

Calendar	Topic	Assessment	Sequencing and Coherence <i>concepts - themes - skills</i>	Literacy <i>reading - vocabulary - oracy - writing</i>
Autumn Half Term 1	C4 Chemical Calculations: Formula Mass and Relative Formula Mass, Percentage by Mass, Conservation of Mass, Expressing concentration HT – Balanced equations, Moles and mole calculations, Titration methodology, Titration calculations, Volume of gases.	C4 Online test set on Educake – instantly marked and direct question feedback through Educake. C4 End of topic test GCSE style questions FT and HT. C4, working scientifically and synoptic content from C1-C4. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.	<p>Quantitative chemistry</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> • conservation of mass and balanced chemical equations, ionic equations, and state symbols • determination of empirical formulae from the ratio of atoms of different kinds • use of amount of substance in relation to masses of pure substances • yield and atom economy of chemical reactions • using concentrations of solutions in mol/dm³ <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> • recognise the importance of scientific quantities and understand how they are determined • whenever a measurement is made, there is always some uncertainty about the result obtained • opportunities within titrations including to determine concentrations of strong acids and alkalis • use of amount of substance in relation to volumes of gases <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> • KS3 conservation of mass in Y8 <p>Link to knowledge in future units: • GCSE Chemistry – fundamental idea can be examined anywhere in GCSE</p> <p>Math skills:</p> <ul style="list-style-type: none"> • recognise and use expressions in decimal form • use an appropriate number of significant figures • understand and use the symbols: =, <>, >, <, ~ • change the subject of an equation • use the relative formula mass of a substance to calculate the number of moles in a given mass of that substance and vice versa • substitute numerical values into algebraic equations using appropriate units for physical quantities • interconvert units • use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano). 	<p>Include details of challenging texts and reading strategies, keyword glossary sheets, oracy opportunities and key disciplinary writing tasks.</p> <p>All pupils are issued with a learning journey, which includes a glossary of keywords for each topic.</p> <p>Bilingual science specific dictionaries are available for EAL pupils in Arabic, Spanish, Ukrainian.</p> <p>Extended writing</p>

<p>Autumn</p> <p>Half</p> <p>Term 2</p>	<p>C5 Chemical Changes: The Reactivity Series, Displacement Reactions, Extracting Metals, Salts from metals, Salts from insoluble bases, Making more salts, Neutralisation and the pH scale, strong and weak acids.</p>	<p>C5 Online test set on Educake – instantly marked and direct question feedback through Educake. C5 End of topic test GCSE style questions FT and HT. C5, working scientifically and synoptic content from C1-C3. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.</p>	<p>Chemical Changes</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> • reduction and oxidation in terms of loss or gain of oxygen • the chemistry of acids; reactions with some metals and carbonates • pH as a measure of hydrogen ion concentration and its numerical scale <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment • carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations, including titrations. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> • KS3 Acid reactions; Metal reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> • GCSE Chemistry – essential knowledge for Paper 1 and for study in y11. <p>Math skills:</p> <ul style="list-style-type: none"> • make order of magnitude calculations. 	<p>Include details of challenging texts and reading strategies, keyword glossary sheets, oracy opportunities and key disciplinary writing tasks.</p> <p>Extended writing</p>
<p>Spring</p> <p>Half</p> <p>Term 3</p>	<p>C6 Electrolysis: Electrolysis of molten and aqueous compounds, extraction of aluminium</p>	<p>C6 Online test set on Educake – instantly marked and direct question feedback through Educake. C6 End of topic test GCSE style questions FT and HT. C6, working scientifically and synoptic content from C1-C5. Teacher marked, feedback though model answer mark scheme and follow up exam style questions on areas of weakness – personalised.</p>	<p>Electrolysis</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> • electrolysis of molten ionic liquids and aqueous ionic solutions • use of chemical cells and fuel cells. <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> • safe and careful use of liquids • make and record observations and measurements using electrolysis apparatus and methods. <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> • KS3 link to endothermic reactions in Y8 <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> • GCSE Chemistry – link back to structure and bonding and forward to energy changes <p>Math skills:</p> <ul style="list-style-type: none"> • recognise and use expressions in decimal form • use ratios, fractions, and percentages • use an appropriate number of significant figures. 	<p>Extended writing</p>

<p>Spring</p> <p>Half</p> <p>Term 4</p>	<p>C7 Energy Changes: Exothermic and endothermic reactions, Using energy transfers, Reaction profile diagrams, Bond energy calculations, Chemical cells and batteries, Fuel cells.</p>	<p>C7 Online test set on Educake – instantly marked and direct question feedback through Educake. C7 End of topic test GCSE style questions FT and HT. C7, working scientifically and synoptic content from C1-C6. Teacher marked, feedback through model answer mark scheme and follow up exam style questions on areas of weakness – personalised.</p>	<p>Energy Changes</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> • measurement of energy changes in chemical reactions (qualitative) • bond breaking, bond making, activation energy and reaction profiles (qualitative) <p>Disciplinary knowledge headlines:</p> <ul style="list-style-type: none"> • use scientific theories and explanations to develop hypotheses. • plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. • apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. • carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. • make and record observations and measurements using a range of apparatus and methods. • evaluate methods and suggest possible improvements and further investigations. <p>Link to knowledge from previous units: • KS3 Chemical reactions</p> <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> • GCSE Chemistry – rates and equilibrium in Y11 <p>Math skills:</p> <ul style="list-style-type: none"> • recognise and use expressions in decimal form • use an appropriate number of significant figures • find arithmetic means • translate information between graphical and numeric form • plot two variables from experimental or other data. 	<p>Twinkle article and questions on endothermic and exothermic reactions</p> <p>Etymology of 'endo', 'exo', and 'thermic' discussed.</p> <p>Oracy 21 activity on reaction profile diagrams</p> <p>Extended writing</p>
--	--	--	---	--

<p>Summer</p> <p>Half</p> <p>Term 5</p>	<p>C8 Rates of Reaction: Methods to monitor the rate of a reaction, Collision theory and the effects of surface area, the effects of temperature, the effects of concentration and using a catalyst,</p>	<p>C8 Online test set on Educake – instantly marked and direct question feedback through Educake.</p>	<p>The rate and extent of chemical change</p> <p>Substantive knowledge headlines:</p> <ul style="list-style-type: none"> • factors that influence the rate of reaction: varying temperature or concentration, changing the surface area of a solid reactant or by adding a catalyst • factors affecting reversible reactions. <p>Disciplinary knowledge headlines: • predict and explain using collision theory the effects of changing conditions of concentration, pressure, and temperature on the rate of a reaction • Apply Le Chatelier's principle to reversible reactions</p> <p>Link to knowledge from previous units:</p> <ul style="list-style-type: none"> • KS3 Y8 Chemical reactions <p>Link to knowledge in future units:</p> <ul style="list-style-type: none"> • GCSE Chemistry – this concept could be examined wrt to unknown reactions in Paper 2 chemistry. <p>Math skills:</p> <ul style="list-style-type: none"> • calculate the mean rate of a reaction from given information about the quantity of a reactant used or the quantity of a product formed, and the time taken • draw, and interpret, graphs showing the quantity of product formed or quantity of reactant used up against time • draw tangents to the curves on these graphs and calculate the gradient of a tangent to the curve as a measure of rate of reaction at a specific time. 	<p>Extended writing</p>
<p>Summer</p> <p>Half</p> <p>Term 6</p>	<p>C8 contd...reversible reactions, dynamic equilibrium and altering conditions.</p>	<p>C8 End of topic test GCSE style questions FT and HT. C8, working scientifically and synoptic content from C1-C7. Teacher marked, feedback through model answer mark scheme and follow up exam style questions on areas of weakness – personalised.</p>		