

Fairfield High School Curriculum Overview – Year 10

Subject	Science	Why do we study these units in Year 10?
Lessons per fortnight	Trilogy science (combined double) GCSE's: 8 Separate science (triple) GCSE's: 10 (includes Wednesday twilight lessons)	The Year 10 Science programme builds upon the GCSE work started in Year 9. All Year 10 pupils study the Combined GCSE Science Trilogy syllabus as designed by the AQA examinations board. Those that successfully opted to study the Triple Science course are taught <i>extra knowledge</i> throughout, to enable them to sit the Separate GCSEs awarded in Biology, Chemistry and Physics. There will be more emphasis this year on independent study with all students expected to review their science work weekly, to produce revision resources in preparation for their GCSE exams in 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 Practicals)	Assessment
1	C4 Quantitative chemistry: C4 Chemical Calculations	<ol style="list-style-type: none"> 1. Relative masses and moles 2. Equations and calculations 3. From masses to balanced equations 4. <i>The yield of a chemical reaction</i> 5. <i>Atom economy</i> 6. Expressing concentrations 7. <i>Titrations</i> 8. <i>Titration calculations</i> 9. <i>Volumes of gases</i> 	<ul style="list-style-type: none"> • C4.7 (RP2) Use titration to investigate reacting volumes 	<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>
1	P6 Particle model of matter: P6 Molecules and matter	<ol style="list-style-type: none"> 1. Density 2. States of matter 3. Changes of state 4. Internal energy 5. Specific latent heat 6. <i>Gas pressure and temperature</i> 7. <i>Gas pressure and volume</i> 	<ul style="list-style-type: none"> • P6.1 (RP5) Calculating densities; P6.3 Measuring the melting point of a substance; P6.5 Specific latent heat of fusion of ice; P6.6 Gas pressure and temperature; P6.7 Investigating pressure and volume 	<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>
1	B8&9 Bioenergetics: B8 Photosynthesis B9 Respiration	<ol style="list-style-type: none"> 1. Photosynthesis 2. The rate of photosynthesis 3. How plants use glucose 4. Optimising photosynthesis 5. Aerobic respiration 6. The response to exercise 7. Anaerobic respiration 	<ul style="list-style-type: none"> • B8.2 (RP6) Investigate the effect of light intensity on the rate of photosynthesis; B8.3 Testing for starch in leaves • B9.1 Investigating respiration; B9.3 Testing fitness/Making lactic acid 	<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>

		8. Metabolism and the liver		
2	C5&6 Chemical changes: C5 Chemical changes C6 Electrolysis	1. The reactivity series 2. Displacement reactions 3. Extracting metals 4. Salts from metals 5. Salts from insoluble bases 6. Making more salts 7. Neutralisation and the pH scale 8. <i>Strong and weak acids</i> 9. Introduction to electrolysis 10. Changes at the electrodes 11. The extraction of aluminium 12. Electrolysis of aqueous solutions	<ul style="list-style-type: none"> C5.1 Metals + Acid; C5.2 Displacing metal from solution/Predicting reactions; C5.3 Reduction by carbon; C5.4 Planning to make a salt; C5.5/5.6 (RP1) Prepare a salt from an insoluble metal carbonate or oxide; C5.6 Making salt from a metal carbonate; C5.7 Obtaining a pH curve through titration; C5.8 Comparing ethanoic acid and hydrochloric acid C6.1 Electrolysis of molten zinc chloride; C6.4 (RP3) Investigate the electrolysis of a solution 	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
2	P7 Atomic structure: P7 Radioactivity	1. Atoms and radiation 2. Discovery of the nucleus 3. Changes in the nucleus 4. Alpha, beta & gamma radiation 5. Activity and half-life 6. <i>Nuclear radiation in medicine</i> 7. <i>Nuclear fission</i> 8. <i>Nuclear fusion</i> 9. <i>Nuclear issues</i>	<ul style="list-style-type: none"> P4.1 Investigating force between charged objects; P4.2 Circuit tests; P4.3/4.6 (RP3) Investigating resistance; P4.4 (RP4) Investigating electrical components; P4.5 Investigating potential difference in a series circuit; P4.6 Testing resistors in series and parallel P5.1 Investigating an alternating potential difference - oscilloscope; P5.2 Wire a plug 	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	B10,11&12 Homeostasis and response: B10 The human nervous system	1. Principles of homeostasis 2. Structure and function of the nervous system 3. Reflex actions 4. <i>The brain</i> 5. <i>The eye</i> 6. <i>Common problems of the eye</i>	<ul style="list-style-type: none"> B10.2 (RP7) Investigate the effect of a factor on human reaction time; B10.5 Finding the blind spot 	Homework: Topic guide with keywords to learn Homework: GCSE practice questions linked to lesson content and to stretch learning

	<p>B11 Hormonal coordination</p> <p>B12 Homeostasis in action</p>	<ol style="list-style-type: none"> 7. Principles of hormonal control 8. The control of blood glucose levels 9. Treating diabetes 10. The role of negative feedback 11. Human reproduction 12. Hormones and the menstrual cycle 13. The artificial control of fertility 14. Infertility treatments 15. <i>Plant hormones and responses</i> 16. <i>Using plant hormones</i> 17. <i>Controlling body temperature</i> 18. <i>Removing waste products</i> 19. <i>The human kidney</i> 20. <i>Dialysis – an artificial kidney</i> 21. <i>Kidney transplants</i> 	<ul style="list-style-type: none"> • B11.2 Testing for glucose in urine; B11.9 (RP8) Investigate the effect of light or gravity on the growth of newly germinated seedlings; B11.10 The effect of rooting compounds and weed killers on the growth of plants • B12.3 Kidney dissection 	<p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>
3	<p>C7 Energy changes:</p> <p>C7 Energy changes</p>	<ol style="list-style-type: none"> 1. Exothermic and endothermic reactions 2. Using energy transfers from reactions 3. Reaction profiles 4. Bond energy calculations 5. <i>Chemical cells and batteries</i> 6. <i>Fuel cells</i> 	<ul style="list-style-type: none"> • C7.1 (RP4) Investigating temperature changes; C7.5 Investigating chemical cells 	<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>
4	<p>P8,9,10&11 Forces:</p> <p>P8 Forces in balance</p>	<ol style="list-style-type: none"> 1. Vectors and scalars 2. Forces between objects 3. Resultant forces 4. Moments at work 5. Levers and gears 6. Centre of mass 7. Moments and equilibrium 	<ul style="list-style-type: none"> • P8.4 investigating the turning effect of a force; P8.5 Wheels and axles; P8.6 Centre of mass; P8.7 Measuring the weight of a beam; P8.9 Test an incline 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions linked to lesson content and to stretch learning</p>

	<p>P9 Motion</p> <p>P10 Force and motion</p> <p>P11 Force and pressure (GCSE Physics only)</p>	<ol style="list-style-type: none"> 8. The parallelogram of forces 9. Resolution of forces 10. Speed and distance-time graphs 11. Velocity and acceleration 12. More velocity-time graphs 13. Analysing motion graphs 14. Force and acceleration 15. Weight and terminal velocity 16. Forces and breaking 17. Momentum 18. <i>Using conservation of momentum</i> 19. <i>Impact forces</i> 20. <i>Safety first</i> 21. Forces and elasticity 22. <i>Pressure and surfaces</i> 23. <i>Pressure in a liquid at rest</i> 24. <i>Atmospheric pressure</i> 25. <i>Upthrust and flotation</i> 	<ul style="list-style-type: none"> • P9.3 Investigating acceleration • P10.1 (RP7) Investigate the relationship between force and acceleration; P10.3 Reaction time challenge; P10.4 Investigating a controlled explosion; P10.8 Stretch tests • P11.1 Measure your foot pressure/A pressure test; P11.2 Pressure tests in a liquid; P11.4 Investigating upthrust 	<p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>
5	<p>B13,14&15 Inheritance, variation and evolution:</p> <p>B13 Reproduction</p>	<ol style="list-style-type: none"> 1. Types of reproduction 2. Cell division in sexual reproduction 3. <i>The best of both worlds</i> 4. DNA and the genome 5. <i>DNA structure and protein synthesis</i> 6. <i>Gene expression and mutation</i> 7. Inheritance in action 8. More about genetics 9. Inherited disorders 10. Screening for genetic disorders 11. Variation 12. Evolution by natural selection 	<ul style="list-style-type: none"> • B13.8 Direct proportion & Ratios 	<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>

	<p>B14 Variation and evolution</p> <p>B15 Genetics and Evolution (GCSE Biology only)</p>	<ol style="list-style-type: none"> 13. Selective breeding 14. Genetic engineering 15. <i>Cloning</i> 16. <i>Adult cell cloning</i> 17. Ethics of technologies 18. <i>The history of genetics</i> 19. <i>Theories of evolution</i> 20. <i>Accepting Darwin's ideas</i> 21. <i>Evolution and speciation</i> 22. <i>Evidence for evolution</i> 23. <i>Fossils and extinction</i> 24. <i>More about extinction</i> 25. <i>Antibiotic resistant bacteria</i> 26. <i>Classification</i> 27. <i>New systems of classification</i> 		
6	<p>C8 The rate and extent of chemical change: C8 Rates and equilibrium</p>	<ol style="list-style-type: none"> 1. Rate of reaction 2. Collision theory and surface area 3. The effect of temperature 4. The effect of concentration and pressure 5. The effect of catalysts 6. Reversible reactions 7. Energy and reversible reactions 8. Dynamic equilibrium 9. Altering conditions 	<ul style="list-style-type: none"> • C8.1 Measuring: Decreasing mass of a reaction mixture/Increasing volume of a gas given off/Decreasing light passing through a solution; C8.3 The effect of temperature on rate of reaction; C8.4 (RP5) Investigating the effect of concentration on rate of reaction; C8.5 Investigating catalysts; C8.6 Heating ammonium chloride; C8.7 Energy changes in a reversible reaction - copper sulfate; C8.9 Observing equilibrium 	<p>Homework: Topic guide with keywords to learn 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>
6	<p>C9,10&11 Organic chemistry:</p>	<ol style="list-style-type: none"> 1. Hydrocarbons 2. Fractional distillation of oil 3. Burning hydrocarbon fuels 4. Cracking hydrocarbons 	<ul style="list-style-type: none"> • C9.1 Distillation of crude oil; C9.2 Comparing fractions; C9.3 Products of complete combustion 	<p>Homework: Topic guide with keywords to learn</p>

	<p>C9 Crude oil and fuels</p> <p>C10 Organic reactions (GCSE Chemistry only)</p> <p>C11 Polymers (GCSE Chemistry only)</p>	<p>5. Reactions of the alkenes</p> <p>6. Structures of alcohols, carboxylic acids & esters</p> <p>7. Addition polymerisation</p> <p>8. Condensation polymerisation</p> <p>9. Natural polymers</p> <p>10. DNA</p>	<ul style="list-style-type: none"> C10.3 Comparing reactions of alcohols; C10.4 Properties of ethanoic acid/Making esters C11.2 Making nylon 	<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>
6	Year 10 Progress Exam	GCSE exam questions on Biology, Chemistry, Physics 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 for success in study of science. 	GCSE Written Exam Paper (1hr45mins)
<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. Remember: Fairfield subscribes to these books online via Kerboodle: https://www.kerboodle.com/users/login# Access issued at the start of year 9: <u>Username:</u> initial + surname (no spaces) <u>Password:</u> initial + surname (no spaces) <u>Institution code:</u> fmq9

<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> <p>AQA GCSE Physics Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004886/?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><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</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.

		by CGP https://www.cgpbooks.co.uk/secondary-books/gcse/science/physics/paf41-new-9-1-gcse-physics-aqa-revision-question	
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