Curriculum Overview – Science with GCSE Triple and Trilogy					
	Year 7	Year 8	Year 9	Year 10	Year 11
Atomic structure & the periodic table	The idea that matter is made from matter is introduced in the matter topic in Year 7 as is the existence of negatively charged electrons.	The periodic table is introduced formally along with its usefulness in making predictions Students learn about the structure of the periodic table, group 1 elements and how the periodic table is useful	Students study how atomic structure has developed over time. This demonstrates how scientists develop ideas over time through experimentation and the discovery of new evidence. Students the structure of the atoms in terms of sub-atomic particles is studied.	The link between the structure periodic table and electron structure is introduced as a way of explaining trends in reactivity which are observed in groups 1 and 7 along with the inert nature of the noble gases. Groups 1, 7 and 0 are studied. The role of Mendeleev in developing the modern periodic table gives students an insight into how scientific ideas develop and become accepted on the basis of evidence.	
Properties of matter	The particle model is formally introduced, and students learn how to use it to explain the properties of the different states of matter. Students use the particle model to explain diffusion. Students are introduced to the link between changes of state and energy and as part of this learning to explain the shape of heating (or cooling) curves Students learn about solubility and in particular the link between solubility and temperature for solid. Students learn what a mixture and a pure substance are in terms of particles.	The differences between metals and non-metals are investigated and the concepts of elements, compounds. The existence of different materials such as polymers, composites and ceramics are introduced and their useful properties linked to their uses.			Organic Chemistry is introduced through study of the alkanes. GCSE Chemistry students also study alkenes, alcohols, carboxylic acids and esters. Polymerisation is introduced.

	During this students will interpret simple graphs and describe trends shown by graphs. The properties of metals and non-metals and the usefulness of classifying materials is studied.				
Bonding	The concept that in solids and liquids particles are held together by attractive forces is introduced.		Types of bonding are introduced along with the structures of materials. Students learn about ionic, covalent and metallic bonding in terms of electrons. Students learn about giant ionic lattice, giant covalent, molecular, metallic and fullerene structures. Nanoparticles will also be introduced and their properties and usefulness studied.	The link between properties of ionic compounds and their structure is developed when studying electrolysis	The link between chain length and the strength of intermolecular forces is developed by studying the trend in boiling points in the alkanes. The link between the strength of intermolecular forces or chemical bonds and melting point is developed by studying thermosetting and softening polymers (triple only)
Chemical change	The concept of the reactivity series of metals is introduced through studying the reaction of metals and acids and displacement reactions. The usefulness of the reactivity series in allowing predictions about reactivity to be made is highlighted. Oxidation reactions are introduced in terms of oxidation. The concept of acidity, alkalinity and pH is introduced. The use of indicators is studied and the concept of neutralization is introduced. Investigating the effectiveness of indigestion remedies allows students to develop their investigative skills.	The concept of the reactivity series of metals is introduced through studying the reaction of metals and acids and displacement reactions. The usefulness of the reactivity series in allowing predictions about reactivity to be made is highlighted. Oxidation reactions are introduced in terms of oxidation. Rusting is studied will provides a real world application of ideas about the reactivity series.		Understanding of reactivity series and it link to metal extraction is developed further. The concept of redox in terms of electrons is introduced. Explanation of acids and alkalis and neutralisation in terms of hydrogen and hydroxide ions are introduced. The concept of the pH scale is developed in terms of hydrogen ions and the concept of strong and weak acids is introduced. Students study the use of electrolysis to separate the	GCSE Chemistry students study rusting and methods for preventing rusting in greater detail. GCSE chemistry students also study how fertilisers are prepared from ammonia and other materials.

				elements in ionic compounds.	
Earth & atmosphere	The structure of the Earth is introduced and igneous, sedimentary and metamorphic rocks are explored. These ideas are then pulled together in the rock cycle.				The evolution of the Earth's atmosphere is introduced. Forms of air pollution, their causes, impact and how we can reduce them are also studied. The effect of mineral extraction on the Earth is explored and alternative less damaging ways of extracting metal ores are explored.
Rate of reactions				The concept of rate of reaction and how this is explained by collision theory is introduced. The effect of catalysts is introduced. Practical methods for measuring rate of reaction are demonstrated and practiced by students. The concept of reversible reactions and equilibria are also introduced. The effect of making changes to various factors on the position of an equilibrium are studied.	GCSE Chemistry students apply their understanding of rate and equilibria to the Haber process.
Energy changes		The concept of energy changes in chemical reactions is introduced. Both exothermic and endothermic reactions are investigated and the etymology of the words highlighted		The concept of energy changes in chemical reactions is developed further. Energy profile diagrams are introduced as is the concept of activation energy. The calculation of the energy change of a reaction using mean bond enthalpies is also studied.	GCSE Chemistry students study the impact of energy changes on the Haber process

				GCSE Chemistry students also learn abut the link between voltage of electrochemical cells and the difference in reactivity of the electrodes	
Quantitative chemistry	The use of word equations to represent chemical reactions is used throughout this year. Formulae of common compounds such as water may be used.	The use of symbols to represent common elements will be introduced. The meaning of chemical formulae will be explored. The use of symbol equations will be developed and used for most reaction and the concept of balancing equations will be developed.	The meaning of chemical formulae will be reinforced. The use of balanced symbol equations will be reinforced.	The principle of conservation of mass in a chemical reaction is reinforced. The concept of the mole is introduced and how it is used to perform various calculations around reactions involving masses will be studied. (Higher tier only). GCSE Chemistry students will also study how to use similar calculations involving solutions and gases. (Triple only)	
Chemical analysis and preparation	Students will be introduced to the fundamental separation techniques of filtration, distillation and chromatography During the topic students will learn how to carry out these techniques practically as well as the purpose of each and when they might be used.		Students will revisit the separation techniques and build on their knowledge of each technique as well as learning about fractional distillation Students will learn how to determine the Rf value of a dot on a paper chromatogram .	Students will develop their understanding of how to put techniques together in order to prepare crystals of a salt. Students will learn about crystallization and how to perform a crystallization.	Students will develop their understanding of chromatography how chemical tests and instrumental techniques are used in analytical chemistry. The principles of how a fractionating column is used to separate crude oil are studied. The use of distillation, reverse osmosis and filtration in different methods for the purification of drinking water as well as the treatment of wastewater are studied. The allows students to see real world applications for practical techniques they have learnt.