

**Curriculum Intent:** Students continue to explore new subject content in chemistry, tackling more challenging concepts at a greater depth than they have done so previously. Students continue to develop scientific skills, directly linked to their required practicals including forming hypotheses, clear written methods, knowledge, and use of scientific equipment as well as presenting and analysing results. The Assessment outcomes are AO1: Demonstrate knowledge and understanding of scientific ideas, scientific techniques, and procedures. AO2: Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques, and procedures. AO3: Analyse information and ideas to interpret, evaluate, make judgements, draw conclusions, develop experimental procedures, and improve experimental procedures.

Year 10	HT1	HT2	HT3	HT4	HT5	HT6
<p><b>Content, Knowledge &amp; Skills</b></p> <p><b>AQA Chemistry Unit 1</b></p> <ul style="list-style-type: none"> <li>• Atoms</li> <li>• The Periodic Table structure and properties.</li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• The periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties. The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges.</li> <li>• The arrangement of elements in the modern periodic table can be explained in terms of atomic structure which</li> </ul>	<p><b>AQA Chemistry Unit 2</b></p> <ul style="list-style-type: none"> <li>• Bonding- ionic, covalent, and metallic.</li> <li>• Properties- giant ionic and covalent.</li> <li>• Nanoparticles</li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• Chemists use theories of structure and bonding to explain the physical and chemical properties of materials.</li> <li>• Theories of bonding explain how atoms are held together in these structures.</li> <li>• Students will learn whether metals / non-metals react and how they react together.</li> <li>• Calculate charges on ions and work out what other ions will bond together for stability.</li> <li>• Work out how covalent substances share electrons to become stable. Based on the type of bonding</li> </ul>	<p><b>AQA Chemistry Unit 3</b></p> <ul style="list-style-type: none"> <li>• Conservation of Mass</li> <li>• Moles</li> <li>• Concentrations</li> <li>• Yield</li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• The law of conservation of mass states that no atoms are lost or made during a chemical reaction so the mass of the products equals the mass of the reactants.</li> <li>• Chemical amounts are measured in moles (mol).</li> <li>• Many chemical reactions take place in solutions.</li> <li>• Quantitative analysis is used to determine the formulae of compounds and the equations for reactions.</li> <li>• Given this information, analysts can then use quantitative methods to determine the</li> </ul>	<p><b>AQA Chemistry Unit 4</b></p> <ul style="list-style-type: none"> <li>• Reactivity</li> <li>• Electrolysis</li> <li>• Displacement</li> <li>• Neutrality</li> <li>• Acidity</li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically.</li> <li>• Metals can be arranged in order of their reactivity in a reactivity series.</li> <li>• Oxidation is the loss of electrons and reduction is the gain of electrons.</li> <li>• Acids are neutralised by alkalis (e.g. soluble metal hydroxides) and bases (e.g. insoluble metal hydroxides and metal oxides) to produce salts and water, and by metal</li> </ul>	<p><b>AQA Chemistry Unit 5</b></p> <ul style="list-style-type: none"> <li>• Energy transfer</li> <li>• Exothermic and Endothermic Reactions</li> <li>• Reaction profiles</li> <li>• Chemical Cells</li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• Energy changes are an important part of chemical reactions.</li> <li>• The interaction of particles often involves transfers of energy due to the breaking and formation of bonds.</li> <li>• Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic.</li> <li>• These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications.</li> <li>• Some interactions between ions in an electrolyte result in</li> </ul>	<p><b>AQA Chemistry Unit 6</b></p> <ul style="list-style-type: none"> <li>• <b>Rate of reaction</b></li> <li>• <b>Collision theory</b></li> </ul> <p><u>Concepts and Principles</u></p> <ul style="list-style-type: none"> <li>• <b>The rate of a chemical reaction can be found by measuring the quantity of a reactant used or the quantity of product formed over time.</b></li> <li>• <b>Collision theory explains how various factors affect rates of reactions.</b></li> <li>• <b>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.</b></li> <li>• <b>Equilibrium is reached when the forward and reverse reactions occur at exactly the same rate. Understanding energy changes that</b></li> </ul>	

	<p>provides evidence for the model of a nuclear atom with electrons in energy levels.</p>	<p>predictions will be made as to the properties of the compound.</p> <ul style="list-style-type: none"> <li>Students will be taught the latest developments in the chemistry of graphite, graphene, fullerenes.</li> </ul>	<p>purity of chemical samples and to monitor the yield from chemical reactions.</p> <ul style="list-style-type: none"> <li>The atom economy (atom utilisation) is a measure of the amount of starting materials that end up as useful products.</li> <li>Chemical equations provide a means of representing chemical reactions and are a key way for chemists to communicate chemical ideas.</li> </ul>	<p>carbonates to produce salts, water and carbon dioxide.</p> <ul style="list-style-type: none"> <li>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'.</li> </ul>	<p>the production of electricity.</p> <ul style="list-style-type: none"> <li>Electricity can also be used to decompose ionic substances and is a useful means of producing elements that are expensive to extract other ways.</li> </ul>	<p><b>accompany chemical reactions is important for this process.</b></p> <ul style="list-style-type: none"> <li><b>In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product.</b></li> </ul>
<b>Key Vocabulary</b>						
<b>Assessment</b>	<p><u>Unit 1 Assessment</u></p> <ul style="list-style-type: none"> <li>Suggest suitable separation and purification techniques for mixtures.</li> <li>Describe how the atomic model and the periodic table developed over time.</li> <li>Explain properties of different groups and transition metals.</li> </ul>	<p><u>Unit 2 Assessment</u></p> <ul style="list-style-type: none"> <li>Draw dot and cross diagrams to represent bonding.</li> <li>Describe the properties of different compounds.</li> </ul>	<p><u>Unit 3 Assessment</u></p> <ul style="list-style-type: none"> <li>Calculate the percentage by mass in a compound.</li> <li>Use the relative formula mass of a substance to calculate the number of moles in a given mass.</li> <li>Explain the effect of a limiting quantity of a reactant on the amount of products.</li> <li>Explain how the mass of a solute and the volume of a solution is related to the</li> </ul>	<p><u>Unit 4 Assessment</u></p> <ul style="list-style-type: none"> <li>Explain reduction and oxidation.</li> <li>Explain how the reactivity of metals is related to the tendency of the metal to form its positive ion.</li> <li>Evaluate specific metal extraction processes.</li> <li>Write ionic equations for displacement reactions.</li> <li>Describe how to carry out titrations.</li> <li>Describe neutrality and relative acidity.</li> </ul>	<p><u>Unit 5 Assessment</u></p> <ul style="list-style-type: none"> <li>Distinguish between exothermic and endothermic reactions on the basis of the temperature change of the surroundings.</li> <li>Draw simple reaction profiles (energy level diagrams) for exothermic and endothermic reactions.</li> <li>Calculate the energy transferred in chemical reactions using bond energies supplied.</li> </ul>	<p><u>Unit 6 Assessment</u></p> <ul style="list-style-type: none"> <li>Recall how changing factors affects the rate of chemical reactions.</li> <li>Predict and explain using collision theory the effects of changing conditions of concentration, pressure and temperature on the rate of a reaction.</li> <li>Make qualitative predictions about the effect of changes on systems at equilibrium when given</li> </ul>

			<p>concentration of the solution.</p> <ul style="list-style-type: none"><li>• Calculate the theoretical mass of a product and the atom economy of a reaction.</li></ul>	<ul style="list-style-type: none"><li>• Predict the products of the electrolysis.</li></ul>	<ul style="list-style-type: none"><li>• Write the half equations for the electrode reactions in the hydrogen fuel cell.</li></ul>	<p>appropriate information.</p>
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**Curriculum Intent:** In their final year of study, Year 11 students will develop a deep understanding of scientific ideas making explicit links between topics studied. They will develop independence and gain confidence in working and thinking scientifically. Students continue to develop scientific skills, directly linked to their required practicals including forming hypotheses, clear written methods, knowledge, and use of scientific equipment as well as presenting and analysing results. The Assessment outcomes are AO1: Demonstrate knowledge and understanding of scientific ideas, scientific techniques, and procedures. AO2: Apply knowledge and understanding of scientific ideas, scientific enquiry, techniques, and procedures. AO3: Analyse information and ideas to interpret, evaluate, make judgements, draw conclusions, develop experimental procedures and improve experimental procedures.

Year 11	HT1	HT2	HT3	HT4	HT5	HT6
<p><b>Content, Knowledge &amp; Skills</b></p> <p><b><u>AQA Chemistry Unit 7</u></b></p> <ul style="list-style-type: none"> <li>Crude oil</li> <li>Hydrocarbons</li> <li>Alcohols and carboxylic acid</li> <li>Polymerisation and amino acids</li> </ul> <p><b><u>Concepts and Principles</u></b> A great variety of carbon compounds is possible because carbon atoms can form chains and rings linked by C-C bonds. These compounds come from once living sources, and hence they are called organic molecules. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Hydrocarbons are molecules consisting of hydrogen and carbon only. These can be 'cracked' to make other organic molecules and modify them in many ways to make new and useful materials.</p>	<p><b><u>AQA Chemistry Unit 8</u></b></p> <ul style="list-style-type: none"> <li>Purity</li> <li>Formulation</li> <li>Separation techniques</li> </ul> <p><b><u>Concepts and Principles</u></b></p> <ul style="list-style-type: none"> <li>A pure substance is a single element or compound, not mixed with any other substance. A formulation is a mixture that has been designed as a useful product.</li> <li>Analysts have developed a range of qualitative tests to detect specific chemicals.</li> <li>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.</li> <li>Chromatography can be used to separate mixtures and can give information to help identify substances.</li> </ul>	<p><b><u>AQA Chemistry Unit 9</u></b></p> <ul style="list-style-type: none"> <li>Atmospheric pollution</li> <li>Earths early atmosphere</li> <li>Carbon footprint</li> </ul> <p><b><u>Concepts and Principles</u></b> The Earth's atmosphere is dynamic and forever changing. The causes of these changes are sometimes man-made and sometimes part of many natural cycles. The combustion of fuels is a major source of atmospheric pollutants. Theories about what was in the Earth's early atmosphere and how the atmosphere was formed have changed and developed over time. The problems caused by increased levels of air pollutants require the development of solutions that help to reduce the impact of human activity.</p>	<p><b><u>AQA Chemistry Unit 10</u></b></p> <ul style="list-style-type: none"> <li>Sustainability</li> <li>Reducing the use of resources</li> <li>Alloys, ceramics, composites and polymers</li> <li>The Haber process</li> </ul> <p><b><u>Concepts and Principles</u></b> Industries use the Earth's natural resources to manufacture useful products. In order to operate sustainably, ways to minimise the use of limited resources, use of energy, waste and environmental impact are developed. Ways to recycle water and land are developed and utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists' study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.</p>	<p><b><u>GCSE Chemistry Triple Content</u></b></p> <ul style="list-style-type: none"> <li>Practicing Maths in Science.</li> <li>Re-visit Chemistry RPAs</li> </ul> <p><b><u>Concepts and Principles</u></b></p> <ul style="list-style-type: none"> <li>Application</li> <li>Evaluation</li> <li>Interpretation</li> <li>Problem-solving</li> <li>Planning and prediction</li> </ul>		

		<ul style="list-style-type: none"> <li>Instrumental methods provide fast, sensitive and accurate means of analysing chemicals. Flame emission spectroscopy is an example of an instrumental method used to analyse metal ions in solutions.</li> <li>Forensic scientists and drug control scientists rely on such instrumental methods in their work.</li> </ul>	<p><b><u>AQA Chemistry Unit 10</u></b></p> <ul style="list-style-type: none"> <li>Potable water and LCA's</li> <li>Reducing use of resources</li> </ul> <p><b><u>Concepts and Principles</u></b></p> <ul style="list-style-type: none"> <li>All humans rely on safe drinking water. Salt can be removed from sea water to make it safe to drink. Waste water must be treated before being released into the environment.</li> <li>Life cycle assessments- Analysis of the impact of a manufactured product on the environment.</li> <li>Many products are recycled to lessen environmental impact.</li> </ul>			
<p><b>Key Vocabulary</b></p>						

<b>Assessment</b>	<u>Unit 7 Assessment</u> <ul style="list-style-type: none"> <li>• Write balanced equations for the complete combustion of hydrocarbons and cracking.</li> <li>• Know the conditions used for fermentation of sugar using yeast.</li> <li>• Know and recognise formulas of alcohols, alkanes, alkenes and carboxylic acids.</li> <li>• Draw diagrams to represent the formation of a polymer from a given alkene monomer.</li> </ul>	<u>Unit 8 Assessment</u> <ul style="list-style-type: none"> <li>• Use melting point and boiling point data to distinguish pure from impure substances. Identify formulations.</li> <li>• Interpret chromatograms and determine R<sub>f</sub> values from chromatograms.</li> <li>• Write balanced equations for the reactions to produce the insoluble hydroxides.</li> <li>• State advantages of instrumental methods compared with the chemical tests in this specification.</li> <li>• Know how carbonates, sulphides and halides can be identified.</li> </ul>	<u>Unit 9 Assessment</u> <ul style="list-style-type: none"> <li>• Interpret evidence and evaluate different theories about the Earth's early atmosphere.</li> <li>• Describe the main changes in the atmosphere over time and some of the likely causes of these changes.</li> <li>• Discuss the scale, risk and environmental implications of global climate change.</li> <li>• Explain the problems caused by increased amounts of pollutants.</li> </ul>	<u>Unit 10 Assessment</u> <ul style="list-style-type: none"> <li>• Distinguish between finite and renewable resources.</li> <li>• Describe the differences in treatment of ground water and salty water.</li> <li>• Evaluate alternative biological methods of metal extraction.</li> <li>• Carry out comparative LCAs for shopping bags made from plastic and paper.</li> </ul>	<ul style="list-style-type: none"> <li>• Practicing extended writing answers, especially those related to required practicals.</li> <li>• Opportunity to fine-tune exam skills.</li> <li>• Re-visit content as informed by March Progress Exams.</li> <li>• Re-visit calculations within the Chemistry curriculum.</li> </ul>	
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