

## KS5 Long Term Curriculum Plan: A LEVEL CHEMISTRY Year 12 2023-2024

**Curriculum Aim:** A level Chemistry attempts to answer the big question ‘what is the world made of’ and its search for this answer that makes this subject so fascinating. From Investigating how one substance can be changed drastically into another, to researching a new wonder drug to save millions of lives, the opportunities that chemistry provides are endless. Throughout the course students will be learning the 3 main areas of chemistry: Physical Chemistry, Inorganic Chemistry and Organic Chemistry. The course prepares students for further study.

**Link to prior learning:** The subject builds on key knowledge and skills from GCSE Sciences, whilst diving deeper into key topics such as atomic structure, amount of substance and bonding.

**Rationale of sequencing:** We begin the course by focusing and developing on essential skills from GCSE on atomic structure and amount of substance. These underpin the content for all other topics covered, thus students learn the essential calculations and knowledge to access the topics later in the course. Throughout all topics we practice essential practical skills. Topics link from one to another, we use continuous recall starters to embed content.

	Focus / Topic	Knowledge & Skills (from NC/Programmes of Study)	Assessment
Autumn 1	<b>Atomic Structure</b> <b>Amount of substance</b>	<p>Students will gain an understanding of:</p> <ul style="list-style-type: none"> <li>• The structure of the atom and how mass spectrometers are used to measure mass of atoms.</li> <li>• The evidence for the arrangement of electrons including sophisticated model of atomic orbitals.</li> <li>• Calculations involving moles, masses, Mr, concentration, and volume.</li> <li>• Revisit ionic, covalent and metallic bonding and introduce intermolecular forces.</li> <li>• Examine forces involved in states of matter and explore shapes of molecules and ions.</li> <li>• Gives an overview of the Periodic Table and classifies blocks of elements.</li> <li>• Studies properties of elements in Period 3.</li> <li>• Describe enthalpy change of combustion and formation quantitatively including Hess’s Law.</li> <li>• Half equations to explain redox reactions in terms of energy transfer.</li> <li>• The trends and patterns in Group 2 elements.</li> </ul> <p>Students develop skills such as reporting calculations to an appropriate number of significant figures and calculations using Avogadro’s constant. Calculate weighted means, empirical formula and interpret/analyse spectra. Students will learn how to make up volumetric solutions and draw diagrams to represent structures. Perform calculations of an enthalpy change.</p>	<p>Paper 1 style exam on all content taught so far. <b>Assessment week (w/b 7<sup>th</sup> Nov 2022)</b></p>
Autumn 2	<b>Bonding</b> <b>Periodicity</b> <b>Energetics</b> <b>Redox</b> <b>Group 2</b>		
Spring 1	<b>Kinetics</b> <b>Introduction to Organic Chemistry</b> <b>Group 7</b> <b>Equilibria</b>	<p>Students will gain knowledge on:</p> <ul style="list-style-type: none"> <li>• Using kinetic theory factors affecting rates of reaction incorporation Maxwell- Boltzmann distribution. The nature of carbon compounds and different types of formulae used to represent compounds.</li> <li>• Using IUPAC naming system to name compounds and looks at types of isomerism.</li> <li>• The trends and patterns in Group 7 elements</li> <li>• Le Chatelier’s Principle to explain the factors that affect the position of equilibrium.</li> </ul> <p>Students develop skills such as draw and interpret distribution curves for different temperatures. Ability to rearrange equations to discover the relationships between variables. Students develop skills such as calculating the concentration of a reagent at equilibrium and the value of an equilibrium constant <math>K_c</math></p>	

Spring 2	Alkanes Alkenes	<p>Students will gain knowledge of:</p> <ul style="list-style-type: none"> <li>• How these compounds are formed, react and their role in depleting the ozone layer.</li> <li>• Crude oil and its fractional distillation, combustion and making smaller alkanes by cracking.</li> <li>• The reactions of these compounds which have one or more double bonds.</li> </ul> <p>Draw structural, displayed and skeletal formulas for given organic compounds.</p>	<p>2 x Year 1 style papers on all content covered to this date. 1 paper per teacher.</p> <p><b>Assessment week (w/b 20<sup>th</sup> Feb 2023)</b></p>
Summer 1	Halogenoalkanes Alcohols Organic Analysis	<p>Students will gain knowledge of:</p> <ul style="list-style-type: none"> <li>• The importance of ethanol and describes the structure and their reactions.</li> <li>• The use of a mass spectrometer.</li> <li>• The use of Infra-red spectroscopy as an important tool for identifying functional groups in organic chemistry.</li> </ul> <p>Students develop skills such as writing half-equations, identifying oxidation and reduction processes in redox reactions and practical skills such as purification by distillation and the tests for alcohols aldehyde, alkene and carboxylic acid.</p>	
Summer 2	Thermodynamics Periodicity Transition metals	<p>Students will gain knowledge of:</p> <ul style="list-style-type: none"> <li>• Feasibility using the Gibbs free energy change.</li> <li>• Trends between periods of the Periodic Table.</li> </ul> <p>How metals have unique chemical structures which give compounds characteristic and useful properties.</p> <p>Students will learn to rearrange the equation <math>\Delta G = \Delta H - T\Delta S</math> to find an unknown.</p>	<p>End of year Mock based on Year 1 content. <b>End of Year exams (w/b 19<sup>th</sup> June 2023)</b></p>

#### Further Information

The Course Specification: <https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-7404-7405-SP-2015.PDF>

All topics will be assessed with an end of module exam (every 3-4 weeks). Practical skills will be assessed throughout the course during required practicals. Students are expected to complete 5 hours of additional study per week for this course.