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 Foundations in Chemistry (Links to KS3 T6, and T12) • Separation techniques • Atomic structure; protons, neutrons Electrons and electron shells, • Relative atomic masses, charges and sizes; • Isotopes (Links the Physics GCSE module 4) • How the theory of atomic structure has changed over time (Same content as Physics Module 4) • • Structure of the periodic table -elements arranged relating to electronic and atomic structure Trends in the periodic table - Group 1 - Group 7 - Group 0 • Properties of transition metals	*In this term we may change the order of Module 3 and 4 depending on the maths skills of the group.* **Module 3 Quantitative Chemistry** (Links to KS3 T29) (Links to maths-ratios and units) Balanced equations and conservation of mass • Relative formula masses • Calculating percentage yield • atom economy • Theoretical yield • Moles and determining the stoichiometry of an equation; • Relationship between volume, mass and molar concentration **Required practical-** Titrating an unknown concentration of acid • Gas volumes and moles	*Module 4 continues in this term* **Module 5 Energy changes** (Links to KS3 T25) • Bond breaking and making relates to exo- and endothermic reactions • Reaction profiles • Relative bond energies as related to exo- and endothermic reactions • Extraction and purification in the industrial processes- including electrolysis and biological methods • Fuel cells **Required practical-** Neutralisation of sodium hydroxide and hydrochloric acid using temperature change to monitor the exothermic reaction	• Medtech challenge – links to engineering, design + tech, business skills. Provide industry mentor. • Stem Club • Launchpad- working with Form the Futures and local industry

Module 2 Bonding (Links to KS3 T15 and T25) • The main features of the particle model in terms of states of matter • Predict the state of substances under given conditions • Reactions take place via electron or proton transfer, or electron sharing Bonds are formed by transferring or sharing electrons Dot and cross diagrams for • -simple covalent structures • -ionic • limitations of bonding models • Types of bonding (double/ single bonds; ionic/covalent) and how bonding relates to bulk properties, including in carbon allotropes • Metallic bonding • Relative strengths of intra and intermolecular bonds as related to state changes, • Reactions take place via electron or proton transfer,	**Module 4 Chemical changes** (Links to KS3 T15 and T25) • Reactivity series • Reactions of acids • Neutralisation • Reaction with carbonates • Reactivity of metals and acid as related to the tendency of metal to form positive ions • Acids as sources of hydrogen ions Alkalis contain hydroxide ions in solution **Required practical -**Making and insoluble salt • Redox reactions reduction and oxidation in terms of loss and gain of oxygen (F) • Redox in terms of electrons lost and gained (H) • Electrolysis • Common species at the cathode and anode • Electrolysis of binary ionic compounds **Required Practical -**Electrolysis of copper chloride, copper sulfate, sodium sulfate and sodium chloride • Competing reactions		

or electron sharing Bonds are formed by transferring or sharing electrons • how bonding relates to bulk properties, including in carbon allotropes • Relative strengths of intra and intermolecular bonds as related to state changes • Nanomaterials- graphene			
Assessment: Low stakes Microsoft Forms quizzes throughout all topics. End of term written test	**Assessment:** Low stakes Microsoft Forms quizzes throughout all topics. End of term written test	**Assessment:** Low stakes Microsoft Forms quizzes throughout all topics. End of term written test	

Chemistry Separate Science			
Year 11			
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) - Analytical techniques - identification of common gases - a type of instrumental analysis - including interpreting an instrumental result in tabular or chart form. - Chromatography - Separation techniques (Link to module 1) - Filtration - Crystallisation - Advanced chromatography **Required practical**-Chromatography of an unknown food colouring - Simple and fractional distillation Substance is pure/impure - Tests for aqueous cations ions - Using NaOH - Using flame tests	**Module 7 Organic** *(started in term 1 and continued in term 2***)** (Links to KS3 T18, T6 and T7) • Carbon can form 4 covalent bonds and this property allows it to form a vast array of natural and synthetic compounds • Functional groups in organic compounds - alkanes, - alkenes, - alcohols - carboxylic acids • Draw using structural formula the functional groups listed above Functionality can be used to predict reactions • Simple reactions -combustion - addition across a double bond - oxidation of alcohols)	*Continuing with Module 10 from last term* **Module 9 Chemistry of the atmosphere** (Links to KS3 T18 and climate change lessons and maths (Pie Charts)) Composition and evolution of the atmosphere Evidence for modern day atmosphere causes, prevention and effects of climate change Carbon footprints Pollutants from fuels and their effect on the environment Consolidation work and revision for exams	• Stem Club

- Tests for anions including - Sulfates - Carbonates - Halides **Required practical-** Testing an unknown salt **Module 6: Rates** (Links to KS3 T5) • Factors that affect frequency and energy of collisions • Activation energy • Interpretation of simple rate graphs Factors that affect frequency and energy of collisions - Temperature - Pressure - Catalyst - Surface area - Concentration **Required practical-** measuring rates- looking at concentration**.** • Activation energy • Interpretation of simple rate graphs. • Reversible reactions • Equilibrium • Factors that effect equilibrium - Concentration - Temperature - Pressure	- Fractional distillation and cracking to make useful materials - Carbon compounds are a finite feedstock and fuel **Module 10 Earths resources** (Links to KS3 T7 and T22) • Fertilisers • Haber process# • industrial production and lab synthesis of fertilisers • recycling and life cycle assessments • Methods for obtaining potable water • separation techniques used for the treatment of waste, ground and salt water **Required practical-** obtaining water from salt water and how to collect both salt and water. • Compare the physical properties of materials and justify their use • Phytomining and bioloeaching • Corrosion • The composition of different alloys		

	• Principles of addition polymerisation including monomers, repeat units and naturally occurring polymers Condensation polymerisation and repeat units, • Importance of functional groups		
Assessment: Low stakes Microsoft Forms quizzes throughout all topics. Interim exam on paper 1 content	**Assessment:** Low stakes Microsoft Forms quizzes throughout all topics. Mock exam on Paper 2 content	**Assessment:** Low stakes Microsoft Forms quizzes throughout all topics. GCSE exams	