

**Chemistry Trilogy Science**

**Year 10**

Term 1 content and skills	Term 2 Content and skills	Term 3 Content and Skills	Extended Curriculum (trips/visits/afterschool activities)
<p><b>Module 1 Foundations in Chemistry</b> (Links to KS3 T6 and T12)</p> <ul style="list-style-type: none"> <li>• Separation techniques</li> <li>• Atomic structure; protons, neutrons Electrons and electron shells,</li> <li>• Relative atomic masses, charges and sizes;</li> <li>• Isotopes (links with Physics Module 4)</li> <li>• How the theory of atomic structure has changed over time (Same content as Physics Module 4)</li> <li>• Structure of the periodic table -elements arranged relating to electronic and atomic structure Trends in the periodic table                             <ul style="list-style-type: none"> <li>- Group 1</li> <li>- Group 7</li> <li>- Group 0</li> </ul> </li> </ul> <p><b>Module 4 Chemical changes</b> (Links to KS3 T15 and T25)</p>	<p><b>Module 4 continued Chemical changes</b> (Links to KS3 T15 and T25)</p> <ul style="list-style-type: none"> <li>• Reactions of acids</li> <li>• The pH scale and neutralisation</li> <li>• Reaction with carbonates tendency of metal to form positive ions</li> <li>• Acids as sources of hydrogen ions</li> <li>• Alkalis contain hydroxide ions in solution</li> </ul> <p><b>Required practical-</b> Making and insoluble salt</p> <ul style="list-style-type: none"> <li>• Strong and weak acids</li> <li>• Redox reactions reduction and oxidation in terms of loss and gain of oxygen (F)</li> <li>• Redox in terms of electrons lost and gained (H)</li> <li>• Electrolysis and extraction of metals and of aqueous solutions</li> <li>• Common species at the cathode and anode</li> </ul>	<p><i>Module 2 continues in this term</i></p> <p><b>Module 3 Quantitative Chemistry</b> (Links to KS3 T29) (Links to maths-ratios and units)</p> <p>Balanced equations and conservation of mass</p> <ul style="list-style-type: none"> <li>• Relative formula masses</li> <li>• Calculating percentage yield</li> <li>• atom economy</li> <li>• Theoretical yield</li> <li>• Moles and determining the stoichiometry of an equation;</li> <li>• Relationship between volume, mass and molar concentration</li> <li>• Gas volumes and moles</li> </ul> <p><b>Module 5 Energy changes</b> (Links to KS3 T25 and GCSE Physics Module 1)</p>	<ul style="list-style-type: none"> <li>• Medtech challenge – links to engineering, design + tech, business skills. Provide industry mentor.</li> <li>• Stem Club</li> </ul> <p>Launchpad- working with Form the Futures and local industry</p>

<ul style="list-style-type: none"> <li>• Reactivity series</li> </ul>	<ul style="list-style-type: none"> <li>• Electrolysis of binary ionic compounds</li> </ul> <p><b>Required Practical</b> - Electrolysis of copper chloride, copper sulfate, sodium sulfate and sodium chloride</p> <ul style="list-style-type: none"> <li>• Half equations to represent reactions at the cathode and anode</li> </ul> <p><b>Module 2 Bonding</b> (<a href="#">Links to KS3 T3 and T29</a>)</p> <ul style="list-style-type: none"> <li>• The main features of the particle model in terms of states of matter</li> <li>• Predict the state of substances under given conditions</li> <li>• Reactions take place via electron or proton transfer, or electron sharing Bonds are formed by transferring or sharing electrons</li> </ul> <p>Dot and cross diagrams for</p> <ul style="list-style-type: none"> <li>• -simple covalent structures</li> <li>• -ionic</li> <li>• limitations of bonding models Types of bonding (double/ single bonds; ionic/covalent) and how bonding relates to bulk properties, including in carbon allotropes</li> <li>• Metallic bonding</li> </ul>	<ul style="list-style-type: none"> <li>• Bond breaking and making relates to exo- and endothermic reactions</li> <li>• Reaction profiles</li> <li>• Relative bond energies as related to exo- and endothermic reactions</li> </ul> <p><b>Required practical-</b> Neutralisation of sodium hydroxide and hydrochloric acid using temperature change to monitor the exothermic reaction</p>	
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	<ul style="list-style-type: none"> <li>• Relative strengths of intra and intermolecular bonds as related to state changes,</li> <li>• Reactions take place via electron or proton transfer, or electron sharing Bonds are formed by transferring or sharing electrons</li> <li>• how bonding relates to bulk properties, including in carbon allotropes</li> <li>• Relative strengths of intra and inter-molecular bonds as related to state changes</li> </ul>		
<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. End of term written test</p>	<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. End of term written test</p>	<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. End of paper 1 test</p>	

**Chemistry Trilogy Science**

**Year 11**

Term 1 content and skills	Term 2 Content and skills	Term 3 Content and Skills	Extended Curriculum (trips/visits/afterschool activities)
<p><b>Module 8 Chemical analysis</b> (Links to KS3 T6,T7 and T9 )</p> <ul style="list-style-type: none"> <li>- Pure substances</li> <li>- Formulations</li> <li>- identification of common gases</li> <li>- a type of instrumental analysis</li> <li>- including interpreting an instrumental result in tabular or chart form.</li> <li>- Chromatography</li> <li>- Separation techniques (Link to Module 1)</li> </ul> <p><b>Required practical</b>-Chromatography of an unknown food colouring</p> <ul style="list-style-type: none"> <li>- Simple and fractional distillation Substance is pure/impure</li> </ul> <p><b>Module 6: Rates</b> (Links to KS3 T5)</p> <ul style="list-style-type: none"> <li>• Calculating rates of reaction</li> <li>• Factors that affect frequency and energy of collisions</li> </ul>	<p><b>Module 7 Organic</b> (started in term 1 and continued in term 2) (Links to KS3 T18, T6, T7 and Module 2 GCSE Biology)</p> <ul style="list-style-type: none"> <li>• Carbon can form 4 covalent bonds and this property allows it to form a vast array of natural and synthetic compounds</li> <li>• Functional groups in organic compounds               <ul style="list-style-type: none"> <li>- alkanes,</li> <li>- alkenes,</li> </ul> </li> <li>• Draw using structural formula the functional groups listed above Functionality can be used to predict reactions</li> <li>• Simple reactions               <ul style="list-style-type: none"> <li>- combustion</li> <li>- addition across a double bond</li> <li>- oxidation of alcohols)</li> </ul> </li> </ul>	<p><b>Module 9 Chemistry of the atmosphere</b> (Links to KS3 T18 and climate change lessons)</p> <p>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</p> <p>Consolidation work and revision for exams</p>	<ul style="list-style-type: none"> <li>• Stem Club</li> <li>• Intervention sessions- exam technique</li> </ul>

<ul style="list-style-type: none"> <li>• Activation energy</li> <li>• Catalysts</li> <li>• Interpretation of simple rate graphs</li> </ul> <p>Factors that affect frequency and energy of collisions</p> <ul style="list-style-type: none"> <li>- Temperature</li> <li>- Pressure</li> <li>- Catalyst</li> <li>- Surface area</li> <li>- Concentration</li> </ul> <p><b>Required practical-</b> measuring rates- looking at concentration.</p> <ul style="list-style-type: none"> <li>• Activation energy</li> <li>• Interpretation of simple rate graphs.</li> <li>• Reversible reactions</li> <li>• Equilibrium</li> <li>• Factors that effect equilibrium</li> </ul> <ul style="list-style-type: none"> <li>- Concentration (H)</li> <li>- Temperature (H)</li> <li>- Pressure (H)</li> </ul>	<ul style="list-style-type: none"> <li>- Fractional distillation and cracking to make useful materials</li> <li>- Carbon compounds are a finite feedstock and fuel</li> <li>-</li> </ul> <p><b>Module 10 Earths resources</b> (<a href="#">Links to KS3 T7 and T22</a>)</p> <ul style="list-style-type: none"> <li>• Natural (finite) versus manmade resources</li> <li>• Recycling and life cycle assessments</li> <li>• Methods for obtaining potable water</li> <li>• separation techniques used for the treatment of waste, ground and salt water</li> </ul> <p><b>Required practical-</b> Obtaining water from salt water and how to collect both salt and water.</p> <ul style="list-style-type: none"> <li>• Compare the physical properties of materials and justify their use</li> <li>• Phytomining and bioleaching</li> </ul>		
<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. Interim exam on paper 1 content</p>	<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. Mock exam on Paper 2 content</p>	<p><b>Assessment:</b> Low stakes Microsoft Forms quizzes throughout all topics. GCSE exams</p>	