



KS4 Chemistry Curriculum Intent Statement (Year 11 – Global Challenges)

At Thomas Mills High School, Year 11 represents the culmination of our Key Stage 4 Chemistry curriculum. This final phase of study challenges pupils to apply their chemical knowledge to global issues, industrial processes, and the sustainable management of natural resources. During the autumn term, pupils complete the final topics from the C5 unit, which began in the summer term of Year 10. This includes the study of reversible reactions, dynamic equilibrium, and the application of Le Chatelier's Principle. Building on this, pupils then progress to the C6 Global Challenges unit, which explores the wider role of chemistry in society. The curriculum continues to develop the analytical, practical, and evaluative skills necessary for success in exams and beyond.

Our intent is to:

Develop Scientific Knowledge and Understanding:

We aim to ensure pupils consolidate and extend their understanding of applied chemistry through topics such as the production of fertilisers, ethanol, and polymers, as well as methods of metal extraction and the operation of hydrogen fuel cells. Pupils examine the environmental implications of these processes, learning how Life Cycle Assessments and recycling inform sustainable decision-making. The topic also explores hydrocarbons, fractional distillation, cracking, and key reactions in organic chemistry including alcohols, carboxylic acids, and polymerisation. Pupils consider how the atmosphere has changed over time, and how chemistry contributes to managing pollution and providing clean water.

Curiosity, Inquiry and Skills Development:

Pupils continue to develop their ability to plan and evaluate practical investigations and analyse complex data. They use symbolic and quantitative methods to represent chemical change, interpret industrial processes, and evaluate competing chemical technologies. Pupils gain confidence in applying their learning to unfamiliar scenarios—such as balancing environmental impact with industrial efficiency—and use models, data, and life cycle analysis to justify decisions. These skills are essential not only for examination success but also for engaging with broader scientific and ethical issues.

Prepare for Future Learning:

The Global Challenges unit prepares pupils for the transition to post-16 science courses and the application of chemistry in careers such as environmental science, engineering, and medicine. By exploring the intersection between science and society, pupils develop the critical thinking and problem-solving abilities required for informed citizenship and scientific literacy. The course ensures pupils leave with a robust understanding of how chemistry helps address the challenges facing our planet, and the confidence to pursue further study or meaningful engagement with science in their future lives.



1	Name of topic/Topics 10C5 Monitoring and Controlling Note that due to the amount of content, the C5 unit for separate science is normally taught across year 10 and year 11.	Knowledge: The Monitoring and Controlling Chemical Reactions topic introduces pupils to the quantitative and dynamic aspects of chemical change. Pupils learn how to calculate percentage yield and atom economy, and explore the implications of these values for industrial and sustainable chemical processes. The concept of concentration is developed, including definitions, units, and (for Separate Chemistry pupils) the use of titration as a method for determining unknown concentrations. The unit also covers factors affecting the rate of chemical reactions—temperature, concentration, pressure, surface area, and catalysts—as well as the interpretation of data from rate experiments. Pupils are introduced to reversible reactions and dynamic equilibrium, applying Le Chatelier's Principle to predict how changes in conditions affect chemical systems.	Calculating the mass of product - Monitoring chemical reactions - - BBC Bitesize Converting units - Higher - Monitoring chemical reactions - Higher - - BBC Bitesize Rate of reaction - Controlling chemical reactions - - BBC Bitesize Reversible reactions - Equilibria - - BBC Bitesize
		Skills: Pupils develop confidence in quantitative problem solving, using formulae to calculate yield, atom economy, and concentration, and converting between units accurately. They interpret and draw graphs to represent changes in reaction rate, and evaluate how experimental data supports theoretical explanations. Through practical investigations, pupils observe the effects of changing conditions on reaction rate and learn to plan and conduct fair tests. Separate Chemistry pupils also gain experience in titration techniques, developing precision in measurement and observation. The topic encourages pupils to think critically about the efficiency, reversibility, and environmental impact of chemical processes—skills essential for further study and real-world scientific understanding.	Multiple choice questions - Sample exam questions - monitoring chemical reactions - - BBC Bitesize Unit: Rate of reaction KS4 Chemistry Oak National Academy Lesson: Chemical equilibrium Foundation OCR KS4 Chemistry Oak National Academy



1	Name of topic/Topics 11C6 Global Challenges	Knowledge: - topics in bold are only required for Separate Chemistry. The Global Challenges topic brings together key areas of applied and environmental chemistry, enabling pupils to understand how chemical knowledge is used to address real-world problems. Pupils explore the role of chemistry in industry, including the production of fertilisers, ethanol, and sulfuric acid via the Contact Process, as well as decisions around reaction conditions such as temperature and pressure. Methods of metal extraction are covered, from traditional reduction and electrolysis to modern phytoextraction and bioleaching. Pupils study the principles and applications of Life Cycle Assessments (LCA), recycling, and sustainable resource use. The topic also introduces hydrocarbons and organic chemistry, including the fractional distillation and cracking of crude oil, properties and reactions of alkanes and alkenes, and the formation of alcohols, carboxylic acids, and polymers. Pupils learn about polymerisation (addition and condensation) and compare the properties and uses of natural and synthetic polymers. The unit concludes with atmospheric chemistry and water treatment, examining pollutants, climate change, and the chemistry of clean water. The operation and chemistry of hydrogen fuel cells are also introduced as a modern energy solution.	Extracting iron and copper - Improving processes and products - - BBC Bitesize Fertilisers - Making fertiliser - - BBC Bitesize Corrosion - Corrosion of metals - GCSE Chemistry (Single Science) Revision - OCR Gateway - BBC Bitesize Different materials - Materials for different uses - - BBC Bitesize Multiple choice questions - Sample exam questions - global challenges - - BBC Bitesize Crude oil and hydrocarbons - Fuel - - BBC Bitesize
		Skills: Pupils refine their ability to interpret and evaluate complex chemical processes, including balancing equations, identifying redox reactions, and applying principles of green chemistry. They analyse how reaction conditions affect industrial yield, rate, and sustainability. Through investigative tasks and data analysis, pupils evaluate the advantages and disadvantages of different extraction and production methods, using criteria such as cost, efficiency, and environmental impact.	- BBC Bitesize Addition polymers - Polymers - Revision - - BBC Bitesize Comparing cells - Chemical cells and fuel cells - BBC Bitesize



Thomas Mills

High School & Sixth Form

CURRICULUM OVERVIEW: Chemistry

		Graph interpretation, chemical modelling, and multi-step reasoning are key skills developed in this unit. Pupils also interpret structural formulae, compare organic compounds, and understand the environmental implications of polymer use and disposal. The unit encourages pupils to think critically about the wider societal role of chemistry and to apply their learning to both familiar and unfamiliar contexts, laying a strong foundation for post-16 study and informed citizenship.	The Earth's early atmosphere - The atmosphere - OCR Gateway - BBC Bitesize
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