Space Studio West London
an Aspirations Academy

Chemistry- Curriculum Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 10 curriculum overview	C1 - Atomics structure C2 - The periodic table	C3 - Structure and bonding C7 - Energy changes	C4 - Chemical calculations	C5 - Chemical changes C6 - Electrolysis C8 - Rates and equilibrium	C8 - Rates and equilibrium C9 - Crude oil and fuels C10 - Organic reactions	C10 - Organic reactions C11 - Polymers
Key knowledge outcomes (students should know)	• Matter is made of atoms containing subatomic particles • Chemical reactions can be described by equations and these can be word or symbol • Mixtures can be separated using a variety of techniques. • Theories of the atom have changed over time. • Electrons have set structures for atoms and these determine chemical properties. • The periodic table was developed over time. • The periodic table relates to electronic structure and can be used to link elements	• RPA 4 - Investigating energy changes • Matter is described using the particles model • Atoms can be changed into ions by changing the number of electrons. • Atoms can bond together by changing into ions. • Ionic bonds can form simple or giant structures, these have different properties. • Atoms can bond by sharing electrons. • Covalent bonds can form simple or giant structures with different properties. • Metals can bond together and form	• RPA 2 - Titration • Atoms and compounds have a relative mass and this can be described by moles to determine the amount. • Chemical symbol equations are balanced. • Chemical equations can be used to determine the quantity of reactants and products of a reaction. • Reactions have a yield and this is related to the economy of used atoms. • Concentrations are expressed mathematically. • Titrations are used to	• RPA 1 - Preparing a salt • RPA 3 - Investigating electrolysis • Different elements have different reactivity, this is described in the reactivity series • More reactive elements will displace less reactive elements. • Salts can be created through reactions between metals and non metals. • Acids and alkalis properties and neutralisation. • Acids have different strengths and this is described by the pH scale. • Ionic compounds can	• RPA 5 - investigating rates of reactions • Chemical reactions can be reversible. • Energy affects reversible reactions and what reaction is favoured. • Reversible reactions reach an equilibrium. • Conditions affecting equilibrium can favour the direction of a reaction. • Oil is made of hydrocarbons. • Hydrocarbons are separated using fractional distillation. • Hydrocarbon burn in combustion reactions. • Hydrocarbons can be cracked into smaller hydrocarbons that	• Chemical reactions involving alcohols • How to make esters. • Plastics and how they are made of polymers. • Different forms of polymerisation. • Natural polymers and how this applies to chemical reactions in biology. • The structure of DNA.

	and properties. • The reactions and properties of the group 1 elements. • The reactions and properties of the group 7 elements. • Transition metals properties and formation of ions.	alloys. • Nanoparticles can be manufactured with large surface area to volume ratios. They can be applied to a range of applications. • Reactions can release or absorb energy overall. • Reactions can be described by reaction profile diagrams. • Energy release can be calculated using bond energies. • Chemical reactions can generate electricity in batteries and fuel cells.	determine unknown acids/alkalis. • Volume and mass of gas are related at constant conditions. • Gas volumes can be used in chemical calculations.	be separated by electrolysis • Metals can be extracted from ores using electrolysis • Electrolysis can be used to separate ionic compounds in aqueous solutions. • Reactions happen at different rates and are affected by different factors. • Collision theory and how it determines the rate of reaction.	are more useful. • Hydrocarbons can be formed into alkanes and alkenes. • Other organic molecules including esters, alcohols and carboxylic acid	
Key skills (students should be able to)	• Drawing electronic structures. • Extended writing; describing trends, practical methods for separating techniques. • Balancing chemical equations.	• Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs. • Extended writing; practical methods, history of the atom.	• Mathematical skills - substitution, rearranging equations, standard form, multistep calculations and unit conversions. • Balancing chemical equations. • Applying moles to chemical equations. • Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs.	• Mathematical skills - substitution, rearranging equations, standard form, multistep calculations and unit conversions. • Balancing chemical equations. • Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs. • Extended writing; practical methods.	• Mathematical skills - substitution, rearranging equations, standard form, multistep calculations and unit conversions. • Balancing chemical equations. • Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs. • Extended writing; practical methods.	• Extended writing; describing trends, practical methods for separating techniques. • Balancing chemical equations. • Graphical skills - plotting scatter graphs, lines of best fit. • Drawing chemicals.

			• Extended writing; practical methods.			
Year 11 curriculum overview	C8 - Rates and equilibrium C9 - Crude oil and fuels C10 - Organic reactions C11 - Polymers	C12 - Chemical analysis C14 - The earth's resources	C15 - Using our resources	Exam practice	Exam Practice	N/A
Key knowledge outcomes (students should know)	• Reactions happen at different rates and are affected by different factors. • Collision theory and how it determines the rate of reaction. • RPA 5 - investigating rates of reactions • Chemical reactions can be reversible. • Energy affects reversible reactions and what reaction is favoured. • Reversible reactions reach an equilibrium. • Conditions affecting equilibrium can favour the direction of a reaction. • Oil is made of hydrocarbons. • Hydrocarbons are separated using	• RPA 6 - calculating R_f values • RPA 7 - chemical tests to identify compounds • RPA 8 - Purify and test water • Pure substances and mixtures • How to create a chromatogram and common errors in chromatography • The different tests to identify gases • The different tests to identify positive and negative ions • Resources can be finite and renewable • The process of making water safe for drinking • How waste water is treated so it is safe to	• How rusts forms and how we can protect materials from rusting • Examples of different alloys and their applications • Polymers and their properties. Polymers can be thermosoftening or thermosetting. • Examples of different materials and properties such as glass, ceramics and composites • The Haber process and making fertiliser • How to maximise the Haber process. • Making fertilise in a lab and in industry.	• Feedback from PPE's. • Content from all units. • Recap of practical methods.	• Content from all units. • Recap of practical methods.	N/A

	fractional distillation. • Hydrocarbon burn in combustion reactions. • Hydrocarbons can be cracked into smaller hydrocarbons that are more useful. • Hydrocarbons can be formed into alkanes and alkenes. • Other organic molecules including esters, alcohols and carboxylic acid • Chemical reactions involving alcohols • How to make esters. • Plastics and how they are made of polymers. • Different forms of polymerisation. • Natural polymers and how this applies to chemical reactions in biology. • The structure of DNA.	enter the environment • How to extract metals from ores • How products are assessed over their lifespan for environmental impact • How materials are recycled and the benefits of recycling.				
Key skills (students should be able to)	• Mathematical skills - substitution, rearranging equations, standard form, multistep calculations and unit conversions. • Balancing chemical	• Balancing chemical equations. • Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs. • Extended writing;	• Graphical skills - plotting scatter graphs, lines of best fit. • Interpreting graphs. • Extended writing; practical methods.	• Answering simple mathematical questions based on substitution. • Answering multistep mathematical questions involving rearrangement.	• Answering simple mathematical questions based on substitution. • Answering multistep mathematical questions involving rearrangement.	N/A

	equations. ● Graphical skills - plotting scatter graphs, lines of best fit. ● Interpreting graphs. ● Extended writing; practical methods. ● Drawing chemicals.	practical methods.		● Answering mathematical questions involving standard form and unit conversion. ● Answering extended mathematical questions with multiple equations and skills. ● Answering short exam questions based on knowledge. ● Answering extended questions of a topic in sustained long answers. ● Answering questions that link topics in both mathematics and extended writing. ● Interpreting data/graphs and how to answer questions based on unknown data. ● Answering balanced chemical equations.	● Answering mathematical questions involving standard form and unit conversion. ● Answering extended mathematical questions with multiple equations and skills. ● Answering short exam questions based on knowledge. ● Answering extended questions of a topic in sustained long answers. ● Answering questions that link topics in both mathematics and extended writing. ● Interpreting data/graphs and how to answer questions based on unknown data. ● Answering balanced chemical equations.	

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KS5 Chemistry (SCIENCE) - Curriculum Plan 26/27

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 12 curriculum overview	GCSE into Yr12 Transition Chemistry Chapter 2 :Atoms , ions and compounds Chapter 3 : amount of substance Chapter 4 : Acids and Redox Chapter 5 : Electrons and bonding	Chapter 6 : Shapes molecules and Intermolecular forces Chapter 6 : Shapes molecules and Intermolecular forces Revision Module 2 Chp2-6 Chapter 7 : Periodicity Chapter 8 : reactivity trends Chapter 9 : Enthalpy Chapter 9 : Enthalpy	Chapter 10 : Rates and equilibrium Chapter 10 : Rates and equilibrium Module 3 Revision Module 3 Revision 2 & 3 PAG Module 2 & 3 PAG Module 2 & 3 Revsion	Chapter 11 : Basic Concepts of organic Chemistry Chapter 11 : Basic concepts of organic Chemistry Chapter 12 : Alkanes Chapter 13 : Alkenes Chapter 14 : Alcohols Chapter 14 : Alcohols	Chapter 15 : Haloalakanes Chapter 16 : Organic Synthesis Chapter 17 : Spectroscopy	Module 4 PAG Module 4 PAG AS Revision AS Revision A 2 Introduction A2 Introduction PAG Revision AS
PAG	PAG 1 : Moles determination 1.1	Pag 4 : Qualitative Analysis 4.1- 4.3 :	No PAG	Pag 5.3 : Oxidation	PAG 5 Synthesis 5.1 : Synthesis of	

	Composition of CuCO3 , 1.2 :RAM of Mg, 1.3 : Formula of MgO PAG 2 : Acid base titration 2.1 : Find conc of HCl , 2.2 : Mr of acid , 2.3 : identify unknown carbonate	Identifying unknowns PAG 3 : Enthalpy 3.1 : enthalpy of neutralisation 3.2 : Hess Law 3.3 : Enthalpy of combustion		of Alcohols	haloalkane5.2 : Synthesis of cyclohexene	
Key knowledge outcomes (students should know)	Understand atomic structure, isotopes, electron configuration and periodicity. Apply the mole concept, empirical and molecular formulae, balanced equations, redox reactions, acids and bonding theories.	Understand molecular shapes, intermolecular forces, periodic trends, Group 2 chemistry, halogens, qualitative analysis and enthalpy changes.	Understand collision theory, reaction rates, catalysts, Boltzmann distribution and dynamic equilibrium.	Understand homologous series, functional groups, nomenclature, alkanes, alkenes and alcohols.	Understand haloalkanes, nucleophilic substitution, elimination, organic synthesis and spectroscopic analysis.	Consolidate AS Chemistry content through revision, practical endorsement and preparation for Yea
Key skills (students should be able to)	Perform mole calculations, write balanced and ionic equations, calculate empirical and molecular formulae, assign oxidation numbers, predict bonding and explain physical properties using bonding models.	Predict molecular geometry using electron pair repulsion theory, explain trends in reactivity, identify ions using qualitative tests, calculate enthalpy changes and construct Hess cycles.	Calculate reaction rates, interpret rate graphs, explain factors affecting reaction rate, apply Le Chatelier's Principle and evaluate experimental investigations.	Name and draw organic compounds, identify functional groups, explain free radical substitution and electrophilic addition mechanisms, predict products of	Construct reaction pathways, explain substitution and elimination mechanisms, interpret infrared spectra and mass spectra, identify unknown organic compounds.	Apply knowledge synoptically, complete OCR PAG practicals independently, analyse experimental data and answer extended-respon se examination questions.

				organic reactions.		
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Year 13 curriculum overview	Chapter 18 :Rates of Reactions Chapter 18 :Rates of Reactions Chapter 19 :Equilibrium Chapter 19 : Equilibrium Chapter 20 : Acids bases and pH Chapter 21: Buffers and neutralisation	Chapter 22 : Enthalpy and entropy Chapter 22 : Enthalpy and entropy Chapter 23 : Redox and electrode potential Chapter 23 : Redox and electrode potential Chapter 24 : Transition metals Chapter 24 : Transition metals Module 5 Revision	Chapter 25 : Aromatic Chemistry Chapter 25 : Aromatic Chemistry Chapter 26 : Carbonyls and Carboxylic acids Chapter 26 : Carbonyls and Carboxylic acids Chapter 27 : Amines , amino acids and proteins Chapter 27 : Amines , amino acids and proteins	Chapter 28 : Organic Synthesis Chapter 29 : Spectroscopy Chapter 29 : Spectroscopy Module 6 Revsion Module 5 & 6 Revsion Module 5 & 6 Revsion	Revision & Exam prep	Revision & Exam prep
PAG	PAG 9.1 Rate of	PAG 8.1 : Electrochemical cells	PAG 6.1 : synthesis of Aspirin	PAG 7.1-.7.2:	Module 6 exam	

	decomposition of H2O2 AS HO32/01 Exam PAG9.2 :Rate of CaCo3 & HCl AS HO32/02 Exam PAG 9.3 : Rate of Mg & HCl Pag 10.3 Ea Chapter 18 EOTTPAG 11.1 :pH , PAG 11.2 -titration curves Chapter 19 EOTT PAG 11.3 : Acids & buffers	1 PAG 8.2 -8.3 : Electrochemical cells 2 & 3 ,PAG 10.1 : Iodine clock pag 10.2 : Thiosulphate and acid PAG 12.1 : Iron in Iron tablets Pag 12.2 : Cu in brass, PAG 12.3 KMno4 in ethanedioic acid	PAG 6.2 : Synthesis of benzoic acid PAG 6.3 : Prepare methyl 3-nitrobenzoate	Identifying organic unknowns	Paper 1 H432 /01Exam Paper 2 H432/02 exam PAG exam	
Key knowledge outcomes (students should know)	Understand rate equations, reaction order, equilibrium constants (Kc), acids, bases, pH and buffer solutions.	Understand entropy, Gibbs free energy, electrode potentials, electrochemical cells and transition metal chemistry.	Understand aromatic chemistry, benzene, electrophilic substitution, carbonyl compounds and carboxylic acids.	Understand amines, amino acids, proteins, polymers, organic synthesis and spectroscopy.	Consolidate all OCR A Level Chemistry content through structured revision, practical review and examination preparation.	Demonstrate secure understanding of the full OCR Chemistry A specification and Practical Endorsement requirements.
Key skills (students should be able to)	Determine reaction orders from	Construct Born-Haber cycles,	Draw electrophilic substitution	Plan multi-step organic synthesis,	Apply knowledge across physical,	Solve unfamiliar synoptic

	experimental data, calculate Kc, pH and buffer calculations, interpret titration curves and evaluate equilibrium systems.	calculate entropy and Gibbs free energy, predict feasibility using electrode potentials, explain transition metal reactions and perform redox calculations	mechanisms, explain aromatic stability, predict reactions of aldehydes, ketones and carboxylic acids and interpret organic synthesis pathways.	identify compounds using IR, mass spectrometry and NMR spectroscopy, interpret chromatograms and solve synoptic organic chemistry problems.	inorganic and organic chemistry, complete OCR-style examination questions, analyse practical data and evaluate experimental methods.	problems, communicate scientific reasoning clearly, perform advanced calculations accurately and demonstrate independence in practical and examination contexts.