



**Curriculum Map: Year 11**

**Subject: Combined Science Trilogy Chemistry Exam Board: AQA**

<b>Topic</b>	<b>Key Knowledge</b> <i>What will all students KNOW by the end of the topic?</i>	<b>Key Skills</b> <i>What key skills will be learnt/developed by the end of the topic? What will all students be able to DO by the end of the topic?</i>	<b>Assessment Opportunities</b> <i>What are the key pieces of assessment? How will students be assessed?</i>
Quantitative Chemistry	<ul style="list-style-type: none"> <li>• Consolidation of writing and balancing equations</li> <li>• Be familiar with specific key terms e.g. relative atomic mass/formula mass, mole, limiting reactant</li> <li>• The conservation of mass law - Avogadro's number</li> <li>• Amounts of substance can be measured in moles</li> <li>• How conservation of mass can be understood using formula masses and moles in balanced equations</li> <li>• How to calculate % of an element in a compound</li> <li>• How to calculate reacting masses in balanced equations</li> <li>• What limiting reactants are and their effect on reacting mass calculations</li> <li>• How concentration of solutions is measured in chemistry</li> <li>• Be familiar with specific key terms e.g. relative atomic mass/formula mass, mole, limiting reactant, yield, concentration</li> </ul> <p>The uncertainty associated with any measurements taken</p>	<ul style="list-style-type: none"> <li>• Investigating mass changes using various apparatus</li> <li>• Writing, balancing and interpreting chemical equations</li> <li>• Use formula mass to calculate moles and vice versa</li> <li>• Recognising and use expressions in standard form</li> <li>• Using ratios, fractions and percentages</li> <li>• Changing the subject of a variety of equations</li> <li>• Converting units</li> <li>• Using appropriate numbers of significant figures</li> <li>• Changing the subject of a variety of equations</li> <li>• Identifying anomalous results and making estimations of uncertainty</li> <li>• Calculating the mean of a data set and use the range as a measure of uncertainty</li> </ul>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul> <p>Assessment 2</p>
Energy Changes	<ul style="list-style-type: none"> <li>• Energy is conserved during chemical reactions</li> <li>• What exothermic and endothermic reactions are including everyday examples of them</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring temperature changes of simple chemical reactions and classifying them as exo or endothermic</li> </ul>	<p>Required practical – temperature changes</p> <ul style="list-style-type: none"> <li>• Homework</li> </ul>

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	<ul style="list-style-type: none"> <li>• How reaction profiles are used to represent chemical reactions</li> <li>• What activation energy is</li> <li>• Energy is needed to break chemical bonds</li> </ul> <p>Energy is released when new bonds are formed</p>	<ul style="list-style-type: none"> <li>• Investigating the variables that affect temperature changes</li> <li>• Drawing and interpreting reaction profiles for exothermic and endothermic reactions</li> <li>• Calculating energy changes in reactions using supplied data</li> </ul>	<ul style="list-style-type: none"> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul> <p>Assessment 2</p>
Organic Chemistry	<ul style="list-style-type: none"> <li>• The origin and composition of crude oil</li> <li>• The Alkanes are a homologous series</li> <li>• The general formula and structure of the alkanes</li> <li>• How fractional distillation is used to refine crude oil</li> <li>• Uses of the fractions from crude oil</li> <li>• Properties of hydrocarbons: boiling points, viscosity and flammability</li> </ul> <p>The cracking of hydrocarbons to produce alkenes and useful alkanes</p>	<ul style="list-style-type: none"> <li>• interpreting models of organic molecules</li> <li>• Making predictions of properties based upon regularly changing patterns</li> <li>• Explaining the process of fractional distillation</li> </ul> <p>Using molecular models to represent alkanes, alkenes</p>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul> <p>Assessment 2</p>
Chemistry of the atmosphere	<ul style="list-style-type: none"> <li>• The theory of how the Earth's early atmosphere was generated, how it has changed and what has and is currently changing it.</li> </ul> <p>Specifically:</p> <ul style="list-style-type: none"> <li>○ Combustion reactions</li> <li>○ Carbon dioxide production</li> <li>○ Other pollutants</li> <li>○ Locking up in rocks and the ocean</li> <li>○ Photosynthesis</li> </ul> <ul style="list-style-type: none"> <li>• The proportions of the different gases in the atmosphere</li> <li>• Principles behind the greenhouse effect</li> <li>• How human activities contribute towards the greenhouse effect</li> </ul>	<ul style="list-style-type: none"> <li>• Explaining how (new) evidence can lead to changes in and/or re-enforcement of, accepted models.</li> <li>• Be able to evaluate the quality of evidence</li> <li>• Be able to describe uncertainties in evidence</li> <li>• Be able to describe how a range of pollutants are formed and predict the products of combustion reactions</li> <li>• Be able to describe and explain the problems caused by increased levels of pollutants</li> <li>• Be able to describe effects of global climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Homework</li> <li>• Starter tasks interleaving past knowledge</li> <li>• PPQ</li> <li>• AfL throughout lessons</li> </ul>

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	<ul style="list-style-type: none"><li>Principles behind and effects of climate change</li><li>The definition of a carbon footprint, how its value is arrived at and how it can be reduced</li></ul> A range of common atmospheric pollutants, their sources and effects	<ul style="list-style-type: none"><li>Be able to discuss the scale, risk and environmental implications of climate change</li><li>Be able to describe actions to reduce greenhouse gas emission but also why these may be limited</li></ul>	
Rates of Reactions	<ul style="list-style-type: none"><li>What rate of reaction is and the different ways that it can be monitored, measured and calculated</li><li>The factors that affect the rate of chemical reactions</li><li>How changing these factors affects the rate of chemical reactions: Collision theory, Activation energy</li><li>What catalysts are and how they affect the rate of reactions and reaction profiles</li><li>That some reactions are reversible and examples of reversible reactions</li><li>Energy changes in reversible reactions</li><li>That some reactions are reversible and examples of reversible reactions</li><li>Energy changes in reversible reactions</li><li>The concept of chemical equilibrium</li><li>Le-Chateliers principle</li><li>The effect of changing conditions on equilibrium</li><li>The effect of changing concentration on equilibrium</li></ul> The effect of changing temperature on equilibrium - The effect of changing pressure on equilibrium	<ul style="list-style-type: none"><li>Writing, balancing and interpreting chemical equations</li><li>Drawing and interpreting graphs from given or experimental data</li><li>Calculating the mean rate of reaction</li><li>Drawing tangents to curves</li><li>Measuring the gradient of tangents</li><li>Identifying reversible reactions</li></ul> Making qualitative predictions about changes made to systems at equilibrium	Required practical – Rates <ul style="list-style-type: none"><li>Homework</li><li>Starter tasks interleaving past knowledge</li><li>PPQ</li><li>AfL throughout lessons</li></ul>
Earth's Resources	<ul style="list-style-type: none"><li>A range of renewable and finite resources and their origins.</li><li>What sustainable development is</li><li>How water treated and is made potable</li><li>Ways of reducing the use of resources</li></ul>	<ul style="list-style-type: none"><li>Recalling key terminology.</li><li>Explaining how agriculture has an impact on the use of resources</li></ul>	Required practical – water <ul style="list-style-type: none"><li>Homework</li><li>Starter tasks interleaving past knowledge</li></ul>

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	<ul style="list-style-type: none"><li>• What a Life Cycle Assessment is</li></ul> <p>How recycling, re-using and reducing can all have an impact on sustainability</p>	<ul style="list-style-type: none"><li>• Explaining how water (from a range of sources) is treated and made potable</li><li>• Using simple laboratory equipment to make pure water by distillation.</li><li>• Carry out and interpret chemical tests to the water before and after</li><li>• Applying understanding of sustainable development to a range of familiar and unfamiliar examples</li><li>• How to carry out a simple Life Cycle Assessment Processing data from a wide range of sources relating to a wide range of products, services and processes</li></ul>	<ul style="list-style-type: none"><li>• PPQ</li><li>• AfL throughout lessons</li></ul>
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