exams									
Six	Revision of content covered, and sitting of AS Exams									