


Year 13 Chemistry	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.						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	
Key ideas	<ul style="list-style-type: none"> • Re cap of benzene and Born-Haber • Entropy and Gibbs free energy • Transition metals • Phenols • Carbonyl compounds 	<ul style="list-style-type: none"> • Redox and redox titrations • Electrochemical cells • Carboxylic acids and esters • Acyl chlorides • Reactions of nitriles 	<ul style="list-style-type: none"> • Chromatography • IR, mass spec and NMR • Rates and the rate equation 	<ul style="list-style-type: none"> • Combined techniques of analysis • Equilibrium and equilibrium constants • Nitrogen containing compounds • Condensation polymers • Chirality and optical isomerism • Lowry-Bronsted acid base reactions • pH 	<ul style="list-style-type: none"> • Nitrogen containing compounds • Buffer solutions • Neutralisation and titration curves 	A LEVEL EXAMINATIONS	
Sequence of Learning -	<ul style="list-style-type: none"> • Entropy as a measure of disorder 	<ul style="list-style-type: none"> • Redox half equations and 	<ul style="list-style-type: none"> • Chromatography – Paper, TLC and gas 	<ul style="list-style-type: none"> • Using combined techniques to 	<ul style="list-style-type: none"> • Nitrogen containing compounds 		

	<ul style="list-style-type: none"> Gibbs free energy equation and calculations 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 Transition elements, testing for ions TM complexes and ligands Ligand substitution Isomerism in TM complexes 	<p>balancing redox equations</p> <ul style="list-style-type: none"> Redox titrations and extended calculations Electrochemical series and standard electrode potentials Redox processes in electrochemical cells Storage cells and H fuel cells 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>chromatography</p> <ul style="list-style-type: none"> Spectroscopic techniques –IR, mass spec and NMR ¹H NMR and ¹³CNMR 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>identify compounds</p> <ul style="list-style-type: none"> Amino acids and peptide links Condensation polymers including polyesters and polyamides Chirality and optical isomerism in organic molecules 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>– amines, amides</p> <ul style="list-style-type: none"> Synthesis of aliphatic and aromatic amines Buffer solutions and buffer calculations Neutralisation curves, selecting indicators for titrations 	
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:	PAG TASKS:	PAG TASKS:	PAG TASKS:		

		6.1 – Synthesis of aspirin 6.2 – Preparation of benzoic acid 8.1 – Electrochemical cells 1	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	11.1 – pH problem solving 11.2 – pH titration curves		
Assessment (Related to mastery grids)	Exam style assessments at regular points throughout the course	Exam style assessments at regular points throughout the course	Exam style assessments at regular points throughout the course YEAR 13 PPE	Exam style assessments at regular points throughout the course		SUMMER A LEVEL EXAMINATIONS