

Fairfield High School Curriculum Overview – Year 11

Subject	Science	Why do we study these units in Year 11?
Lessons per fortnight	Trilogy science (combined double) GCSE's: 8 Separate science (triple) GCSE's: 10 (includes Wednesday twilight lessons)	The Year 11 Science continues the GCSE work completed in Years 9 & 10. All Year 11 pupils study the Combined GCSE Science Trilogy syllabus as designed by the AQA examining board. Those successful in their Year 10 Triple Science studies continue with the <i>extra content</i> in order to sit the Separate GCSEs awarded in Biology, Chemistry and Physics. Weekly independent study to prepare for their GCSE exams in May/June is an expectation throughout Year 11. The science capital of students is supplemented further with a range of trips and extra-curricular workshops organised by employers and local universities.
Setting	Groups set by ability	

Students are encouraged to be Responsible Global Citizens through numerous links to the sustainable development goals embedded within the Year 10 programme of study. All science topics are linked to at least one goal and these are explored through their links to the science being explored.

We ensure all students experience high challenge in the sciences by differentiating lessons so that ideas can be extended by all students even those making greater than expected progress.

Literacy work this year includes the introduction of a wide range of scientific vocabulary. This is explored through various scientific texts and scientific talk.

Innovation and Creativity opportunities are included in lessons and via workshops delivered by local universities and employers throughout the year. Through a range of off-site trips pupils are challenged to explore the sciences in all its forms.

Employability opportunities and skills are highlighted in lessons throughout the course and supplemented with workshops and trips throughout the year.

Term	Unit title	Knowledge and Understanding/content	Skills (including Required Practical's)	Assessment
1	<p>B16,17&18 Ecology:</p> <p>B16 Adaptations, interdependence and competition</p> <p>B17 Organising an ecosystem</p> <p>B18 Biodiversity and ecosystems</p>	<ol style="list-style-type: none"> 1. The importance of communities 2. Organisms in their environment 3. Distribution and abundance 4. Competition in animals 5. Competition in plants 6. Adapt and survive 7. Adaptation in animals 8. Adaptation in plants 9. Feeding relationships 10. Materials cycling 11. The carbon cycle 12. <i>Rates of decomposition</i> 13. The human population explosion 14. Land and water pollution 15. Air pollution 16. Deforestation and peat destruction 17. Global warming 18. <i>The impact of change</i> 19. Maintaining biodiversity 20. <i>Trophic levels and biomass</i> 21. <i>Biomass transfers</i> 22. <i>Factors affecting food security</i> 23. <i>Making food production efficient</i> 24. <i>Sustainable food production</i> 	<ul style="list-style-type: none"> • B16.3 (RP9) Measure the population size of a common species in a habitat - Quadrats/Transects; B16.5 Investigating competition in plants • B17.4 (RP10) Investigate the effect of temperature on the rate of decay of fresh milk 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions linked to lesson content and to stretch learning</p> <p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>

2	Year 11 November PPE Exams:	Trilogy/Triple GCSE exam questions on: 1. Biology paper 1, 2. Chemistry paper 1, 3. Physics Paper 1, content as well as skills and application of science.	<ul style="list-style-type: none"> Familiarisation with Exam Hall conditions. Highlights gaps in knowledge and skills required to aid in revision of science for summer exams. Results provided to Colleges to aid interview process. 	<p>Revision of GCSE Paper 1 content covered in Yr9/10 required for this exam.</p> <p>GCSE Trilogy/Triple Paper 1 written exams:</p> <ul style="list-style-type: none"> 1hr15mins/1hr45mins
2	C9,10&11 Organic chemistry:	<ol style="list-style-type: none"> Hydrocarbons Fractional distillation of oil Burning hydrocarbon fuels Cracking hydrocarbons <i>Reactions of the alkenes</i> <i>Structures of alcohols, carboxylic acids & esters</i> <i>Addition polymerisation</i> <i>Condensation polymerisation</i> <i>Natural polymers</i> DNA 	<ul style="list-style-type: none"> C9.1 Distillation of crude oil; C9.2 Comparing fractions; C9.3 Products of complete combustion C10.3 Comparing reactions of alcohols; C10.4 Properties of ethanoic acid/Making esters C11.2 Making nylon 	<p>Homework: Topic guide, revision assignment, online quizzes, GCSE practice questions.</p> <p>Required Practical: Flipped Learning</p> <p>Midpoints assessment: 10 multiple choice questions and 1 long answer question.</p> <p>Diagnostic GCSE Science topic test</p>
2	C12 Chemical analysis: C12 Chemical analysis	<ol style="list-style-type: none"> Pure substances and mixtures Analysing chromatograms Testing for gases Tests for positive ions Tests for negative ions Instrumental analysis 	<ul style="list-style-type: none"> C12.2 (RP6) Finding Rf values; C12.3 Tests for hydrogen/oxygen/carbon dioxide/chlorine gas; C12.4 Identifying positive ions; C12.5 (RP7) Use chemical tests to identify unknown compounds 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions linked to lesson content and to stretch learning</p> <p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>

2	<p>P12,13,14 Waves: P12 Wave properties</p> <p>P13 Electromagnetic waves</p> <p>P14 Light (GCSE Physics only)</p>	<ol style="list-style-type: none"> 1. The nature of waves 2. The properties of waves 3. Reflection and refraction 4. More about waves 5. <i>Sound waves</i> 6. <i>The uses of ultrasound</i> 7. <i>Seismic waves</i> 8. The electromagnetic spectrum 9. Light, infrared, microwaves, and radio waves 10. Communications 11. Ultraviolet waves, x-rays, and gamma rays 12. X-rays in medicine 13. <i>Reflection of light</i> 14. <i>Refraction of light</i> 15. <i>Light and colour</i> 16. <i>Lenses</i> 17. <i>Using lenses</i> 	<ul style="list-style-type: none"> • P12.1 Observing mechanical waves - slinky/rope; P12.3 Reflection & Refraction tests; P12.4 (RP8) Investigating plane waves in a ripple tank and waves in a solid; P12.5 Investigating different sounds • P13.2 (RP10) Investigating infrared radiation; P13.4 Ultraviolet waves • P14.2/14.3 (RP9) Investigate the reflection and refraction of light; P14.4 Investigating the converging lens 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions linked to lesson content and to stretch learning</p> <p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>
3	<p>C13 Chemistry of the atmosphere: C13 The Earth's atmosphere</p>	<ol style="list-style-type: none"> 1. History of our atmosphere 2. Our evolving atmosphere 3. Greenhouse gases 4. Global climate change 5. Atmospheric pollutants 	<ul style="list-style-type: none"> • C13.2 Testing for carbonates in shells 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions linked to lesson content and to stretch learning</p> <p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>

3	P15 Magnetism and electromagnetism: P15 Electromagnetism	<ol style="list-style-type: none"> 1. Magnetic fields 2. Magnetic fields of electric currents 3. <i>Electromagnets in devices</i> 4. The motor effect 5. <i>The generator effect</i> 6. <i>The alternating-current generator</i> 7. <i>Transformers</i> 8. <i>Transformers in action</i> 	<ul style="list-style-type: none"> • P15.1 Investigating bar magnets/Plotting a magnetic field; P15.2 Fields around a current carrying wire; P15.3 Investigating the strength of an electromagnet; P15.5 Investigating a simple generator; P15.7 A model transformer 	Homework: Topic guide with keywords to learn Homework: GCSE practice questions linked to lesson content and to stretch learning Required Practical: Flipped Learning Diagnostic GCSE Science topic test
3	C14&15 Using resources: C14 The Earth's resources C15 Using our resources (GCSE Chemistry only)	<ol style="list-style-type: none"> 1. Finite and renewable resources 2. Water safe to drink 3. Treating waste water 4. Extracting metals from ores 5. Life cycle assessments 6. Reduce, reuse, and recycle 7. <i>Rusting</i> 8. <i>Useful alloys</i> 9. <i>The properties of polymers</i> 	<ul style="list-style-type: none"> • C14.2 (RP8) Purify and test water; C14.4 Extracting copper from malachite • C15.1 What causes iron to rust?; C15.3 Modifying a polymer - slime; C15.4 Making glass; C15.7 Making ammonium sulfate fertiliser in the lab 	Homework: Topic guide with keywords to learn Homework: GCSE practice questions linked to lesson content and to stretch learning Required Practical: Flipped Learning
		<ol style="list-style-type: none"> 10. <i>Glass, ceramics, and composites</i> 11. <i>Making ammonia – the Haber process</i> 12. <i>The economics of the Haber process</i> 13. <i>Making fertilisers in the lab</i> 14. <i>Making fertilisers in industry</i> 		Diagnostic GCSE Science topic test
2	Year 11 February PPE Exams:	Trilogy/Triple GCSE exam questions on: <ol style="list-style-type: none"> 4. Biology paper 2, 5. Chemistry paper 2, 6. Physics Paper 2, content as well as skills and application of science.	<ul style="list-style-type: none"> • Familiarisation with Exam Hall conditions. • Highlights gaps in knowledge and skills required to aid in revision of science for summer exams. • Results used to make predicted grades should a student be unable to complete summer exams. 	Revision of GCSE Paper 2 content covered in Yr9/10 required for this exam. GCSE Trilogy/Triple Paper 2 written exams: <ul style="list-style-type: none"> • 1hr15mins/1hr45mins

4	<p>P16 Space Physics (GCSE, Triple, Physics only): P16 Space (GCSE Physics only)</p>	<ol style="list-style-type: none"> 1. Formation of the solar system 2. The life history of a star 3. Planets, satellites, and orbits 4. The expanding universe 5. The beginning and future of the universe 		<p>Homework: Topic guide with keywords to learn Homework: GCSE practice questions linked to lesson content and to stretch learning Required Practical: Flipped Learning Diagnostic GCSE Science topic test</p>
4	<p>Revision of GCSE Paper 1 content covered in Yr9/10 required for these exams:</p>	<ol style="list-style-type: none"> 1. Biology Paper 1 topics 1–4: Cell Biology; Organisation; Infection and response; and Bioenergetics. 2. Chemistry Paper 1 topics 8–12: Atomic structure and the periodic table; Bonding, structure, and the properties of matter; Quantitative chemistry; 	<ul style="list-style-type: none"> • Questions in the written exams will draw on the knowledge and understanding students have gained by carrying out the Required Practical's. These questions will count for at least 15% of the overall marks for the qualification. Many of our questions 	<p>May Exams</p>
		<p>Chemical changes; and Energy changes.</p> <ol style="list-style-type: none"> 3. Physics Paper 1 topics 18–21: Energy; Electricity; Particle model of matter; and Atomic structure. 	<p>will also focus on investigative skills and how well students can apply what they know to practical situations often in novel contexts.</p>	

5	Revision of GCSE Paper 2 content covered in Yr10/11 required for these exams:	<p>4. Biology Paper 2 topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology.</p> <p>5. Chemistry Paper 2 topics 13–17: The rate and extent of chemical change; Organic chemistry; Chemical analysis; Chemistry of the atmosphere; and Using resources. Paper 2 Q's may draw on fundamental concepts and principles from Sections 5.1 to 5.3.</p> <p>6. Physics Paper 2 topics 22–24: Forces; Waves; Magnetism and electromagnetism (and Space - Triple only)</p>	<ul style="list-style-type: none"> Students will be required to demonstrate the following mathematics skills in GCSE Combined Science assessments: <ol style="list-style-type: none"> Arithmetic and numerical computation Handling data Algebra Graphs Geometry and trigonometry 	June Exams
5	May GCSE Exams: Paper 1 Biology Paper 1 Chemistry Paper 1 Physics	A range of question types will be used, including multiple choice, short answer and those that require extended responses. Extended response questions will be of sufficient length to allow students to demonstrate their ability to construct and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. Extended responses may be prose, extended	Exams measure achievement of the following Assessment Objectives. <ul style="list-style-type: none"> AO1: Demonstrate knowledge and understanding of: scientific ideas; scientific techniques and procedures - 40% AO2: Apply knowledge and understanding of: scientific ideas; scientific enquiry, techniques and procedures - 40% AO3: Analyse information and ideas to: interpret and evaluate; make 	GCSE Trilogy/Triple Paper 1 written exams: <ul style="list-style-type: none"> 1hr15mins/1hr45mins Foundation & Higher Tier 70/100 marks Each 16.7% of GCSE
6	June GCSE Exams: Paper 2 Biology Paper 2 Chemistry Paper 2 Physics	calculations, or a combination of both, as appropriate to the question.	judgments and draw conclusions; develop and improve experimental procedures - 20%	GCSE Trilogy/Triple Paper 2 written exams: <ul style="list-style-type: none"> 1hr15mins/1hr45mins Foundation & Higher Tier 70/100 marks
				<ul style="list-style-type: none"> Each 16.7% of GCSE

<p><u>Text books:</u></p> <p>GCSE Biology book</p> <p>GCSE Chemistry Book</p> <p>GCSE Physics Book</p>	<p><u>Trilogy Combined GCSE Science:</u></p> <p>AQA GCSE Biology for Combined Science (Trilogy) Student Book by Ann Fullick https://global.oup.com/education/product/9780198359265/?region=uk</p> <p>AQA GCSE Chemistry for Combined Science (Trilogy) Student Book by Lawrie Ryan https://global.oup.com/education/product/9780198359272/?region=uk</p> <p>AQA GCSE Physics for Combined Science (Trilogy) Student Book by Jim Breithaupt https://global.oup.com/education/product/9780198359289/?region=uk</p>	<p><u>Separate Triple GCSE Science:</u></p> <p>AQA GCSE Biology Student Book Author: Ann Fullick https://global.oup.com/education/product/9780198359371/?region=uk</p> <p>AQA GCSE Chemistry Student Book Author: Lawrie Ryan https://global.oup.com/education/product/9780198359388/?region=uk</p> <p>AQA GCSE Physics Student Book Author: Jim Breithaupt https://global.oup.com/education/product/9780198359395/?region=uk</p>	<ul style="list-style-type: none"> It is not the expectation that parents buy student books, but you may find it helpful if you are required to study at home for an extended period.
<p><u>Revision guides:</u></p>	<p><u>Trilogy Combined GCSE Science:</u></p> <p>AQA GCSE Combined Science Higher Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004879/?region=uk</p>	<p><u>Separate Triple GCSE Science:</u></p> <p>AQA GCSE Biology Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004848/?region=uk</p> <p>AQA GCSE Chemistry Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004855/?region=uk</p>	<ul style="list-style-type: none"> KS4 revision resources are recommended to aid revision as pupils prepare for their GCSE exams in May/June of yr11.
		<p>AQA GCSE Physics Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004886/?region=uk</p>	

<p><u>Revision cards:</u></p>	<p><u>Trilogy Combined GCSE Sciences:</u></p> <p>GCSE Combined Science AQA Revision Question Cards: All-in-one Biology, Chemistry & Physics by CGP https://www.cgpbooks.co.uk/secondary-books/gcse/science/combined-science/scaf41-new-9-1-gcse-combined-science-aqa-revisio</p>	<p><u>Separate Triple GCSE Sciences:</u></p> <p>GCSE Biology AQA Revision Question Cards by CGP https://www.cgpbooks.co.uk/secondary-books/gcse/science/biology/baf41-new-9-1-gcse-biology-aqa-revision-question</p> <p>GCSE Chemistry AQA Revision Question Cards by CGP https://www.cgpbooks.co.uk/secondary-books/gcse/science/chemistry/caf41-new-9-1-gcse-chemistry-aqa-revision-questi</p> <p>GCSE Physics AQA Revision Question Cards by CGP https://www.cgpbooks.co.uk/secondary-books/gcse/science/physics/paf41-new-9-1-gcse-physics-aqa-revision-question</p>	<ul style="list-style-type: none"> • KS4 revision resources are recommended to aid revision as pupils prepare for their GCSE exams in May/June of yr11.
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