



**Curriculum Overview for:
Chemistry**

**Key Stage 3/4
Academic Year Group: 9**

Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Atoms and their history	Atomic Structure	The Periodic Table	Evolution of the Atmosphere	Pollution and Climate Change	Energy Changes
Content	<ul style="list-style-type: none"> Atoms, Elements, and compounds. Word and balanced symbol equations. Mixtures and separating mixtures. Early development of the atomic model. 	<ul style="list-style-type: none"> Structure of the atom. Ions, atoms and isotopes. Electronic structure 	<ul style="list-style-type: none"> Development and arrangement of the periodic table. Groups 0, 1 and 7. Transition metals and their properties. 	<ul style="list-style-type: none"> History and the evolution of the atmosphere. The carbon cycle 	<ul style="list-style-type: none"> Greenhouse gases and global warming. Effects of global warming and carbon footprint. Other pollution types (e.g. acid rain) 	<ul style="list-style-type: none"> Endothermic and Exothermic Reactions *Bond breaking and Bond making in chemical reactions. Cells and batteries Fuel cells.
Rationale/ Linking	Follows on from work on elements compounds and mixtures in middle school. Begins to build in the first of the scientific skills WS1.1 Understanding how scientific methods and theories have developed over time.	Structure of the atom is fundamental to understanding all future chemical reactions. This knowledge underpins many of the future topics and is built on throughout the course.	Further development of the WS 1.1 skills and build in WS1.3 and WS 1.4 - power and limitations of science and the importance of peer review. Learning to navigate and use the PT, a tool to be used across many of the further topics in Chemistry e.g Bonding in Y10.	Teaches the processes that are required to understand how global warming works, build foundations for next steps. Linked to biology curriculum – carbon cycle revisited in Biology in Y10 (spiral learning).	Very relevant to current affairs, helps students to understand the causes and implications of climate change. Links to GCSE Geography curriculum particularly the urban issues and challenges unit.	Provides an understanding of why chemical reactions get hot or cold at foundation level this can be used in many everyday applications. At a higher level this provides the basic knowledge and skills for large parts of the A Level Chemistry course.
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			Learning Resources	GCSE AQA Chemistry Textbook. Practical resources for displacement reactions, exothermic and endothermic reactions and fuel cells.	



Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Bonding and Structure	Bonding and Properties of Matter	Rates of Reaction	Rates of reaction and equilibria	Chemical Analysis	Using the Earth's resources
Content	<ul style="list-style-type: none"> Ionic bonding Covalent Bonding Metallic bonding and the properties of metals. Using models and diagrams to represent bonding. States of matter. 	<ul style="list-style-type: none"> Properties of ionic compounds and simple covalent molecules. Giant covalent structures and the allotropes of carbon. *Scale and use of nanoparticles. An introduction to polymers. 	<ul style="list-style-type: none"> Finding and calculating the rate of reaction. Introduction to collision theory. The effect of concentration, temperature, surface area, pressure on the rate of reaction. 	<ul style="list-style-type: none"> Rate of reaction required practical The effect of a catalyst on the rate of reaction. Reversible reactions and equilibria. Le Chatelier's principle. 	<ul style="list-style-type: none"> Pure substances and formulations Chromatography Testing for common gases. *Qualitative testing for unknowns.. Required practical – qualitative analysis – identifying unknowns. 	<ul style="list-style-type: none"> Water treatment processes. Distillation required practical Alternative metal extraction Lifecycle assessments and reducing our use of resources. Corrosion Alloys as useful materials Ceramics, Polymers and composites The Haber process and NPK fertilisers.
Rationale / Linking	This topic provides a spiral learning opportunity to revisit the structure of the atom from the start of Y9 and provides a perfect chance for retrieval practice then moving on to application of atomic structure. Topic also provides explanations for all chemical reactions that will be learnt about during Y10 and Y11.	Using work on bonding from last half term students now use this knowledge to explain the properties of a range of substances and link this to their applications in the wider world.	Understanding collision theory and rates of reaction provides opportunities for spiral learning from the energy changes topic, getting students to consider what is happening in a chemical reaction on a particle level.	Using understanding from spring 1 to make predictions. Developing skills WS 1.2, 1.5, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7 and all WS3 skills. Work on Le Chatelier's principle prepares higher tier students for Kc at A level.	Students continue to build heavily of the practical skills from WS2 and 3 that were developed during the Spring term.	In the final summer term students will use their qualitative analysis skills during the distillation required practical – providing another real-world application to their most recent student. As part of this topic students will also spiral back to the impact of humans on the environment (from Y9 atmosphere) with a focus on sustainable living and reducing our use of resources.
Assessment	Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Y10 trial exams take place in the summer term. Regular informal assessment opportunities built into lessons and homework.			Learning Resources	GCSE AQA Chemistry Textbook. Practical resources for rates of reaction required practical and chemical analysis testing.	



Term	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Topic	Organic Chemistry	Quantitative Chemistry	Quantitative Chemistry	Chemical Changes	Revision and Past Paper Practice Final Exams	N/A
Content	<ul style="list-style-type: none"> Crude oil, hydrocarbons and fractional distillation. Combustion and cracking. *Reactions of alkenes *Alcohols, carboxylic acids and esters. *Polymerisation and natural polymers. *Higher tier only	<ul style="list-style-type: none"> Relative formula mass *Calculating moles and reacting masses. Using moles in equations and limiting reactants 	<ul style="list-style-type: none"> Calculating concentrations *Calculating the amount of gas. *Percentage Yield and atom economy 	<ul style="list-style-type: none"> The reactions of metals including with acid and redox. The reactivity series. Extraction of metals by reduction. The pH scale neutralisation and salts. Electrolysis 	Revision of topics and practice of past exam papers as exam preparation.	N/A
Rationale/ Linking	Students start Y11 with some spiral learning from the using resources topic with the introduction of organic chemistry and processing and uses of crude oil. Students then learn about other homologous series in organic chemistry and their reactions. Building strong foundations and providing higher students an insight to KS5 Chemistry.	The quantitative topic starts with spiralling back to atomic structure and the periodic table with students analysing information about subatomic particles from the periodic table. Students then use numeracy skills from maths with the introduction of the mole.	Higher tier students use the newly learnt concept of the mole to solve more complex problems. An ideal introduction to the mole that is integral to A level. Following calculating concentration, foundation tier students will move onto the chemical changes topic.	Spiralling round again from the using resources topic on alloys and corrosion students revisit the reactions and extractions of metals. During the neutralisation section students use titrations giving further opportunity to practice the quantitative skills from the Autumn term. Finally students learn about electrolysis which while conceptually challenging ties many other areas and gives an excellent opportunity to revisit many topics prior to starting formal class revision. For example atomic structure, energy changes (half equations), properties of ionic substances, sustainability, resources and extracting metals.		N/A
Assessment	Y11 Mock Exams in the Autumn Term – one full exam paper. Formal assessment – once per half term which includes an interim assessment part way into each topic and a final assessment for each topic. Regular informal assessment opportunities built into lessons and homework.			Learning Resources	GCSE AQA Chemistry Textbook. Practical resources for Neutralisation, Reduction, Extraction of Metals and Electrolysis	