

Year 11: Chemistry Separate Science

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.



	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1
Key ideas and Sequence of Learning	<p>Module C5- monitoring & controlling reactions</p> <ul style="list-style-type: none"> Theoretical yield Percentage yield Atom economy Making ethanol Titration procedure Titration calculations Gas calculations <p>Module C6 – Global Challenges</p> <ul style="list-style-type: none"> Haber process Fertilisers Making fertilisers Contact process 	<p>Module C6 – Global Challenges</p> <ul style="list-style-type: none"> Producing electricity Alloys Corrosion Different materials <p>Module C4 – predicting chemical reactions</p> <ul style="list-style-type: none"> Transition metals Cation tests Anion tests Instrumental methods <p>Module 2- elements, compounds and materials</p> <ul style="list-style-type: none"> Nanoparticles 	Revision and consolidation	Revision and consolidation Students begin their GCSE exams	Students finish their GCSE exams
Key Questions	<ol style="list-style-type: none"> How do you calculate theoretical and % yield? How do you calculate atom economy? How must chemists consider yield and atom economy when designing processes? Explain the two methods of producing ethanol – fermentation and hydration of ethene 	<ol style="list-style-type: none"> Describe a fuel cell and explain how it generates electricity What is an alloy? What is corrosion and how can it be prevented/minimised? What is a composite material? How do you select suitable materials for different jobs? 	<p>Students will review their PPE exam papers in detail to identify strengths and weaknesses</p> <p>Students will then prepare for their GCSE exams in lessons with their teacher. They will also have lectures for each module.</p>	Students will prepare for their GCSE exams in lessons with their teacher.	

	<ol style="list-style-type: none"> 5. Comparing the two methods of producing ethanol 6. How do you carry out a titration and record results? 7. How do you calculate an unknown concentration from titration results? 8. How do you use $V=24n$ to calculate moles and volumes of gas? 9. What is the Haber process? 10. Explain the optimum conditions for the Haber process 11. Why are fertilisers important and what chemicals make good fertilisers? 12. Describe the contact process for making sulfuric acid 	<ol style="list-style-type: none"> 6. What are the properties and uses of the transition metals? 7. How do you test for cations using flame tests? 8. How do you test for cations using NaOH? 9. How do you test for sulfate ions? 10. How do you test for halide ions? 11. Explain the use of instrumental methods such as IR spectroscopy, Mass spectrometry and Gas Chromatography 12. Explain the uses of nanoparticles 			
<p style="text-align: center; color: purple;">Vocabulary</p>	<ul style="list-style-type: none"> • Yield • Theoretical • Actual • Atom economy • Titration • Concordant • Burette • Pipette • Titre • Equilibrium • Shift • Pressure 	<ul style="list-style-type: none"> • Fuel cell • Anode • Cathode • Redox • Reduction • Oxidation • Alloy • Rusting • Barrier • Sacrificial metal • Galvanisation • Composite materials • Ceramics 			

	<ul style="list-style-type: none"> • Concentration • Fermentation • Hydration • Catalyst • Contact Process • Haber Process 	<ul style="list-style-type: none"> • Transition metals • Cations • Precipitate • Flame test • Anion • Infra-red spectroscopy • Absorption • Mass spectrometry • Molecular ion • Fragment • Gas chromatography • Retention time • Stationary phase • Mobile phase 			
<p>Practical Skills</p>	<ul style="list-style-type: none"> • Fermentation and distillation of ethanol • Titration – finding unknown concentrations of solutions • Recording results and calculating suitable mean titres • Making salts, linking to C3 and to titration method 	<ul style="list-style-type: none"> • Ion tests – • Cations: flame tests, NaOH precipitation • Anions: Halide (silver nitrate), sulfate (barium chloride) • Carbonate 			