



## Year 11: Chemistry

**Curriculum Intent:** Year 11 Separate Chemistry looks to build on the foundation established in the Combined Science course. The more complex topics covered include titrations and quantitative analysis, equilibrium and industrial processes, qualitative analysis including testing for ions and basic organic chemistry. The knowledge gained provides students with a deeper insight into the subject, allowing them to tackle more complex problems and questions which link different areas. It also builds a solid knowledge base for progression to A level chemistry. Practical skills include qualitative and quantitative analysis through ion testing and carrying out titrations and volumetric calculations.

	<b>Topic 1</b> Titrations	<b>Topic 2</b> Equilibrium and pathways	<b>Topic 3</b> Qualitative analysis and compounds	<b>Topic 4</b> Organic Chemistry
<b>Key ideas</b>	<ul style="list-style-type: none"> <li>Theoretical yield</li> <li>Percentage yield</li> <li>Atom economy</li> <li>Titration procedure</li> <li>Titration calculations</li> <li>Gas calculations</li> </ul>	<ul style="list-style-type: none"> <li>Haber process</li> <li>Fertilisers</li> <li>Making fertilisers</li> <li>Contact process</li> <li>Making ethanol</li> <li>Producing electricity</li> </ul>	<ul style="list-style-type: none"> <li>Alloys</li> <li>Corrosion</li> <li>Different materials</li> <li>Transition metals</li> <li>Cation tests</li> <li>Anion tests</li> <li>Instrumental methods</li> <li>Nanoparticles</li> </ul>	<ul style="list-style-type: none"> <li>Alkanes</li> <li>Alkenes</li> <li>Alcohols</li> <li>Carboxylic acids</li> <li>Addition polymers</li> <li>Condensation polymers</li> <li>Biological polymers</li> </ul>
<b>Sequence of Learning - Key Questions</b>	<p>Recap – all content from Combined Chemistry</p> <ol style="list-style-type: none"> <li>How do you calculate theoretical yield?</li> <li>How do you calculate % yield</li> <li>How do you calculate atom economy?</li> <li>How must chemists consider yield and atom economy when designing processes?</li> <li>How do you carry out a titration?</li> <li>How do you record titration results correctly?</li> </ol>	<p>Recap – all content from Combined Chemistry</p> <ol style="list-style-type: none"> <li>What is the Haber process?</li> <li>Explain the optimum conditions for the Haber process</li> <li>Why are fertilisers important?</li> <li>What chemicals make good fertilisers?</li> <li>Describe the contact process for making sulfuric acid</li> <li>Explain the two methods of producing ethanol – fermentation and hydration of ethene</li> </ol>	<p>Recap – all content from Combined Chemistry</p> <ol style="list-style-type: none"> <li>What is an alloy?</li> <li>What is corrosion and how can it be prevented/minimised?</li> <li>What is a composite material?</li> <li>How do you select suitable materials for different jobs?</li> <li>What are the properties and uses of the transition metals?</li> <li>How do you test for cations using flame tests?</li> </ol>	<p>Recap – all content from Combined Chemistry</p> <ol style="list-style-type: none"> <li>What are alkanes?</li> <li>What are alkenes?</li> <li>How can you distinguish between alkanes and alkenes?</li> <li>What are alcohols?</li> <li>What are carboxylic acids?</li> <li>Describe the reactions of alkanes, alkenes, alcohols and carboxylic acids</li> <li>How are addition polymers made from alkenes?</li> </ol>

	<p>7. How do you calculate an unknown concentration from titration results?</p> <p>8. How do you use <math>V=24n</math> to calculate moles and volumes of gas?</p>	<p>7. Comparing the two methods of producing ethanol</p> <p>8. Describe a fuel cell</p> <p>9. Explain how a fuel cell generates electricity</p>	<p>7. How do you test for cations using NaOH?</p> <p>8. How do you test for sulfate ions?</p> <p>9. How do you test for halide ions?</p> <p>10. Explain the use of instrumental methods such as IR spectroscopy, Mass spectrometry and Gas Chromatography</p> <p>11. Explain the uses of nanoparticles</p>	<p>8. How are condensation polymers made from dialcohols with dicarboxylic acids or diamines?</p> <p>9. Describe some biological polymers</p>
<b>Vocabulary</b>	<p>Yield</p> <p>Theoretical</p> <p>Actual</p> <p>Atom economy</p> <p>Titration</p> <p>Concordant</p> <p>Burette</p> <p>Pipette</p> <p>Titre</p>	<p>Equilibrium</p> <p>Shift</p> <p>Pressure</p> <p>Concentration</p> <p>Catalyst</p> <p>Contact Process</p> <p>Haber Process</p> <p>Fermentation</p> <p>Hydration</p> <p>Fuel cell</p> <p>Anode</p> <p>Cathode</p> <p>Redox</p> <p>Reduction</p> <p>Oxidation</p>	<p>Alloy</p> <p>Rusting</p> <p>Barrier</p> <p>Sacrificial metal</p> <p>Galvanisation</p> <p>Composite materials</p> <p>Ceramics</p> <p>Transition metlas</p> <p>Cations</p> <p>Precipitate</p> <p>Flame test</p> <p>Anion</p> <p>Infra red spectroscopy</p> <p>Absorption</p> <p>Mass spectrometry</p> <p>Molecular ion</p> <p>Fragment</p> <p>Gas chromatography</p> <p>Retention time</p> <p>Stationary phase</p> <p>Mobile phase</p>	<p>Alkane</p> <p>Alkene</p> <p>Alcohol</p> <p>Carboxylic acid</p> <p>Homologous series</p> <p>General formula</p> <p>Functional group</p> <p>Combustion</p> <p>Saturated</p> <p>Unsaturated</p> <p>Double bond</p> <p>Polymer</p> <p>Addition polymer</p> <p>Repeat unit</p> <p>Dialcohol</p> <p>Diamine</p> <p>Dicarboxylic acid</p> <p>Condensation polymer</p> <p>Nylon</p> <p>Biological polymer</p>
<b>Practical Skills</b>	<p>Titration – finding unknown concentrations of solutions</p>	<p>Making salts, linking to C3 and to titration method</p> <p>Fermentation and distillation of ethanol</p>	<p>Ion tests –</p> <p>Cations: flame tests, NaOH precipitation</p>	<p>Testing for unsaturation with bromine water</p> <p>Oxidation of alcohols</p> <p>Reactions of acids – linking to C3</p>

	Recording results and calculating suitable mean titres		Anions: Halide (silver nitrate), sulfate (barium chloride) Carbonate	Nylon rope trick – making condensation polymer
<b>Assessment (Related to mastery grids)</b>	AO1 – core knowledge check AO1 - Tassomai AO2 – applying knowledge – exam style questions	AO1 – core knowledge check AO1 - Tassomai AO2 – applying knowledge – exam style questions	AO1 – core knowledge check AO1 - Tassomai AO2 – applying knowledge – exam style questions	AO1 – core knowledge check AO1 - Tassomai AO2 – applying knowledge – exam style questions