

YEAR 10 CHEMISTRY CURRICULUM PROGRESSION OVERVIEW

Science is changing our lives and is vital to the world's future prosperity, and all students should be taught essential aspects of the knowledge, methods, processes and uses of science. Pupils will build on their chemistry learning from KS3, extending their knowledge and understanding of physical chemistry, inorganic and organic and chemical analysis. They should be helped to appreciate the achievements of science in showing how the complex and diverse phenomena of the natural world can be described in terms of a number of key ideas relating to the sciences which are inter-linked, and which are of universal application.

	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	4.1.1 Atomic Structure 4.1.2 The Periodic Table	4.2 Bonding, structure, and the properties of matter	4.4.1 Reactivity of metals 4.3 Quantitative Chemistry 1 (start)	4.4 Chemical Changes, Reactions of Acids	4.4.3 Electrolysis 4.3.2 -4.3.3 Quantitative Chemistry 2	4.3.4 -4.3.5 Quantitative Chemistry 2 4.5 Energy Changes
Core Knowledge/ Threshold Concept	4.1.1 A simple model of the atom, symbols, relative atomic mass, electronic charge and isotopes 4.1.2 The periodic table – ideas of how the PT was developed. The arrangement of elements can be explained in terms of atomic structure	4.2.1 Chemical bonds, ionic, covalent and metallic Analysis of structures showing atoms can be arranged in a variety of ways. 4.2.2 How bonding and structure are related to the properties of substances, including polymers, nanoparticles and alloys	4.4.1 How metals react with other substances, ordering reactivity, explain REDOX in terms of oxygen and electrons (H) 4.3.1 Chemical measurements, conservation of mass and relative formula mass, balancing chemical equations, Changes in mass and uncertainty	4.4.2. Reactions of acids, including salt preparation, pH and neutralisation. 4.4.2.5 Titrations – be able to carry out a titration and use the data to calculate chemical concentrations Describe strong/ weak/ dilute and concentrated in relation to acids.	4.4.3 How electrolysis works, the products formed from different electrolytes and uses of electrolysis 4.3.2 The mole (H), amounts of substance, limiting reagents, 4.4.3 Yield and atom economy.	4.3.4- 4.3.5 Using concentrations in solutions calculations, Gas volume calculations 4.5. Exothermic and endothermic reactions, reaction profiles, bond energy calculations. Chemical and fuel cells.
Why this learning now?	Topics covered in Term 1 are fundamental to understanding Chemistry and follow	Crucial knowledge builds on fundamental concepts. For example, pupils apply their knowledge of atoms to bonding.	Crucial knowledge builds to cover more conceptually difficult aspects such as redox half equations.	Pupils will apply their learning to new contexts. The quantitative section has been split to	Pupils extend their learning of redox to electrolysis and application of electrolysis to extracting metals.	Topics build in difficulty and continue to apply crucial knowledge.

	from Key Stage 3 learning			allow mastery through application.	Pupils apply mathematical processes to chemical reactions/ problems	
Assessment Opportunities:	<ul style="list-style-type: none"> ➤ Recall starter activities (crucial knowledge) ➤ AFL in lessons ➤ End of topic tests & exam questions (develop exam skills) 					
	➤ Standardised block test (Oct) with synoptic content.	➤ Re-test for underperforming students (Nov)	➤ Standardised block test (Jan) with synoptic content.	Re-test for underperforming students (Feb/Mar)	<ul style="list-style-type: none"> ➤ Standardised block test (Apr) with synoptic content. ➤ Re-test for underperforming students (Feb) 	➤ Full Mock Paper 1 Exam (Jun)
Learning at Home	<p>Staff use a variety of resources including:</p> <ul style="list-style-type: none"> ➤ Exam questions ➤ Online learning (SENECA, MyGCSEScience, YouTube, etc.) ➤ Recall activities (quizzes, revision tasks, etc.) 					
Key Vocabulary	Atomic number, Mass number, Isotope, Periodic table, Reactivity	Covalent bond, Fullerene, Ionic bond, Lattice, Electrostatic, Delocalised	Displacement, Conservation, Mass, Oxidation, Reduction, REDOX, Reactant, Product, Uncertainty	Acid, Alkali, Concentration, strong, weak, Ionised, Titration, concordant, titre value,	Electrode, electrolyte, Mole, yield, atom economy,	Endothermic, Exothermic, Energy profiles
Spiritual, Moral, Social and Cultural concepts covered	<p>Spiritual: Pollution, the development of the Periodic Table, history of the development of the atom, Moral: Fertilisers, Pollution, Fossil fuels, Nuclear fuels, plastics, LCA Social: Water purification, Fossil fuels, Nuclear power Cultural: Contributions of scientists,</p>					
Links to careers and the world of work	<p>Staff will regularly link the learning in lessons to real-life contexts. For example, in Biology the pupils will look at the circulatory system which links to medical careers and in Ecology will perform experiments like a biologist. In Chemistry, they will look at the industrial applications of electrolysis and the work of famous scientists in developing the atomic model. Finally, in Physics the students will discuss how components are used in household items and how plugs and the National Grid function.</p>					

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	Autumn Term 1	Autumn Term 2	Spring Term 1	Spring Term 2	Summer Term 1	Summer Term 2
Topic	4.6 The rate and extent of chemical change 4.7 Organic chemistry 1	4.7 Organic chemistry 2 4.8 Chemical analysis 1	4.8 Chemical analysis 2 4.9 Chemistry of the atmosphere	4.10 Using resources	Synoptic Content & Exam Skills	GCSE Exams
Core Knowledge/ Threshold Concept	4.6.1 Rate of reaction: calculating rates of reactions and factors which affect the rates of chemical reactions 4.6.2 Reversible reactions and dynamic equilibrium 4.7.1 Carbon compounds as fuels and feedstock.	4.7.2 Reactions of alkenes and alcohols 4.7.2.4 Carboxylic acids 4.7.3 Synthetic and naturally occurring polymers 4.8.1 Purity, formulations and chromatography	4.8.2 Identification of common gases 4.8.3 Identification of ions by chemical and spectroscopic means 4.9.1 The composition and evolution of the Earth's atmosphere 4.9.2 Carbon dioxide and methane as greenhouse gases 4.9.3 Common atmospheric pollutants and their sources	4.10.1 Using the Earth's resources and obtaining potable water 4.10.2 Life cycle assessment and recycling 4.10.3 Using materials 4.10.4 The Haber process and the use of NPK fertilisers	Synoptic Content & Exam Skills GCSE Exams	GCSE Exams
Why this learning now?	Crucial knowledge builds to cover more conceptually difficult aspects such as the effect of changing	Crucial knowledge builds on fundamental concepts. For example, pupils apply their knowledge of covalent	Pupils will apply their learning to new contexts. For example, analysis of the results from flame emission spectroscopy	Pupils will apply their learning to cover the use of the earth's resources for essential daily	In this final term, the lessons are spent on review of key concepts and revision techniques ready for the GCSE exam.	GCSE exams

	conditions on equilibrium	bonding to properties of organic molecules		resources such as potable water		
Assessment Opportunities:	➤ Recall starter activities (crucial knowledge) ➤ AFL in lessons ➤ End of topic tests & exam questions (develop exam skills)					
	➤ Paper 1 Mock Exam (Oct).	➤ End of topic tests	➤ Paper 1 and 2 Mock (Jan)	➤ End of topic tests	➤ GCSE Exams	➤ GCSE Exams
Learning at Home	Staff use a variety of resources including: ➤ Exam questions ➤ Online learning (SENECA, MyGCSEScience, YouTube, etc.) ➤ Recall activities (quizzes, revision tasks, etc.)					
Key Vocabulary	Collision, activation, temperature, catalyst, equilibrium, dynamic, reversible, endothermic and exothermic, fractional distillation, alkane, hydrocarbon	Alkenes, alcohol, carboxylic, combustion, synthetic, polymers, condensation, formulation, chromatography.	Spectroscopy, spectroscopic, atmosphere, pollutant, photosynthesis	Potable, biological, sedimentation, manufacturing phytomining, bioleaching, composites	➤ GCSE Exams	➤ GCSE Exams
Spiritual, Moral, Social and Cultural concepts covered	Spiritual: Pollution, extraction and use of fossil fuels Moral: Fertilisers, Pollution, Fossil fuels, plastics, LCA's Social: Water purification, LCA's, Fossil fuels, Haber process. Cultural: Contributions of scientists to the processing of the earth's natural resources to improve their properties and usefulness					
Links to careers and the world of work	Staff will regularly link the learning in lessons to real-life contexts. For example, pupils will look at the extraction of crude oil and then the processing of the crude oil into useful products. Students will study the various methods to produce water that is safe to drink (potable water) and the production of fertilisers from the raw materials.					