Chemistry Separate Science			
Year 10			
Term 1 content and skills	**Term 2 Content and skills**	**Term 3 Content and Skills**	**Extended Curriculum (trips/visits/afterschool activities)**
Module 1 Atomic structure and the periodic table (Links to KS3 T6, T22 and T28) The topic explores the link between the structure of the atom and the arrangement of elements in the modern periodic table. • Atoms, Elements and Compounds • Separating mixtures • The structure of the atom and development of the model of the atom (Same content as Physics Module 4) • Electron arrangement • Ions • Relative atomic mass and Isotopes(Links the Physics GCSE module 4) • How the theory of atomic structure has changed over time • The periodic table • Group 1	**Module 3 Chemical changes** (Links to KS3 T13, T16, T19 and T28) This topic explores chemical reactions and how we can use these chemical reactions to produce useful materials • Reactivity of metals • Displacement reactions • Extraction of metals • **Required Practical**: Making copper sulfate • The pH scale and neutralisation • Electrolysis of molten ionic compounds • Electrolysis of aqueous ionic compounds • **Required Practical**: Electrolysis of aqueous solution • Using electrolysis to extract aluminium	*Module 5 continues in this term* **Module 4 Energy changes** (Links to KS3 T16) This topic explores the energy changes that accompany chemical reactions and then looks at how we can use chemical reactions to produce electricity in electrochemical cells • Exothermic and endothermic reactions • **Required Practical:** Measuring temperature changes during a reaction • Calculating the energy change of reactions using bond energies • Electrochemical cells • Hydrogen fuel cells	• Stem Club

• Group 7 and group 0 • Transition metals **Module 2 Bonding** (Links to KS3 T15 and T28) This topic develops models of the structure and bonding of materials to explain their properties and then looks at the development of new materials with unique properties for a range of technologies. • States of matter and the particle model • Ionic bonding • Small covalent molecules • Metallic bonding • Polymers • Giant covalent structure • Graphene and Fullerene • Nano technology	**Module 5 Quantitative Chemistry** (Links to KS3 T28) (Links to maths-ratios and units) This topic explores the use of quantitative analysis to predict chemical formula, the equations for reactions and predict the mass, concentration and volume of reactants used and products made. • Conservation of mass and balancing chemical equations • Relative formula mass • Moles • Balancing equations using moles • Finding formula using moles • Limiting reactants • Concentration • Titrations • **Required Practical:** Acid Base Titration • Moles of gases • % yield • Atom economy		
Assessment: A key skills set task per topic (based on practical work, numeracy, data analysis or literacy), end of topic test (which can be open book or closed book). Additionally low stakes testing (eg Microsoft forms quizzes, exam questions etc) are used within lessons.			

Assessment: End of term closed book written test	**Assessment:** End of term closed book written test	**Assessment:** End of term paper 1 exam	

Chemistry Separate Science			
Year 11			
Modules may move around between the terms in year 11 each year to best support that year group.			
Term 1 content and skills	**Term 2 Content and skills**	**Term 3 Content and Skills**	**Extended Curriculum (trips/visits/afterschool activities)**
Module 8 Chemical analysis (Links to KS3 T6,T7 and T9) This topic starts by looking at how to separate a mixture into its separate components and then goes onto to explore chemical analytical techniques to discover the identity of the components • Separating mixtures • Chromatography • Gas tests • Flame tests • Testing for cations • Testing for anions • Required Practical: Use of chemical tests to identify an unknown compound **Module 7 Organic** (Links to KS3 T18, T6 and T7) This topic introduces the learner to the field of Organic chemistry, identifying groups of organic molecules and the properties and	**Module 6: The rate and extent of Chemical change** (Links to KS3 T5) This topic looks at the rate of chemical reactions and how to measure it and then explores the factors that effects the rate of the reaction. Then we study how far reactions go and introduce the concept of chemical equilibria and study the factors that control the equilibrium yield. Finally industrial process such as the production of ammonia is studied to see how the conditions used are a compromise between rate of reaction equilibrium yield and costs • How to measure the rate of reactions • Describing and explaining the factors that control the rate of a reaction • **Required Practical:** Experiments to investigate the effect of concentration on the rate of reactions	*Continuing with Module 9 from last term* **Module 10 Earths resources** (Links to KS3 T7 and T25) This topic explores how chemists can use natural resources in a sustainable way. • Managing resources • Obtaining water from fresh water and sea water • Cleaning wastewater • **Required Practical:** Analysis and purification of water samples • NPK fertilisers • Extracting metals and new ways of obtaining copper from low grade ores • Corrosion and its prevention • Polymers ceramics and composites Consolidation work and revision for exams	• Stem Club

reactions that characterise these groups • Crude oil and hydrocarbons • Alkanes as fuels • Cracking and reactions of alkenes • Homologous series • Reactions of alcohols • Reactions of carboxylic acids • Polymerisation •	• Catalysts • Chemical equilibria • Using Le Chatelier's principle to determine the equilibrium yield • The Haber process to make ammonia **Module 9 Chemistry of the atmosphere** (Links to KS3 T18 and climate change lessons and maths (Pie Charts)) This topic explores how the current atmosphere has evolved over geological time from earth very early atmosphere. It then goes onto look at more recent changes in our atmosphere in particular the increasing levels of the greenhouse gases carbon dioxide and methane and the consequences of global warming. Finally, the effects of other pollutants of burning fossil fuels are explored. • Chemistry of the current atmosphere • Evolution of the atmosphere from the early atmosphere • The greenhouse effect • The consequences of global warming		

	• Measuring carbon footprint • Other pollutants from burning fossil fuels		
Assessment: A key skills set task per topic (based on practical work, numeracy, data analysis or literacy), end of topic test (which can be open book or closed book). Additionally low stakes testing (eg Microsoft forms quizzes, exam questions etc) are used within lessons.			
Assessment: Interim exam on paper 1 content	**Assessment:** Mock exam on Paper 2 content	**Assessment:** GCSE exams	