

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content	<u>Thermodynamics</u>	<u>Aromatic Chemistry</u>	<u>NMR and Chromatography</u>	<u>Amino Acids</u>	<u>Revision</u>	
Knowledge	<p>Please see Y12 Curriculum Map</p> <p><u>Carboxylic Acids</u></p> <p>Content:</p> <ul style="list-style-type: none"> - Carboxylic Acids - Esters - Acyls <p>Knowledge:</p> <ul style="list-style-type: none"> - Naming Esters and Carboxylic Acids - Know some common uses of Esters - Different ways to hydrolyse esters - Name some common acyls - Recall the mechanism for acylation <p>Required Practical:</p> <ul style="list-style-type: none"> - Preparation of Aspirin - Preparation of an ester <p><u>Kinetics</u></p> <p>Content:</p> <ul style="list-style-type: none"> - Measuring the rate of a reaction - Rate equation - Rate constant 	<p>Content:</p> <ul style="list-style-type: none"> - Benzene - Aromatic Compounds - Common reactions of Benzene <p>Knowledge:</p> <ul style="list-style-type: none"> - Describe the bonding in Benzene - Name some common aromatic compounds - Understand why benzene is more stable than cyclohexa-1,3,5-triene - Draw the mechanism for electrophilic substitution - Draw the mechanism for Friedel's craft acylation <p><u>Amines</u></p> <p>Content:</p> <ul style="list-style-type: none"> - Properties of Amines - Making Amines <p>Knowledge:</p> <ul style="list-style-type: none"> - Be able to name amines - Describe the uses of quaternary 	<p>Content:</p> <ul style="list-style-type: none"> - Hydrogen NMR (Nuclear Magnetic Resonance) - Carbon NMR - TLC (Thin Layer Chromatography) - GC (Gas Chromatography) <p>Knowledge:</p> <ul style="list-style-type: none"> - Be able to use NMR to identify the structure of a molecule - Be able to set up a TLC practical - Calculate R_f of a mixture - Compare retention times of unknown chemicals with known retention times to identify molecules <p>Required Practical:</p> <ul style="list-style-type: none"> - Carry out TLC <p><u>Electrochemical Cells</u></p> <p>Content:</p> <ul style="list-style-type: none"> - Half Cells - Calculating E_{cell} - Describing test tube reactions - Lithium Ion cell - Fuel Cells 	<p>Content:</p> <ul style="list-style-type: none"> - Peptides - Proteins - Enzymes - DNA - Anti-Cancer drugs <p>Knowledge:</p> <ul style="list-style-type: none"> - Be able to draw amino acids - Be able to separate mixtures of amino acids - Know how to locate amino acids - Be able to draw peptides - Know primary, secondary and tertiary structure of proteins - Understand the action of enzymes - Understand the structure of DNA - Explain how Cis-Platin works <p><u>Transition Metals</u></p> <p>Content:</p> <ul style="list-style-type: none"> - General properties - Complexes of transition metals 	<ul style="list-style-type: none"> - To focus on recapping key knowledge and re-address common misconceptions - Embed additional exam practice for each chapter - Focus on key aspects of required practicals 	

	<ul style="list-style-type: none"> - Order of reactions - Rate determining step - Factors affecting the rate of reactions - Arrhenius Equation <p>Knowledge:</p> <ul style="list-style-type: none"> - Know the meaning of rate of reaction - Deduce the rate of reaction from a concentration time graph - Derivative the rate equation from a chemical reaction - Perform rate equation calculations - Identify the rate limiting step of a mechanism <p>Required Practical:</p> <ul style="list-style-type: none"> - Measuring the initial rate of a reaction - Measuring continuous rates of a reaction 	<ul style="list-style-type: none"> - ammonium salts - Describe the differences in strengths between different amines - Draw the mechanism of nucleophilic substitution - Draw the mechanism for nucleophilic addition-elimination <p>Equilibrium</p> <p>Content:</p> <ul style="list-style-type: none"> - Partial Pressures - Equilibrium constant K_p - Factors affecting equilibrium <p>Knowledge:</p> <ul style="list-style-type: none"> - To know Dalton's law of partial pressure - Be able to calculate the mole fraction - Be able to calculate units for K_p - Describe how changing the conditions of a reaction change the position of equilibrium <p>Acids and Bases</p> <p>Content:</p> <ul style="list-style-type: none"> - Acids and Bases - pH calculations - K_a Calculations - Ionic Product of Water - Buffer Solutions - Titration Curves - Back Titrations 	<p>Knowledge:</p> <ul style="list-style-type: none"> - Set up a simple cell - Draw a simple cell - Describe electrode potential - Calculating Ecell - Writing RedOx equations - Describe the purpose of fuel cells - Be able to write half equations for fuel cells <p>Required Practical:</p> <ul style="list-style-type: none"> - Electrochemical cells 	<ul style="list-style-type: none"> - Ligand exchange reactions <p>Knowledge:</p> <ul style="list-style-type: none"> - Be able to write electronic configuration for any transition metal - Draw the 3D configuration of transition metal complexes - Appreciate how the colour of the transition metal compound can be affected by multiple factors - Know the uses of transition metals as catalysts <p>Polymers</p> <p>Content:</p> <ul style="list-style-type: none"> - Formation of Polymers - Disposal of polymers <p>Knowledge:</p> <ul style="list-style-type: none"> - Be able to draw polymers - Disposal of polymers <p>Content:</p> <ul style="list-style-type: none"> - Know how to carry out condensation polymers - Be able to recognize some common polymers - Be able to draw repeating units - Know the different ways to 		
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Skills	<ul style="list-style-type: none"> • Identifying functional groups • Measuring the boiling point of an ester • Writing balanced equations for the formation of 	<ul style="list-style-type: none"> • Be able to use thermochemical evidence to explain the extra stability of the benzene ring • Recognize the structures of amines • Predict the 	<ul style="list-style-type: none"> • Be able to use infrared spectroscopy data, mass spectroscopy data and NMR to identify an organic molecule • Be able to carry out TLC • Evaluate the uses of 	<ul style="list-style-type: none"> • Appreciating the links with biology • Be able to identify the monomers of unknown polymers • Evaluate the uses and 	<ul style="list-style-type: none"> • Recalling important information • Exam Technique • Spacing • Interleaving • Elaboration 	

	<ul style="list-style-type: none"> biodiesel from triglycerides Successfully measure the rate of a reaction Following a given method and adapting it for the experiment Writing a risk assessment Carry out a reflux experiment 	<p>qualitative effects of change in temperature on the position of equilibrium and K_p</p> <ul style="list-style-type: none"> Understand and sketch the typical shapes of pH curves Be able to carry out a titration 	<ul style="list-style-type: none"> fuel cells in industry Be able to carry out an electrochemical cell practical 	<p>disposal of polymers</p> <ul style="list-style-type: none"> Use the reactions in the specification to form an unknown molecule Be able to identify transition metals from chemical tests 	<ul style="list-style-type: none"> Time management 	
Key Questions	<p>Why do reactions happen?</p> <p>Why are some compounds more stable than others?</p> <p>How can we increase the speed of a chemical reaction?</p>	<p>How do we make aspirin?</p> <p>How do we make sure that many industrial processes are carried out safely?</p> <p>Why is it important that we do not confuse acids and bases in industry and the home?</p>	<p>How do we deduce the structure of an unknown compound?</p> <p>How do we power our portable devices such as laptops and mobile phones?</p>	<p>How is DNA formed?</p> <p>How do some chemotherapy drugs work?</p>		
Assessment	<p>UCAS Retake Exam</p> <p>End of Topic Assessments</p> <p>CPAC's for practicals</p>	<p>End of Topic Assessments</p> <p>CPAC's for practicals</p>	<p>Year 13 Mocks</p> <p>End of Topic Assessments</p> <p>CPAC's for practicals</p>	<p>End of Topic Assessments</p> <p>CPAC's for practicals</p>	<p>Year 13 A-Level Exams</p>	
Literacy/numeracy/SMSC/Character	<p>Numeracy:</p> <ul style="list-style-type: none"> - Calculations present in Thermodynamics Chapter - Reading a scale - Constructing a results table - Data analysis - Construction of a tangent - Calculations of rate <p>Keywords: continuous, monitoring, rate constant, initial rate, tangent, order, rate-determining step, arrhenius</p>	<p>Numeracy:</p> <ul style="list-style-type: none"> - Calculations of equilibrium constants - Calculation of partial pressures - Calculation of mole fractions - Use of appropriate significant figures - Calculation of pH of acids - Calculation of pH of bases - Carry out buffer calculations - Carry out titration calculations <p>Keywords: partial pressure,</p>	<p>Numeracy:</p> <ul style="list-style-type: none"> - Calculate R_f value - Calculating E_{cell} - Balancing RedOx equations - Reading scales - Recording data in tables - Data analysis <p>Keywords: RedOx, half-cell, salt bridge, electrode potential, electrochemical series, fuel cell, multiplets, splitting patterns, mobile, stationary, chromatography, R_f</p> <p>SMSC:</p> <ul style="list-style-type: none"> - Appreciate that 	<p>Numeracy:</p> <ul style="list-style-type: none"> - Be able to balance complex chemical equations - Be able to calculate the energy required to excite an electron <p>Keywords: Peptides, Proteins, Enzymes,</p> <p>SMSC</p> <ul style="list-style-type: none"> - Cross curriculum links with Biology. - Students understand how we form new drugs to 		

	<p>SMSC: - Students working together to successfully carry out a practical - Students able to identify risks and work safely</p>	<p>mole fraction, equilibrium constant, dissociation, ionic product, pH scale, monoprotic acid, base, diprotic acid, pH curve, indicators, buffer, amines, benzene</p> <p>SMSC: - Appreciate nitration of benzene is an important step in the manufacture of explosives - Appreciate the use of amines in dyes - Work together to carry out a practical - Be able to identify risks and work safely</p>	<p>electrochemical cells can be used as a commercial source of electrical energy - Appreciate the benefits and risks to society associated with the use of these cells - Work together to carry out a practical - Be able to identify risks and work safely</p>	<p>target specific illnesses - Appreciate that computers can be used to help design such drugs - Appreciate that society needs to assess the balance between the benefits and the adverse effects of drugs</p>		
<p>Enrichment opportunities and futures</p>	<p>Visiting UCL for Science Lectures Summer Fayre at Royal Institute of Chemistry Royal Institution Videos Anaesthesia Heritage Centre Wellcome collection</p>					