

Fairfield High School Curriculum Overview – Year 9

Subject	Science	Why do we study these units in Year 9?
Lessons per fortnight	Separate science (triple) GCSE's: 7	The Year 9 Science programme forms the foundation year for the GCSE and builds on the 10 big ideas; Forces, Electromagnetism, Energy, Waves, Matter, Reactions, Earth, Organisms, Ecosystems & Genes, introduced in Years 7 & 8. All Year 9 pupils study the Triple GCSE Science syllabus as designed by the AQA examining board. This enables the pupils to make an informed option choice, between continuing to study the separate sciences or to follow the combined sciences route in Years 10 & 11. All students are expected to review their science work weekly to produce revision resources as this qualification is linear which means that students will sit all their exams at the end of Year 11. The science capital of students is supplemented further with a range of trips and extra-curricular workshops offered throughout the year.
Setting	Mixed ability bands	

Students are encouraged to be Responsible Global Citizens through numerous links to the sustainable development goals embedded within the Year 9 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>B1&2 Cell Biology: B1 Cell structure & transport</p> <p>B2 Cell division</p>	<ol style="list-style-type: none"> Using microscopes Animal & plant cells Eukaryotic & prokaryotic cells Specialisation in animal & plant cells Diffusion Osmosis in animals & plant cells Active transport Exchanging materials Cell division Growth & differentiation Stem cells Stem cell – ethical implications 	<ul style="list-style-type: none"> B1.2 (RP1) Using a light microscope; B1.4 Observing specialised cells; B1.6 Investigating osmosis; B1.8 (RP3) Investigating the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue – osmosis B2.1 Observing cell division - mitosis 	<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	<p>C1&2 Atomic structure and the periodic table: C1 Atomic structure</p>	<ol style="list-style-type: none"> Atoms Chemical equations Separating mixtures Fractional distillation & paper chromatography 	<ul style="list-style-type: none"> C1.2 Investigating the mass of reactants and products; C1.4 Detecting dyes in food colourings 	<p>Homework: Topic guide with keywords to learn</p> <p>Homework: GCSE practice questions</p>

	C2 The periodic table	<ol style="list-style-type: none"> 5. History of the atom 6. Structure of the atom 7. Ions, atoms, and isotopes 8. Electronic structures 9. Development of the periodic table 10. Electronic structures & the periodic table 11. Group 1 – the alkali metals 12. Group 7 – the halogens 13. Explaining trends 14. <i>The transition elements</i> 	<ul style="list-style-type: none"> • C2.3 Reactions of alkali metals with water; C2.4 Displacement reactions; C2.6 The colours of vanadium ions 	<p>linked to lesson content and to stretch learning</p> <p>Required Practical: Flipped Learning</p> <p>Diagnostic GCSE Science topic test</p>
2	<p>P1,2&3 Energy: P1 Conservation and dissipation of energy</p> <p>P2 Energy transfer by heating</p> <p>P3 Energy resources</p>	<ol style="list-style-type: none"> 1. Changes in energy stores 2. Conservation of energy 3. Energy and work 4. Gravitational potential energy stores 5. Kinetic energy and elastic energy stores 6. Energy dissipation 7. Energy and efficiency 8. Electrical appliances 9. Energy and power 10. Energy transfer by conduction 11. <i>Infrared radiation</i> 12. Specific heat capacity 13. Heating and insulating buildings 14. Energy demands 15. Energy from wind and water 16. Power from the Sun and the Earth 17. Energy and the environment 	<ul style="list-style-type: none"> • P1.2 Investigate pendulums/Bungee jumping; P1.3 Doing work; P1.4 Stepping up; P1.5 Investigating kinetic energy stores; P1.7 Investigating efficiency • P2.1 (RP2) Investigating thermal insulators/Comparing conductivity in metals; P2.2 Detecting infrared radiation; P2.4 (RP1) Determining specific heat capacity 	<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>B3&4 Organisation: B3 Organisation and the digestive system</p> <p>B4 Organising animals and plants</p>	<p>18. Big energy issues</p> <ol style="list-style-type: none"> 1. Tissues and organs 2. The human digestive system 3. The chemistry of food 4. Catalysts & enzymes 5. Factors affecting enzyme action 6. How the digestive system works 7. Making digestion efficient 8. The blood 9. The blood vessels 10. The heart 11. Helping the heart – stents & pacemakers 12. Breathing and gas exchange 13. Tissues and organs in plants 14. Transport systems in plants – xylem & phloem 15. Evaporation and transpiration 	<ul style="list-style-type: none"> • B3.3 (RP4) Use standard food tests to identify food groups; B3.4 Breaking down hydrogen peroxide; B3.6 (RP5) Investigate the effect of pH on the rate of reaction of amylase enzyme; B3.7 Breaking down protein • B4.7 Evidence for movement through xylem; B4.3 Heart dissection; B4.5 Examining the lungs; B4.8 Investigating stomata; B4.9 Transpiration - Potometer 	<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>C3 Bonding, structure, and the properties of matter:</p>	<ol style="list-style-type: none"> 1. States of matter 2. Atoms into ions 3. Ionic bonding 4. Giant ionic structures 5. Covalent bonding 6. Structure of simple molecules 7. Giant covalent structures 8. Fullerenes and graphene 9. Bonding in metals 10. Giant metallic structures 11. <i>Nanoparticles</i> 12. <i>Applications of nanoparticles</i> 	<ul style="list-style-type: none"> • C3.1 Cooling curves; C3.4 Testing conductivity; C3.6 Conductivity of simple molecular compounds; C3.9 Growing silver crystals; C3.10 Making models of metals 	<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>

				Diagnostic GCSE Science topic test
5	<p>P4&5 Electricity: P4 Electric circuits</p> <p>P5 Electricity in the home</p>	<ol style="list-style-type: none"> 1. <i>Electrical charges and fields</i> 2. Current and charge 3. Potential difference and resistance 4. Component characteristics 5. Series circuits 6. Parallel circuits 7. Alternating current 8. Cables and plugs 9. Electrical power and potential difference 10. Electrical currents and energy transfer 11. Appliances and efficiency 	<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 	<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>
6	<p>B5,6&7 Infection and response: B5 Communicable diseases</p> <p>B6 Preventing and treating disease</p>	<ol style="list-style-type: none"> 1. Health and disease 2. Pathogens and disease 3. <i>Growing bacteria in the lab</i> 4. <i>Preventing bacterial growth</i> 5. Preventing infections 6. Viral diseases 7. Bacterial diseases 8. Diseases caused by fungi and protists 9. Human defence responses 10. <i>More about plant diseases</i> 11. <i>Plant defence responses</i> 12. Vaccination 13. Antibiotics and painkillers 14. Discovering drugs 	<ul style="list-style-type: none"> • B5.3 Growing useful microbes - Aseptic technique; B5.4 (RP2) Investigating the effect of antiseptics/antibiotics on bacterial growth 	<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>

	B7 Non-communicable diseases	<p>15. Developing drugs</p> <p>16. <i>Making monoclonal antibodies</i></p> <p>17. <i>Uses of monoclonal antibodies</i></p> <p>18. Non-communicable diseases</p> <p>19. Cancer</p> <p>20. Smoking and the risk of disease</p> <p>21. Diet, exercise, and disease</p> <p>22. Alcohol and other carcinogens</p>		
6	End of Year Test	Measures two dimensions of science learning, understanding of science content: Biology; chemistry; Physics, and working scientifically (application of skills).	<ul style="list-style-type: none"> Pupils are expected to have revised each unit throughout years 7-9 and review these again in preparation for this test. 	Online Progress Test in Science: Level 14 End of KS3 Test (1 hour)
<p>Textbooks:</p> <p>GCSE Biology book</p> <p>GCSE Chemistry Book</p> <p>GCSE Physics Book</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>In text questions to test understanding of text.</p> <p>Practice exam questions test knowledge, application and extension of concepts studied.</p>
<p>Revision resources:</p> <p>Biology Revision guide</p>		<p>AQA GCSE Biology Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004848/?region=uk</p>	KS4 (yr9 – 11) revision resources are recommended to aid revision as pupils prepare for their GCSE exams in May/June of yr11.	<p>In text questions to test understanding of text.</p> <p>Practice exam questions to test knowledge, application</p>

Chemistry revision guide	<p>AQA GCSE Chemistry Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004855/?region=uk</p>		and extension of concepts studied.
Physics revision guide	<p>AQA GCSE Physics Revision and Exam Practice. Editor: Primrose kitten https://global.oup.com/education/product/9781382004886/?region=uk</p>		
Biology Revision cards	<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>		
Chemistry revision cards	<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>		
GCSE Physics revision cards	<p>GCSE Biology 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>		