


<h2>Year 13 Chemistry</h2>	<p>Curriculum Intent: Year 13 Chemistry builds further on the concepts and knowledge developed in year 12. Organic chemistry moves into aromatic compounds, nitrogen containing compounds and advanced organic synthesis. Students prepare and analyse organic compounds. Multi-step synthesis problems bring together all the knowledge of organic reactions. Spectroscopy is used in more detail, bringing understanding of IR and mass spec from year 12 and combining it with ^1H and ^{13}C nuclear magnetic resonance spectroscopy. In physical chemistry, mathematical concepts such as the rate equation, equilibrium constants, acid dissociation and pH build on the concepts developed more qualitatively in year 12. Entropy and Gibb's free energy build on the understanding of enthalpy from year 12. Inorganic chemistry focuses on transition elements and redox, using half equations and standard electrode potentials to predict and explain redox processes. This includes redox titration and analysis. The whole body of knowledge comes together in the final stages to tackle problems that cut across all areas of chemistry and prepare the students for the challenge of the final examinations.</p>					
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key ideas	<p>Module 5</p> <ul style="list-style-type: none"> Recap of benzene and Born-Haber Entropy and Gibbs free energy Transition metals <p>Module 6</p> <ul style="list-style-type: none"> Phenols Carbonyl compounds Carboxylic acids and esters Acyl chlorides 	<p>Module 5</p> <ul style="list-style-type: none"> Redox and redox titrations Electrochemical cells Rates and the rate equation <p>Module 6</p> <ul style="list-style-type: none"> Revision for PPE preparation 	<p>Module 5</p> <ul style="list-style-type: none"> Rates and the rate equation- PAGs <p>Module 6</p> <ul style="list-style-type: none"> Chromatography IR, mass spec and NMR 	<p>Module 5</p> <ul style="list-style-type: none"> Equilibrium and equilibrium constants Lowry-Bronsted acid base reactions pH <p>Module 6</p> <ul style="list-style-type: none"> Combined techniques of analysis Nitrogen containing compounds Condensation polymers Chirality and optical isomerism 	<p>Module 5</p> <ul style="list-style-type: none"> Buffer solutions Neutralisation and titration curves <p>Module 6</p> <ul style="list-style-type: none"> Reactions of nitriles <p>REVISION AND EXAM PREPARATION</p>	A LEVEL EXAMINATIONS

<p>Sequence of Learning (taught by 2 teachers)</p>	<p>Module 5</p> <ul style="list-style-type: none"> • Entropy as a measure of disorder • Gibbs free energy equation and calculations • Transition elements, testing for ions • TM complexes and ligands • Ligand substitution • Isomerism in TM complexes <p>Module 6</p> <ul style="list-style-type: none"> • Phenols and comparison to benzene reactivity • Reactions of phenols • Carbonyl compounds – features and testing with 2,4 DNPH and tollen’s reagent. • Nucleophilic addition to carbonyls and reduction to alcohols using NaBH₄ 	<p>Module 5</p> <ul style="list-style-type: none"> • Redox half equations and balancing redox equations • Redox titrations and extended calculations • Electrochemical series and standard electrode potentials • Redox processes in electrochemical cells • Storage cells and H fuel cells <p>Module 6</p> <ul style="list-style-type: none"> • Carboxylic acids and reactions • Esterification and hydrolysis of esters • Use of acyl chlorides in esterification • Nitriles and their use in synthesis to extend the carbon chain 	<p>Module 5</p> <ul style="list-style-type: none"> • Rates of reaction - the rate equation • Orders of reaction and deducing the rate equation • Initial rates methods • Continuous monitoring method • Suggesting 2-step mechanisms and rate-determining step <p>Module 6</p> <ul style="list-style-type: none"> • Chromatography – Paper, TLC and gas chromatography • Spectroscopic techniques –IR, mass spec and NMR • ¹H NMR and ¹³CNMR 	<p>Module 5</p> <ul style="list-style-type: none"> • Equilibrium and the equilibrium constant • Kc and Kp calculations • Lowry-Bronsted acid base theory • Calculating pH of strong acids and alkalis • The ionic product of water • Calculating pH of weak acids <p>Module 6</p> <ul style="list-style-type: none"> • Using combined techniques to identify compounds • Amino acids and peptide links • Condensation polymers including polyesters and polyamides • Chirality and optical isomerism in organic molecules 	<p>Module 5</p> <ul style="list-style-type: none"> • Buffer solutions and buffer calculations • Neutralisation curves, selecting indicators for titrations <p>Module 6</p> <ul style="list-style-type: none"> • Nitrogen containing compounds – amines, amides • Synthesis of aliphatic and aromatic amines 	
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Vocabulary	The list of key words is too numerous for inclusion here. The recommended course textbook provides a complete Glossary of key words					
Practical Skills	PAG TASKS: 6.2 – Preparation of benzoic acid	PAG TASKS: 6.1 – Synthesis of aspirin 8.1 – Electrochemical cells 1	PAG TASKS: 9.1 – Rate of decomposition of hydrogen peroxide 9.2 – The rate of reaction of calcium carbonate and hydrochloric acid 9.3 – The rate of reaction of magnesium and hydrochloric acid 10.1 – Rates – Iodine clock 10.2 – Rates – Thiosulfate and acid 10.3 – Rates – Activation energy	PAG TASKS: 11.1 – pH problem solving 11.2 – pH titration curves		