

Year 12: Chemistry

Curriculum Intent: Students follow the two-year OCR A-Level (A) Chemistry specification building on their existing knowledge from GCSE. Year 12 focuses on the foundations in chemistry in the autumn term; atomic structure, structure and bonding, amount of substance, periodic trends and titration. Spring term starts to develop the areas of organic and physical chemistry to prepare for some more difficult concepts. Basic organic nomenclature and reactions of functional groups, reaction mechanisms and synthesis of organic compounds form the majority of what is learnt, with key practical skills and techniques being developed alongside this. This consolidates the base knowledge needed to move onto more complex aromatic chemistry and multi-step synthesis in year 13. In Physical chemistry, concepts such as equilibrium, rates, the Boltzmann distribution and enthalpy are developed beyond the simple understanding from GCSE. This will lead onto more difficult mathematical ideas related to physical chemistry, such as entropy, Gibbs free energy and equilibrium constants.



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Key ideas	<ul style="list-style-type: none"> • Atomic structure • Amount of substance • Structure and bonding 	<ul style="list-style-type: none"> • Neutralisation reactions and titration • Redox • Shapes of molecules • Intermolecular forces • Periodic trends and patterns 	<ul style="list-style-type: none"> • Basic organic nomenclature • Curly arrow mechanisms • Alkanes, alkenes, halogenoalkanes • Group 2 and group 7 • Qualitative analysis • Enthalpy changes 	<ul style="list-style-type: none"> • Hess' Law • Rates and the Boltzmann distribution • Dynamic equilibrium and Le Chatelier's principle • Nucleophilic substitution • Alcohols • IR and Mass Spec 	<ul style="list-style-type: none"> • Rates and enthalpy • Born-Haber cycles • Enthalpy of hydration • Benzene and aromatic compounds • Nitration of benzene 	<ul style="list-style-type: none"> • Exam preparation • PPEs
Sequence of Learning -	<ul style="list-style-type: none"> • Atomic structure, isotopes and formula mass • Electron configurations, spdf notation 	<ul style="list-style-type: none"> • Strong and weak acids • Neutralisation • Acid-base titrations • Shapes of molecules and ions, electron 	<ul style="list-style-type: none"> • Basic organic nomenclature, structural formula, displayed formula, skeletal formula 	<ul style="list-style-type: none"> • Enthalpy change of combustion and formation • Hess' law and enthalpy cycles • Enthalpy change of 	<ul style="list-style-type: none"> • Equilibrium constant and calculations • Born-Haber cycles and lattice enthalpy 	Examination preparation PAG catch-up and round up PPE DIRT

	<ul style="list-style-type: none"> The mole and reacting masses, gas volumes and concentration % yield and atom economy Ionic and covalent bonding, properties of ionic and covalent materials 	<ul style="list-style-type: none"> pair repulsion theory Electronegativity, bond polarity, intermolecular forces including hydrogen bonding Metallic and giant covalent structures Periodicity and explaining trends in ionisation energy and melting point Oxidation numbers and redox reactions 	<ul style="list-style-type: none"> Isomerism and stereoisomerism Alkanes and reactions of alkanes. Combustion and free-radical substitution Alkenes and reactions of alkenes. Curly arrow mechanism for electrophilic addition Halogenoalkanes and the hydrolysis of halogenoalkanes Group 2 and group 7 trends. Reactivity and reactivity of group 2 compounds Qualitative analysis 	<ul style="list-style-type: none"> neutralisations Rates and collision theory, the Boltzmann distribution Dynamic equilibrium and Le Chatelier's principle Nucleophilic substitution of halogenoalkanes Alcohols; classification and properties Oxidation reactions of alcohols using reflux and distillation Analytical techniques; IR and Mass Spectrometry 	<ul style="list-style-type: none"> Enthalpy of hydration Benzene structure and aromatic compounds Electrophilic substitution of benzene Nitration of benzene 	
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: 1.1 – Determination of the composition of copper (II) carbonate	PAG TASKS: 2.1 – Determination of the concentration of hydrochloric acid	PAG TASKS: 4.1 – Identifying unknowns	PAG TASKS: 3.1 – Determination of the enthalpy change of neutralisation	PAG TASKS: 5.2 – Preparation of cyclohexene 6.3 – Nitration of methyl benzoate	PAG TASKS: 12.1 – Investigating iron tablets

