

Long Term Plan: Chemistry Year 10

“Science is simply the word we use to describe a method of organising our curiosity.”

The programme for years 7 – 11 has staff teaching a single class, with rotating topics/subjects. There is varied order of topics for classes to allow for the rotation of practical equipment. Students will complete a biology, chemistry and then physics topic followed by an assessment. This process will then repeat again.

Staff are to use the [Curriculum Road Map](#) in the Science Drive to ensure that they rotate at the appropriate times.

Topic	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Links to future KS	Opportunity for stretch for high prior attainers
One	Electrolysis	<p>The reactivity series and application of this to displacement reactions in electrolysis.</p> <p>Reduction and oxidation, in terms of electrons (HT only construction of ion equations)</p> <p>Electrolysis of molten and aqueous substances</p> <p>Use of electrolysis to extract metals</p>	<p>Writing ionic equations to show oxidation and reduction</p> <p>Writing balanced chemical equations</p> <p>Safely using laboratory equipment and glassware</p> <p>Accurately recording data</p> <p>Presenting and interpreting data in tabular and graphical form.</p>	<p>Some students may refer to neutralization as redox reactions - but these are one of the few reactions in this unit that is not redox.</p> <p>Students often confuse the terms “Cation” “Anion” “Cathode” and “Anode”</p>	<p>This unit follows directly on from the first two units of year 8, extending students’ knowledge to explore the concepts of redox reactions in greater depth</p>	<p>Builds directly into Unit 4 of Paper One at GCSE. As well as AS/A2 Chemistry</p>	<p>Writing half equations for redox reactions and electrolysis.</p>
SMSC & British Values	Working safely in the lab, and respecting each other’s workspace						
Cultura	The social, economic, and environmental impact of the various methods of extracting metals.						

I Capital							
Career Link	As the central science, Chemistry opens doors to a wide range of STEM field careers.						
Two	Energy Changes	Endothermic and Exothermic Reactions Reaction pathways Bond Energy and bond energy calculations (Triple Only) Fuel cells	Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data Calculating a mean Changing the subject of an equation Using data to evaluate and compare	Mislabelling of the activation energy and overall energy change on reaction profile diagrams. Students often miscalculate bond energies by doing products - reactants rather than reactants - products	This unit builds directly from the energetics unit, studied in year 8; extending students prior knowledge of endothermic and exothermic reactions to explore why this is the case.	Students at A-Level will study energetics in more detail, looking calorimetry, Hess' Law and more complex enthalpy calculations	Students may be challenged to find a missing bond enthalpy if given the overall energy change for a reaction.
SMSC & British Values	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Cultural Capital	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Career Link	As the central science, Chemistry opens doors to a range of STEM Field careers						
Three	Quantitative Chemistry	Mass, Mr and Moles Concentration of Solution	Changing the subject of an equation Calculating percentage Using ratios	The difference between g/dm and mol/dm Students often struggle to identify when they need to use molar	At KS3 students have studied the mechanics of chemical reactions and have also	Quantitative chemistry forms the basis of much of the work done during physical chemistry during A-Level.	Higher prior attainments can be challenged to work through multi-step problems involving different equations

		(HT Only) Calculating reaction masses Balancing Equations using moles % Yield and Atom Economy	Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data Calculating a mean Identifying anomalous and concordant results. Converting units	coefficients in a calculation and when they don't Calculating the Mr of diatomic molecules, particularly in reaction mass calculations	been introduced to the idea of conservation of mass and balanced equations. Students have also studied neutralisation reactions which builds directly into titration		
SMSC & British Values	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Cultural Capital	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Career Link	As the central science, Chemistry opens doors to a range of STEM Field careers						
Four	Rate and Extent of Chemical Change	Measuring and calculating the rate of a chemical reaction The effect of temperature, pressure, concentration, surface area and presence of a catalyst on the rate of reaction Reversible Reactions and dynamic	Interpreting data presented in both graphical and tabular form. Using laboratory equipment and glassware Recording accurate data Calculating a mean Changing the subject of an equation Using data to evaluate and compare Drawing tangents to a graph	Students often struggle to link dynamic equilibria with changing environmental conditions. Students often do not talk about collisions when explaining the effect of various factors on the rate of reaction	Students have previously studied the basic concept of "rate of reaction" and how a catalyst affects this.	At A-Level students will study kinetics in more detail, looking at rate constants and rate equations.	Higher prior students can be challenged to suggest compromise conditions for industrial process that utilize reversible equations given the enthalpy change and balanced equation for the reaction

		equilibria, including making predictions about changing yield when environmental conditions change					
SMSC & British Values	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Cultural Capital	Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios						
Career Link	As the central science, Chemistry opens doors to a range of STEM Field careers						
Five	Organic Chemistry	<p>The structure and properties of alkanes and alkenes</p> <p>Fractional Distillation and Cracking Complete and incomplete combustion</p> <p>(Triple Only) The structure and properties of alcohols, carboxylic acids, esters and polymers.</p>	<p>Using and deriving the general formula of a homologous series</p> <p>Predicting the properties of a compound</p> <p>Writing and balancing chemical equations</p>	Students often confuse alkanes and alkenes	Students have previously looked at chemical equations as the rearrangements of atoms throughout KS3	At A-Level students will study organic chemistry in more detail, forming most of the content of Paper Two	Explaining the properties of organic compounds linking to their structure.
SMSC & British Values	<p>The environmental impact of fossil fuels and crude oil use.</p> <p>Discussion of the benefits and disadvantages of the oil industry in the UK</p>						
Cultural Capital	<p>The social, economic and environmental impact of the oil industry worldwide.</p> <p>A deeper understanding of how many modern materials is derived from oil.</p>						

Career Link	As the central science, Chemistry opens doors to a range of STEM Field careers
Six	<p>Students have end of year exams and 2 weeks of work experience in this final section of the academic year.</p> <p>Consolidation of the KS4 programme of study</p> <p>Revision and preparation for GCSE exams (& Consolidation of this part of the KS4 programme of study)</p> <p>Revisit to subject knowledge from across the course & use of PLC to ensure that students have a good grasp of all aspects of the specification</p> <p>Use of retrieval quizzes and activities to identify gaps in SK and misconceptions</p> <p>Support students in developing summary notes, flash cards etc to aid retrieval of key facts</p> <p>Ensure that students have the necessary skills for effective revision</p> <p>Focus on past exam questions and papers – command words and application of knowledge</p> <p>Practice the application of knowledge that draws upon the practical aspects of the course</p> <p>Timed completion of questions to support with pace through the exam paper</p> <p>SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers</p>