

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

The programme for Y10 and 11 differs in comparison to KS3. There are 5 sets in each population. X/Y 1 classes will be taught triple science content and will see a subject specialist teacher three times a fortnight. There are 2 data collection points for Y10

Staff use the **Curriculum Road Map** to ensure they teach the correct topic with enough time to cover the depth and breadth of our curriculum.

| Торіс | 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 | Quantitative Chemistry | Mass, Mr and Moles Concentration of Solution (HT Only) Calculating reaction masses Balancing Equations using moles % Yield and Atom Economy | Changing the subject of an equation Calculating percentage Using ratios 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. | The difference between g/dm and mol/dm Students often struggle to identify when they need to use molar coefficients in a calculation and when they don't Calculating the Mr of of diatomic molecules, particularly in reaction mass calculations | At KS3 students have studied the mechanics of chemical reactions and have also been introduced to the idea of conservation of mass and balanced equations. Students have also studied neutralisation reactions which builds directly into titration | 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 |

| | | | Converting units | | | | | |
|-----------------------------|--|---|--|--|--|--|---|--|
| SMSC & British Values | British value | British values in science Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios | | | | | | |
| Cultural Capital | Mathematical pr | Mathematical problems can be put into real world contexts to explore a variety of concepts and scenarios | | | | | | |
| | https://www.bbc.co.uk/bitesize/tags/zjb8f4j/jobs-that-use-science/1, https://www.bradfordacademy.co.uk/wp-content/uploads/2019/10/CEIAG-in-the-Curriculum-Science.pdf, https://www.pearson.com/uk/educators/schools/subject-area/science/why-science-matters/your-future-in-stem-a-z.html More information here. As the central science, Chemistry opens doors to a range of STEM Field careers | | | | | | | |
| Two | Chemical changes | Reactivity of metals reactions with acids Electrolysis | Experimenting with chemical reactions in a systematic way and organising their results logically Mixing of reagents to explore chemical changes and/or products. investigate pH changes when a strong acid neutralises a strong alkali. Measure the pH of different acids at different concentrations. (HT only) Make order of magnitude calculations. (HT only) | Physical vs chemical changes. Acids can burn and eat material away Neutralisation means an acid breaking down A base/alkali inhibits the burning properties of an acid | At KS3 students have studied the mechanics of chemical reactions Students have also studied neutralisation reactions which builds directly into titration | Chemical changes links to the 3.1.12 Acids and bases (A-level only) topic in KS5. | Explaining how concentration and strength are linked. | |
| SMSC & British Values | Students following laboratory rules for the safety of all Discussions on how certain developments have affected moments in life. | | | | | | | |
| Cultural Capital | Neutralisation reactions and how they are useful in everyday life. | | | | | | | |

| | Uses of indicators. | | | | | | |
|-----------------------------|--|--|---|--|--|--|---|
| | Chemical reactions in everyday life. | | | | | | |
| Career Link | https://www.bbc.co.uk/bitesize/tags/zjb8f4j/jobs-that-use-science/1, https://www.bradfordacademy.co.uk/wp-content/uploads/2019/10/CEIAG-in-the-Curriculum-Science.pdf, https://www.pearson.com/uk/educators/schools/subject-area/science/why-science-matters/your-future-in-stem-a-z.html More information here. As the central science, Chemistry opens doors to a range of STEM Field careers | | | | | | |
| | | | | | | | |
| Three | Atmospheric Chemistry | The composition of the modern atmosphere and how this has changed from the formation of the Earth Human impact on the atmosphere, including greenhouse gases, climate change and global warming. The impact of major atmospheric pollutants on human health and the environment | Use of timelines Extended Writing Reading for comprehension Evaluating the accuracy of data Using data to make predictions about the outcome of experiments Interpreting data presented in tabular or graphical form | Many students believe that oxygen is the most plentiful gas in the atmosphere, rather than Nitrogen. Many students overestimate the concentration of carbon dioxide in the atmosphere Many students confuse global warming with climate change | In KS3 students studied the atmosphere and discussed the 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 | At A-Level, students will study the impact of CFCs and the mechanism by which they have contributed to loss of ozone. | Students may be asked to compare interventions based on compromise between their environmental and economic impacts. |
| SMSC & British Values | British values in science 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 | https://www.bbc.co.uk/bitesize/tags/zjb8f4j/jobs-that-use-science/1, https://www.bradfordacademy.co.uk/wp-content/uploads/2019/10/CEIAG-in-the-Curriculum-Science.pdf, https://www.pearson.com/uk/educators/schools/subject-area/science/why-science-matters/your-future-in-stem-a-z.html More information here. Climate scientist Environmental campaigner Meteorologist | | | | | | |
| Four | 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 | British values in science 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. | | | |
|----------------|---|--|--|--|
| Career Link | https://www.bbc.co.uk/bitesize/tags/zjb8f4j/jobs-that-use-science/1, https://www.bradfordacademy.co.uk/wp-content/uploads/2019/10/CEIAG-in-the-Curriculum-Science.pdf, https://www.pearson.com/uk/educators/schools/subject-area/science/why-science-matters/your-future-in-stem-a-z.html More information <u>here</u> . As the central science, Chemistry opens doors to a range of STEM Field careers | | | |
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| Five | Students have end of year exams and 2 weeks of work experience in this final section of the academic year. | | | |
| | Consolidation of the KS4 programme of study | | | |
| | Revision and preparation for GCSE exams (& Consolidation of this part of the KS4 programme of study) | | | |
| | 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 | | | |