

2023-24 Year 10 Curriculum and Assessment Plan for Chemistry Separate Science

The curriculum and assessment of pupils at this stage of education has been carefully designed to build on the work in KS3 and Year 9					
<p>Half Term 1:</p> <p>All pupils will know: the bonding topic GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk) Pages 26-36</p> <p>All pupils will be assessed by: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact- Why do we teach this? Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. Theories of bonding explain how atoms are held together in these structures. Scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. The properties of these materials may offer new applications in a range of different technologies</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Visualise and represent 2D and 3D forms including twodimensional representations of 3D objects. Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding. Recognise substances as metallic giant structures from diagrams showing their bonding. Make order of magnitude calculations. Calculate areas of triangles and rectangles, surface areas and volumes of cubes. Recognise and use expressions in standard form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations 	<p>Half Term 2:</p> <p>All pupils will know: the quantitative chemistry topic GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk) Pages 36-43</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this? Chemists use quantitative analysis to determine the formulae of compounds and the equations for reactions. Given this information, analysts can then use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions. Chemical reactions can be classified in various ways. Identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together, to establish patterns and to make predictions about the behaviour of other chemicals. Chemical equations provide a means of representing chemical reactions and are a key way for chemists to communicate chemical ideas.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Opportunities within investigation of mass changes using various apparatus. Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Understand and use the symbols: =, <, >, α, ~ Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Opportunities within titrations including to determine concentrations of strong acids and alkalis. 	<p>Half Term 3:</p> <p>All pupils will know: the chemical changes topic GCSE Chemistry Specification Specification for first teaching in 2016 (aqa.org.uk) Pages 43-51</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this? <i>Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes. It also helped biochemists to understand the complex reactions that take place in living organisms. The extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and how easily they can be 'pulled apart'.</i></p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Mixing of reagents to explore chemical changes and/or products This is an opportunity to investigate pH changes when a strong acid neutralises a strong alkali. An opportunity to measure the pH of different acids at different concentrations Make order of magnitude calculations.
	<p>Reading Skills needed for this unit: Key Vocabulary: Ionic, covalent, metallic, free electron, ion, electrostatic, lattice, fullerene, nanotube, allotrope, bond, intermolecular, intramolecular</p>		<p>Reading Skills needed for this unit: Key Vocabulary: Mole, concentration, decimetre, percentage yield, titration, RAM, molecular mass, percentage by mass, formula mass, empirical formula</p>		<p>Reading Skills needed for this unit: Key Vocabulary: pH, Hydrogen ion, Hydroxide ion, acid, base, alkali, electrolysis, molten, aqueous, anode, cathode, discharged, reactivity series, halide, halogen, ionic half equation</p>

	<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> Calculate areas of triangles and rectangles, surface areas and volumes of cubes. Recognise and use expressions in standard form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use an appropriate number of significant figures. Understand and use the symbols: =, <>, >, α, ~ Change the subject of an equation. Substitute numerical values into algebraic equations using appropriate units for physical quantities. 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> Make order of magnitude calculations.
<p>Half Term 4:</p> <p>All pupils will know: the energy changes topic GCSE Chemistry Specification Specification for first teaching in 2016 (aaa.org.uk) Pages 51-54</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this?</p> <p>Energy changes are an important part of chemical reactions. The interaction of particles often involves transfers of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications. Some interactions between ions in an electrolyte result in the production of electricity. Cells and batteries use these chemical reactions to provide electricity. Electricity can also be used to decompose ionic substances and is a useful means of producing elements that are too expensive to extract any other way.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> An opportunity to measure temperature changes when substances react or dissolve in water. Safe and careful use of liquids. 	<p>Half Term 5:</p> <p>All pupils will know: the rates of reaction topic Pages 55-61 GCSE Chemistry Specification Specification for first teaching in 2016 (aaa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this?</p> <p>Chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated in order to speed them up or slow them down. Chemical reactions may also be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product. Understanding energy changes that accompany chemical reactions is important for this process. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product. Whilst there may be compromises to be made, they carry out optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Recognise and use expressions in decimal form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations. Translate information between graphical and numeric form. Drawing and interpreting appropriate graphs from data to determine rate of reaction. Plot two variables from experimental or other data. Determine the slope and intercept of a linear graph. Draw and use the slope of a tangent to a curve as a measure of rate of change. This topic offers opportunities for practical work and investigations in addition to required practical 5. An opportunity to investigate the catalytic effect of 	<p>Half Term 6:</p> <p>All pupils will know: the remainder of the analysis topic Pages 73-75 GCSE Chemistry Specification Specification for first teaching in 2016 (aaa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact- Why do we teach this?</p> <p>Analysts have developed a range of qualitative tests to detect specific chemicals. The tests are based on reactions that produce a gas with distinctive properties, or a colour change or an insoluble solid that appears as a precipitate. Instrumental methods provide fast, sensitive and accurate means of analysing chemicals, and are particularly useful when the amount of chemical being analysed is small. Forensic scientists and drug control scientists rely on such instrumental methods in their work.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> An opportunity to investigate flame colours. An opportunity to make precipitates of metal hydroxides. An opportunity to observe flame spectra using a handheld spectroscope.

			adding different metal salts to a reaction such as the decomposition of hydrogen peroxide.		
	Reading Skills needed for this unit: Key Vocabulary: Activation energy, energy change, energy profile, bond energy, endothermic, exothermic,		Reading Skills needed for this unit: Key Vocabulary: Surface area, mean rate, concentration, particle model, collision, volume, mass, mole, equilibrium, shift,		Reading Skills needed for this unit: Key Vocabulary: Ion, flame test, cation
	Opportunity for cross-curricular skill development <ul style="list-style-type: none"> 		Opportunity for cross-curricular skill development <ul style="list-style-type: none"> Recognise and use expressions in decimal form. Use ratios, fractions and percentages. Make estimates of the results of simple calculations. Translate information between graphical and numeric form. Drawing and interpreting appropriate graphs from data to determine rate of reaction. Plot two variables from experimental or other data. Determine the slope and intercept of a linear graph 		Opportunity for cross-curricular skill development <ul style="list-style-type: none">
<p>Ensuring this curriculum meets the needs of all pupils: this curriculum has been designed to ensure pupils from all starting points will develop the key curriculum skills and knowledge identified. The curriculum design ensures that each unit forms part of the overall learning journey and there are opportunities for revisiting skills and linking together key pieces of knowledge. Whole Academy policies and practices are followed to tailor the delivery of the curriculum for individuals and groups of students. For example SEND students have individual learning profiles that outline needs/strategies to be used, Whole group RIPs are in place to identify key teaching strategies that will be used with individual teaching groups. Ongoing formative assessment and clear summative assessment points allow individual staff and departments to identify misconception and adjust curriculum appropriately.</p>					
<p>Enrichment opportunities:</p> <ul style="list-style-type: none"> UK Chemistry Olympiad RSC Education 					
<p>Career opportunities/ links:</p> <p>Chemistry career options RSC Education</p>					