

Long Term Plan: Chemistry Year 11

“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 |
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| One | Organic Chemistry | The structure and properties of alkanes and alkenes Fractional Distillation and Cracking Complete and incomplete combustion (Triple Only) The structure and properties of alcohols, carboxylic acids, esters and polymers. | Using and deriving the general formula of a homologous series Predicting the properties of a compound Writing and balancing chemical equations | 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 | The environmental impact of fossil fuels and crude oil use. Discussion of the benefits and disadvantages of the oil industry in the UK | | | | | | |
| Cultural Capital | The social, economic and environmental impact of the oil industry worldwide. A deeper understanding of how many modern materials is derived from oil. | | | | | | |

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| Career Link | As the central science, Chemistry opens doors to a wide range of STEM field careers. | | | | | | |
| Two | Chemical Analysis | Pure and impure substances Chromatography Gas Testing (Triple Only) Flame testing, ion testing and spectroscopy | Following written methods and flow charts Interpreting chromatograms and other experimental results Writing scientific methods Measuring and recording accurate results Safe use of laboratory equipment and glassware. Presenting and interpreting data in both tabular and graphical form. | Students often confuse the results of the various ion tests. Students often describe spectroscopy as being more "accurate" or "Reliable" as opposed to more "Sensitive" or "Precise" | Students have studied the idea of pure and impure substances, mixtures vs compounds and separation techniques at KS3. This unit extends this by introducing deeper analysis - not just separating mixtures but identifying their components. | Organic Analysis is studied in further depth at A-Level, where students will look at more complex spectroscopic methods, such as IR and MS spectroscopy. | Students could be presented with complex mixtures or a number of different solutions and challenged to produce viable methods of identification. |
| SMSC & British Values | Safe working in the lab, and respect for others workspaces. | | | | | | |
| Cultural Capital | The use of spectroscopic methods in real life applications, such as quality assurance and forensic investigation | | | | | | |
| Career Link | As the central science, Chemistry opens doors to a range of STEM Field careers | | | | | | |
| Three | Atmospheric Chemistry | The composition of the modern | Use of timelines | Many students believe that oxygen is the most plentiful | In KS3 students studied the atmosphere and discussed the | At A-Level, students will study the impact | Students may be asked to compare interventions based on compromise |

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| | | <p>atmosphere and how this has changed from the formation of the Earth</p> <p>Human impact on the atmosphere, including greenhouse gases, climate change and global warming.</p> <p>The impact of major atmospheric pollutants on human health and the environment</p> | <p>Extended Writing</p> <p>Reading for comprehension</p> <p>Evaluating the accuracy of data</p> <p>Using data to make predictions about the outcome of experiments</p> <p>Interpreting data presented in tabular or graphical form</p> | <p>gas in the atmosphere, rather than Nitrogen.</p> <p>Many students overestimate the concentration of carbon dioxide in the atmosphere</p> <p>Many students confuse global warming with climate change</p> | <p>impact of human activity on the climate. This unit builds on this by introducing a more analytical and quantitative approach to exploring human impact on the atmosphere and environment</p> | <p>of CFCs and the mechanism by which they have contributed to loss of ozone.</p> | <p>between their environmental and economic impacts.</p> |
| SMSC & British Values | The effects of climate change, how every day actions contribute to climate change and what interventions can be put in place to prevent climate catastrophe | | | | | | |
| Cultural Capital | The effects of climate change, how every day actions contribute to climate change and what interventions can be put in place to prevent climate catastrophe | | | | | | |
| Career Link | <p>Climate scientist</p> <p>Environmental campaigner</p> <p>Meteorologist</p> | | | | | | |
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| Four | Using Resources | <p>Finite and infinite resources</p> <p>Potable water and water treatment</p> <p>Life cycle assessments</p> <p>(Triple Only) Bioleaching and phytomining</p> | <p>Safe use of laboratory equipment</p> <p>Interpreting data presented in tabular or graphical form</p> <p>Recording accurate date</p> <p>Simple calculations</p> | The differences between potable and pure water | Students have previously studied the difference between finite and infinite resources, and this is extended in this unit; alongside the new concepts that are introduced. | At A-Level students will study processes such as the Harber Process in greater depth, and place it in its chemical and economical context. | Students could be tasked to carry out life cycle assessments of varying complexities |

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| | | The use of alloys, polymers and composite materials The Harber Process | involving addition and subtraction Extended Writing Using data to evaluate and compare | | | | |
| SMSC & British Values | The social, economic and environmental impact of modern products, including how individual actions can have an impact on the environment | | | | | | |
| Cultural Capital | The social, economic, and environmental impact of modern products, including how individual actions can have an impact on the environment | | | | | | |
| Career Link | As the central science, Chemistry opens doors to a wide range of STEM field careers | | | | | | |
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| Five & Six | Supporting Revision – from 24/April Consolidation of the KS4 programme of study Revision and preparation for GCSE exams 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 Use of retrieval quizzes and activities to identify gaps in SK and misconceptions Support students in developing summary notes, flash cards etc to aid retrieval of key facts Ensure that students have the necessary skills for effective revision Focus on past exam questions and papers – command words and application of knowledge Practice the application of knowledge that draws upon the practical aspects of the course Timed completion of questions to support with pace through the exam paper SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers | | | | | | |