



SCIENCE CURRICULUM AREA STAFF

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SCIENCE CURRICULUM INTENT

The Science curriculum is designed to increase our pupils' knowledge, skills and understanding of the physical world around them, and to help them appreciate the relevance of Science in their everyday lives.

Our curriculum has been built on the principles of interleaved learning: pupils will revisit and augment previous knowledge on a short, medium and long-term basis. We will also provide students with the skills they need to succeed in life; critical thinking, logical deduction, language skills, mathematical skills and the ability to analyse and interpret data.

The curriculum will also prepare students to achieve their full potential in GCSE Science through outstanding teaching, effective discipline in line with whole-school policy, accurate monitoring and meaningful intervention.

The Science curriculum will embrace other subjects' curriculums in order to fit in with the whole school vision of providing a coherent and accessible education for students of all abilities and interests.

The Science curriculum is designed to develop personal qualities and cultural capital in all students in a wider context by giving them an understanding of (amongst other things): health issues (e.g. obesity, smoking, cancer treatments); moral issues (e.g. genetic modification); and environmental issues (e.g. nuclear and fossil fuels, global warming) whilst being sensitive of their cultural needs.

SCIENCE CURRICULUM OVERVIEW

For the KS4 Skills requirement coding links to those provided on the specifications hyperlinked below for working scientifically (WS) apparatus and techniques (AT) and Mathematical requirements (MS).

Year 10: Combined Science (Trilogy) 1 teacher for all 3 disciplines.					
Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: B1, C1, P1 WEEKS: 10		TOPIC: C3, P3 WEEKS: 7		TOPIC: C7, P5, B6, C4 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
B1 Cell structure and transport C1 Atomic structure P1 Conservation and dissipation of energy	B1 (EQ) C1 (BA) P1 (EQ)	C3 Bonding and structure P3 Energy resources	C3 (EQ) P3 (EQ) MID-YEAR EXAMS x3 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	C7 Energy changes P5 Electricity in the home B6 Preventing and treating disease C4 Chemical calculations	C7 (EQ) P5 (EQ) B6 (EQ) C4 (EQ) P6 (EQ)
SKILLS		SKILLS		SKILLS	
MS 1b, 2a, 2h WS 4.4 Use prefixes centi, milli, micro and nano. WS 1.2 Recognise, draw and interpret images of cells. MS 1d, 3a AT 7 Required practical activity 1: use a light microscope to observe, draw and label a selection of plant and animal cells. A		MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects. WS 1.2 MS 4a MS 1a, 1c WS 1.2 Recognise substances as small molecules, polymers or giant		AT 5 An opportunity to measure temperature changes when substances react or dissolve in water Required practical activity 10: investigate the variables that affect temperature changes in reacting solutions such as, e.g.	

<p>magnification scale must be included. AT skills covered by this practical activity: biology AT 1 and 7.</p> <p>WS 1.1 MS 1a, 1b, 2h, 3b WS 4.4 Use prefixes centi, milli, micro and nano.</p> <p>MS 1.2 Recognise, draw and interpret diagrams that model diffusion. WS 1.5 Use of isotonic drinks and high energy drinks in sport.</p> <p>MS 1c, 5c</p> <p>Required practical activity 2: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. AT skills covered by this practical activity: biology AT 1, 3 and 5</p> <p>WS 1.2 Recognise, draw and interpret diagrams that model osmosis.</p> <p>MS 1a, 1c MS 4a, 4b, 4c, 4d</p> <p>WS 2.2, 2.3 AT 4 Safe use of a range of equipment to separate chemical mixtures.</p> <p>WS 4.3, 4 Use SI units and the prefix nano. MS 1b Recognise expressions in standard form.</p> <p>MS 1d WS 1.2 Students should be able to represent the electronic structures of the first twenty elements of the periodic table in both forms. MS 5b Visualise and</p>		<p>structures from diagrams showing their bonding.</p> <p>WS 1.2 Recognise substances as metallic giant structures from diagrams showing their bonding.</p> <p>WS 4.4 WS 1.3, 1.4 WS 3.5 MS 1c, 2c, 4a</p>		<p>acid plus metals, acid plus carbonates, neutralisations, displacement of metals. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6.</p> <p>MS 1a</p> <p>MS 1c, 3b, 3c, 3d AT 7 WS 1.4 MS 1c, 3b, c, d WS 1.5 S 3b, c WS 4.5 Students should be able to recall and apply both equations for calculating power.</p> <p>WS 1.2 WS 1.4 Detailed knowledge of the structure of a transformer is not required.</p> <p>WS 1.4 Evaluate the global use of vaccination in the prevention of disease</p> <p>WS 1.6 Understand that the results of testing and trials are published only after scrutiny by peer review.</p> <p>WS 1.2 AT 1, 2,6 Opportunities within investigation of mass changes using various apparatus.</p> <p>WS 3.4</p>	
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<p>represent 2D and 3D forms including two-dimensional representations of 3D objects</p> <p>WS 1.2, 4.3, 4.4, 4.5, 4.6 MS 1a, c, 3b, c MS 3b, c Students should be able to recall and apply the equation for calculating kinetic energy MS 3b, c Students should be able to apply the equation for elastic potential energy which is given on the Physics equation sheet. S 3b, c Students should be able to recall and apply the equation for gravitational potential energy. AT 1 Investigate the transfer of energy from a gravitational potential energy store to a kinetic energy store. MS 3b, c Students should be able to apply the equation for calculating specific heat capacity which is given on the Physics equation sheet. Required practical activity 14: an investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored. AT skills covered by this practical activity: physics AT 1 and 5.</p>				<p>(HT) WS 4.1, 4.2, 4.3, 4.5, 4.6 MS 1a Recognise and use expressions in decimal form. MS 1b Recognise and use expressions in standard form. MS 2a Use an appropriate number of significant figures. MS 3a Understand and use the symbols: =, <>, >, α, \sim MS 3b Change the subject of an equation. MS 1c (HT) MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 3b Change the subject of an equation. MS 3c Substitute numerical values into algebraic equations using appropriate units for physical quantities. (HT) MS 3b Change the subject of an equation. MS 3c Substitute numerical values into algebraic equations using appropriate units for physical quantities. (HT) MS 4.1 MS 1c Use ratios, fractions and percentages. MS 3b Change the subject of an equation.</p>	
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S 3b, c Students should be able to recall and apply both equations for calculating power.					
Autumn 2		Spring 2		Summer 2	
TOPIC: B2, C2, P2, B3 WEEKS: 5		TOPIC: B4, C5, P4, B5 WEEKS: 9		TOPIC: P6, B7, C6, P7 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
B2 Cell division C2 Periodic table P2 Energy transfer by heating B3 Organisation and the digestive system	B2 (EQ) C2 (EQ) P2 (EQ) B3 (BA)	B4 Organising animals and plants C5 Chemical changes P4 Electric circuits B5 Communicable disease	B4 (EQ) C5 (EQ) P4 (EQ) B5 (BA)	P6 Molecules and matter B7 Non-communicable disease C6 Electrolysis P7 Radioactivity	P6 (EQ) B7 (EQ) C6 (EQ) P7 (EQ)
SKILLS		SKILLS		SKILLS	
WS 1.2 Use models and analogies to develop explanations of how cells divide. WS 1.3 Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments. WS 1.1, 1.6 This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time. WS 1.2		MS 1a, 1c AT 7 Observing and drawing blood cells seen under a microscope. WS 1.5 Evaluate risks related to use of blood products. WS 3.5 WS 1.4 WS 1.3 Evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment. AT 7 Observation and drawing of a transverse section of leaf. AT 3, 4, 5 Measure the rate of transpiration by the uptake of water. AT 6, 7 Investigate the distribution of stomata and guard		MS 1a, b, c, 3b, c Students should be able to recall and apply the density equation to changes where mass is conserved. WS 1.2 MS 1a, 3b, 3c, 3d Students should be able to apply the equation for specific heat capacity, which is given on the Physics equation sheet, to calculate the energy change involved when the temperature of a material changes. MS 1a, 3b, c, d Students should be able to apply the equation for specific latent heat, which is given	END OF YEAR EXAMS x3 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT

<p>S 1.1, 1.6 Explain how testing a prediction can support or refute a new scientific idea. T 6 Offers an opportunity within displacement reactions of halogens.</p> <p>WS 1.4 AT 1, 5 Investigate thermal conductivity using rods of different materials. MS 3b, c Students should be able to recall and apply both equations. MS 1a, c, 3b, c Students may be required to calculate or use efficiency values as a decimal or as a percentage.</p> <p>MS 1c Students should be able to develop an understanding of size and scale in relation to cells, tissues, organs and systems. MS 1a, 1c WS 1.2 Students should be able to use other models to explain enzyme action. Required practical activity 3: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. AT skills covered by this practical activity: biology AT 2. Required practical activity 4: investigate the effect of pH on the rate of reaction of amylase enzyme. AT skills covered by this practical activity: biology AT 1, 2 and 5.</p>		<p>cells. MS 2a, 2d, 5c Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. MS 1a, 1c</p> <p>AT 6 Mixing of reagents to explore chemical changes and/or products. Required practical activity 8: preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution. AT skills covered by this practical activity: chemistry AT 2, 3, 4 and 6. AT 3 This is an opportunity to investigate pH changes when a strong acid neutralises a strong alkali. (HT) An opportunity to measure the pH of different acids at different concentrations. MS 2h Make order of magnitude calculations.</p> <p>WS 1.2, 1.4</p>		<p>on the Physics equation sheet, to calculate the energy change involved in a change of state. MS 4a AT 5 Perform an experiment to measure the latent heat of fusion of water. WS 3.5</p> <p>WS 1.4 WS 1.5 Interpret data about risk factors for specified diseases. MS 2d MS 2c, 4a MS 2g</p> <p>WS 1.2 Required practical activity 9: investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis. AT skills covered by this practical activity: chemistry AT 3 and 7</p> <p>MS 1b WS 4.4 Students should be able to recognise expressions given in standard form. WS 4.1 WS 1.1, 1.6 This historical context provides an opportunity for</p>	
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		<p>MS 3b, c Students should be able to recall and apply the equation for calculating charge.</p> <p>MS 3b, c Students should be able to recall and apply the equation for calculating potential difference.</p> <p>Required practical activity 15: use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: the length of a wire at constant temperature and combinations of resistors in series and parallel. AT skills covered by this practical activity: physics AT 1, 6 and 7.</p> <p>AT 6 Investigate the relationship between the resistance of a thermistor and temperature. Investigate the relationship between the resistance of an LDR and light intensity.</p> <p>MS 4c, 4d, 4e</p> <p>Required practical activity 16: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature. AT skills covered by this practical activity: physics AT 6 and 7</p>		<p>students to show an understanding of why and describe how scientific methods and theories develop over time.</p> <p>WS 1.2 WS 1.4, 1.5 MS 4a (HT) MS 1c, 3d WS 1.6</p>	
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		MS 1c, 3b, 3c, 3d AT 7			
		WS 1.4 MS 2c, 2g, 4a MS 2d			

Year 10: Separate Science Biology

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: B1, B2, B3 WEEKS: 10		TOPIC: B5 WEEKS: 7		TOPIC: B8, B9 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
B1 Cell structure and transport B2 Cell division B3 Organisation and the digestive system	B1 (EQ) B2 (BA) B3 (EQ)	B5 Communicable disease	B5 (EQ) MID-YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	B8 Photosynthesis B9 Respiration	B8 (BA) B9 (EQ)
SKILLS		SKILLS		SKILLS	
MS 1b, 2a, 2h WS 4.4 Use prefixes centi, milli, micro and nano. WS 1.2 Recognise, draw and interpret images of cells. MS 1d, 3a AT 7 Images of cells in videos, bioviewers, photographs and micrographs can be used as comparison for students own drawings.		WS 1.4 MS 2c, 2g, 4a MS 2d WS 1.4 The everyday application of scientific knowledge to detect and identify plant disease WS 1.4 The understanding of ion deficiencies allows horticulturists		MS 3d Solve simple algebraic equations. MS 1a, 1c, 2c, 3d, 4a, 4c MS 3a, 3d (HT only) WS 1.4 Use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses.	

<p>Required practical activity 1: use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. AT skills covered by this practical activity: AT 1 and 7.</p> <p>WS 1.1 MS 1a, 1b, 2h, 3b WS 4.4 Use prefixes centi, milli, micro and nano. MS 1a, 1b, 1d, 2a, 2h Calculate the number of bacteria in a population after a certain time if given the mean division time. MS 5c Calculate cross-sectional areas of colonies or clear areas around colonies using πr^2 WS 2.2, 2.4 MS 5c</p> <p>Required practical activity 2: investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition. AT skills covered by this practical activity: AT 1, 3, 4 and 8 WS 1.2 Recognise, draw and interpret diagrams that model diffusion. WS 1.5 Use of isotonic drinks and high energy drinks in sport MS 1c, 5c WS 1.2 Recognise, draw and interpret diagrams that model osmosis. MS 1a, 1c MS 4a, 4b, 4c, 4d</p>		<p>to provide optimum conditions for plants.</p>		<p>Required practical activity 5: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. AT skills covered by this practical activity: biology AT 1, 2, 3, 4 and 5.</p> <p>AT 1, 3, 4 Investigations into the effect of exercise on the body.</p>	
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<p>WS 1.2 Use models and analogies to develop explanations of how cells divide.</p> <p>WS 1.3 Evaluate the practical risks and benefits, as well as social and ethical issues, of the use of stem cells in medical research and treatments.</p> <p>MS 1c Students should be able to develop an understanding of size and scale in relation to cells, tissues, organs and systems.</p> <p>MS 1a, 1c</p> <p>WS 1.2 Students should be able to use other models to explain enzyme action.</p> <p>Required practical activity 3: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. AT skills covered by this practical activity: biology AT 2.</p> <p>Required practical activity 4: investigate the effect of pH on the rate of reaction of amylase enzyme. AT skills covered by this practical activity: biology AT 1, 2 and 5.</p>					
Autumn 2		Spring 2		Summer 2	
<p>TOPIC: B4 WEEKS: 5</p>		<p>TOPIC: B6, B7 WEEKS: 9</p>		<p>TOPIC: B16, B17 WEEKS: 6</p>	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT

B4 Organising animals and plants	B4 (BA)	B6 Preventing and treating disease B7 Non-communicable disease	B6 (BA) B7 (EQ)	B16 Adaptations, interdependence and competition B17 Organising an ecosystem	B16 (EQ) B17 (EQ) END OF YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT
SKILLS		SKILLS		SKILLS	
MS 1a, 1c AT 7 Observing and drawing blood cells seen under a microscope. WS 1.5 Evaluate risks related to use of blood products. WS 3.5 WS 1.4 WS 1.3 Evaluate methods of treatment bearing in mind the benefits and risks associated with the treatment. AT 7 Observation and drawing of a transverse section of leaf. AT 3, 4, 5 Measure the rate of transpiration by the uptake of water. AT 6, 7 Investigate the distribution of stomata and guard cells. MS 2a, 2d, 5c Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. MS 1a, 1c		WS 1.4 Evaluate the global use of vaccination in the prevention of disease WS 1.6 Understand that the results of testing and trials are published only after scrutiny by peer review WS 1.3 Appreciate the power of monoclonal antibodies and consider any ethical issues. WS 1.5 Evaluate the advantages and disadvantages of monoclonal antibodies. WS 1.4 WS 1.5 Interpret data about risk factors for specified diseases. MS 2d MS 2c, 4a MS 2g		WS 2.6 Recording first-hand observations of organisms. MS 2c, 4a Extract and interpret information from charts, graphs and tables. WS 1.2 MS 2b, 2f, 4a, 4c Required practical activity 9: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species. AT skills covered by this practical activity: AT 1, 3, 4, 6 and 8. WS 1.2 Interpret and explain the processes in diagrams of the carbon cycle, the water cycle MS 1c, 4a, 4c Required practical activity 10: investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change. AT skills covered by this practical activity: AT 1, 3, 4 and 5	

Year 10: Separate Science Chemistry

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: C1 WEEKS: 10		TOPIC: C5 WEEKS: 7		TOPIC: C6, C9 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C1 Atomic structure	C1 (BA)	C5 Chemical changes	C5 (EQ)	C6 Electrolysis C9 Crude Oil and Fuels	C6 (EQ) C9 (BA)
SKILLS		SKILLS	MID-YEAR EXAMS WHOLE- SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	
WS 2.2, 2.3 AT 4 Safe use of a range of equipment to separate chemical mixtures. WS 4.3, 4 Use SI units and the prefix nano. MS 1b Recognise expressions in standard form. MS 1d WS 1.2 Students should be able to represent the electronic structures of the first twenty elements of the periodic table in both forms. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects		AT 6 Mixing of reagents to explore chemical changes and/or products. Required practical activity 1: preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution. AT skills covered by this practical activity: chemistry AT 2, 3, 4 and 6. AT 3 This is an opportunity to investigate pH changes when a strong acid neutralises a strong alkali.		WS 1.2 Required practical activity 3: investigate what happens when aqueous solutions are electrolysed using inert electrodes. This should be an investigation involving developing a hypothesis. AT skills covered by this practical activity: chemistry AT 3 and 7 WS 1.2 Make models of alkane molecules using the molecular modelling kits. WS 1.2, 4.1 Investigate the properties of different hydrocarbons.	

		(HT) An opportunity to measure the pH of different acids at different concentrations. MS 2h Make order of magnitude calculations.			
Autumn 2		Spring 2		Summer 2	
TOPIC: C2, C3 WEEKS: 5		TOPIC: C7, C4 WEEKS: 9		TOPIC: C10 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C2 Periodic table C3 Bonding and structure		C7 Energy changes C4 Chemical Calculations	C7 (EQ) C4 (BA)	C10 Organic Reactions	C10 (EQ) END OF YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT
SKILLS		SKILLS		SKILLS	
WS 1.1, 1.6 This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time. WS 1.2 S 1.1, 1.6 Explain how testing a prediction can support or refute a new scientific idea. T 6 Offers an opportunity within displacement reactions of halogens. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects. WS 1.2 MS 4a MS 1a, 1c		AT 5 An opportunity to measure temperature changes when substances react or dissolve in water Required practical activity 4: investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6. MS 1a AT6 Safe and careful use of liquids. WS 1.2		WS 1.2 Recognise substances that are alkenes from their names or from given formulae in these forms. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects. AT 2, 5, 6 Opportunities when investigating reactions of alcohols. AT 2, 5, 6 Opportunities within investigation of the reactions of carboxylic acids.	

<p>WS 1.2 Recognise substances as small molecules, polymers or giant structures from diagrams showing their bonding.</p> <p>WS 1.2 Recognise substances as metallic giant structures from diagrams showing their bonding.</p> <p>WS 1.2, 1.4, 4.1, 4.2, 4.3 4.4, 4.5 MS 2h Make order of magnitude calculations.</p> <p>MS 5c Calculate areas of triangles and rectangles, surface areas and volumes of cubes.</p> <p>MS 1b Recognise and use expressions in standard form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations.</p> <p>WS 1.3, 1.4, 1.5</p>		<p>AT 1, 2, 6 Opportunities within investigation of mass changes using various apparatus.</p> <p>WS 3.4</p> <p>(HT) WS 4.1, 4.2, 4.3, 4.5, 4.6 MS 1a Recognise and use expressions in decimal form. MS 1b Recognise and use expressions in standard form. MS 2a Use an appropriate number of significant figures. MS 3a Understand and use the symbols: =, <>, >, \propto, ~ MS 3b Change the subject of an equation.</p> <p>MS 1c</p> <p>(HT) MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 3b Change the subject of an equation. MS 3c Substitute numerical values into algebraic equations using appropriate units for physical quantities.</p> <p>(HT) MS 3b Change the subject of an equation. MS 3c Substitute numerical values into algebraic equations using appropriate units for physical quantities.</p> <p>(HT) MS 4.1</p> <p>MS 1c Use ratios, fractions and percentages. MS 3b Change the subject of an equation.</p>			
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		<p>AT 1, 3, 8 Opportunities within titrations including to determine concentrations of strong acids and alkalis.</p> <p>Required practical 2: (chemistry only) determination of the reacting volumes of solutions of a strong acid and a strong alkali by titration. (HT only) determination of the concentration of one of the solutions in mol/dm³ and g/dm³ from the reacting volumes and the known concentration of the other solution. AT skills covered by this practical activity: 1 and 8</p>			
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Year 10: Separate Science Physics

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: P1, P2 WEEKS: 10		TOPIC: P4, P5 WEEKS: 7		TOPIC: P8 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
P1 Conservation and dissipation of energy P2 Energy transfer by heating	P1 (BA) P2 (EQ)	P4 Electric circuits P5 Electricity in the home	P4 (EQ) MID-YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA	P8 Forces in Balance	P8 (BA)
SKILLS		SKILLS		SKILLS	

<p>WS 1.2, 4.3, 4.4, 4.5, 4.6 MS 1a, c, 3b, c MS 3b, c Students should be able to recall and apply the equation for calculating kinetic energy MS 3b, c Students should be able to apply the equation for elastic potential energy which is given on the Physics equation sheet. S 3b, c Students should be able to recall and apply the equation for gravitational potential energy. AT 1 Investigate the transfer of energy from a gravitational potential energy store to a kinetic energy store. MS 3b, c Students should be able to apply the equation for calculating specific heat capacity which is given on the Physics equation sheet. Required practical activity 1: an investigation to determine the specific heat capacity of one or more materials. The investigation will involve linking the decrease of one energy store (or work done) to the increase in temperature and subsequent increase in thermal energy stored. AT skills covered by this practical activity: physics AT 1 and 5. S 3b, c Students should be able to recall and apply both equations for calculating power. Required practical activity 2:(physics only): investigate the effectiveness of</p>		<p>WS 1.2, 1.4 S 3b, c Students should be able to recall and apply the equation for calculating charge. MS 3b, c Students should be able to recall and apply the equation for calculating potential difference. Required practical activity 3: use circuit diagrams to set up and check appropriate circuits to investigate the factors affecting the resistance of electrical circuits. This should include: the length of a wire at constant temperature and combinations of resistors in series and parallel. AT skills covered by this practical activity: physics AT 1, 6 and 7. AT 6 Investigate the relationship between the resistance of a thermistor and temperature. Investigate the relationship between the resistance of an LDR and light intensity. MS 4c, 4d, 4e Required practical activity 4: use circuit diagrams to construct appropriate circuits to investigate the I–V characteristics of a variety of circuit elements, including a filament lamp, a diode and a resistor at constant temperature.</p>	<p>COLLECTION POINT P5 (EQ)</p>	<p>MS 3b, c Students should be able to recall and apply the equation for calculating weight MS 3a Students should recognise and be able to use the symbol for proportionality, \propto WS 1.2 MS 4a, 5a, b S 3b, c Students should be able to recall and apply the equation for calculating work done MS 3c Students should be able to recall and apply the equation for calculating moments.</p>	
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different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material. AT skills covered by this practical activity: AT 1 and 5. WS 1.4 AT 1, 5 Investigate thermal conductivity using rods of different materials. MS 3b, c Students should be able to recall and apply both equations. MS 1a, c, 3b, c Students may be required to calculate or use efficiency values as a decimal or as a percentage.		AT skills covered by this practical activity: physics AT 6 and 7 MS 1c, 3b, 3c, 3d AT 7			
Autumn 2		Spring 2		Summer 2	
TOPIC: P3 WEEKS: 5		TOPIC: P6, P7 WEEKS: 9		TOPIC: P9 WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
P3 Energy resources	P3 (BA)	P6 Molecules and matter P7 Radioactivity	P6 (BA) P7 (EQ)	P9 Motion	P9 (EQ) END OF YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT
SKILLS		SKILLS		SKILLS	
WS 4.4 WS 1.3, 1.4 WS 3.5 MS 1c, 2c, 4a		MS 1a, b, c, 3b, c Students should be able to recall and apply the density equation to changes where mass is conserved. WS 1.2 MS 1a, 3b, 3c, 3d Students should be able to apply the equation for		MS 1a, c, 2f MS 3b, 3c Students should be able to recall and apply the equation for calculating speed MS 4a, b, c, d, f MS 1d, 3b, 3c Students should be able to recall and apply the	

		<p>specific heat capacity, which is given on the Physics equation sheet, to calculate the energy change involved when the temperature of a material changes. MS 1a, 3b, c, d Students should be able to apply the equation for specific latent heat, which is given on the Physics equation sheet, to calculate the energy change involved in a change of state. MS 4a AT 5 Perform an experiment to measure the latent heat of fusion of water.</p> <p>WS 3.5</p> <p>Required practical activity 5: use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. Volume should be determined from the dimensions of regularly shaped objects, and by a displacement technique for irregularly shaped objects. Dimensions to be measured using appropriate apparatus such as a ruler, micrometer or Vernier callipers. AT skills covered by this practical activity: AT 1</p> <p>MS 3b, c Students should be able to apply the equation for calculating</p>		<p>equation for calculating acceleration.</p> <p>WS 3.3</p> <p>MS 3b, 3c Students should be able to apply the equation for uniform acceleration which is given on the Physics equation sheet.</p> <p>MS 1, 3c Throughout this section (Forces and motion), students should be able to use ratios and proportional reasoning to convert units and to compute rates.</p>	
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		<p>pressure which is given on the Physics equation sheet</p> <p>MS 1b WS 4.4 Students should be able to recognise expressions given in standard form.</p> <p>WS 4.1</p> <p>WS 1.1, 1.6 This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time. WS 1.2</p> <p>WS 1.4, 1.5</p> <p>MS 4a</p> <p>(HT) MS 1c, 3d</p> <p>WS 1.6</p>			
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Year 10: Entry Level Certificate

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: Component 1 Biology WEEKS: 10		TOPIC: Component 5 Physics WEEKS: 7		TOPIC: Component 4 Chemistry WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
Component 1 Biology: The Human Body	ESA TDA: Use pre-inoculated agar plates to	Component 5 Physics: Energy, Forces and the structure of Matter	ESA TDA: Investigate factors that	Component 4 Chemistry: Chemistry in Our World	ESA TDA: Investigate which water
SKILLS		SKILLS		SKILLS	

Modelling animal cells Using apparatus- stop watches Using calculators	evaluate the effect of disinfectants and antibiotics. TDA: Investigate the effect of caffeine drinks on pulse rate.	Testing different materials for thermal conductivity Investigating speed of a trolley as it rolls down a slope	affect the rate of cooling. TDA: Investigate different surfaces and how this affects friction. MID-YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	Identify laboratory equipment, observe the rate of chemical reactions (measure the start and finish temperature), Investigate the variables that affect a rate of reaction, classify strength of acids reactions, communicate about pH scale, infer how to make a graph, predict how carbon dioxide is released into the atmosphere, record the experiments results, Identify the safest water to drink.	sample would be the safest to use as drinking water
Autumn 2		Spring 2		Summer 2	
TOPIC: Component 3 Chemistry WEEKS: 5		TOPIC: Component 2 Biology WEEKS: 9		TOPIC: Component 6 Physics WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
Component 3 Chemistry: Elements, Mixtures and Compounds	ESA TDA: Investigate which material has the highest boiling point	Component 2 Biology: Environment, Evolution and Inheritance	ESA TDA: Investigate if there is more pollution near the road	Component 6 Physics: Electricity, Magnetism and Waves	ESA TDA: Investigate which materials are the best electrical insulators.
SKILLS		SKILLS		SKILLS	
State how to do an experiment safely,		Investigate factors that affect photosynthesis process, explore		Collecting data from electrical circuits	

Explain what is a chemical reaction, write chemical symbols, identify elements on periodic table, communicate about the difference between elements, compounds and mixtures, recognise simple compounds from their names, write word equations for reactions of metals and non-metals, investigate the three states of matter, separate simple mixtures, predict what is the best way to present data (bar chart, pie chart or line graph).		how organisms are adapted to live in their natural environment, observe how all materials in the living world are recycled to provide the building blocks for future organisms, predict why animals and plants are subjected to environmental changes, record data from experiment graph, state what happened during the investigation drawing one conclusion, Infer how humans can cause widespread changes in the environment, presenting data.		Constructing electrical circuits Carrying out risk assessments.	TDA: Investigate factors that affect the strength of an electromagnet. END OF YEAR EXAMS WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT
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Year 11: Combined Science (Trilogy) Biology

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: B7, B8, B9 WEEKS: 10		TOPIC: B11, B12, B13, B14 WEEKS: 7		TOPIC WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
B7 Non-communicable disease B8 Photosynthesis B9 Respiration	B7 (EQ) B8 (BA) B9 (EQ)	B11 Hormonal Coordination B12 Reproduction B13 Variation and Evolution B14 Genetics and Evolution	B11 (EQ) B12 (EQ) B13 (EQ) B14 (BA)		

SKILLS		SKILLS		SKILLS	
<p>WS 1.4 WS 1.5 Interpret data about risk factors for specified diseases. MS 2d MS 2c, 4a MS 2g</p> <p>MS 3d Solve simple algebraic equations. MS 1a, 1c, 2c, 3d, 4a, 4c MS 3a, 3d (HT only) WS 1.4 Use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses.</p> <p>Required practical activity 5: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. AT skills covered by this practical activity: biology AT 1, 2, 3, 4 and 5.</p> <p>AT 1, 3, 4 Investigations into the effect of exercise on the body.</p>		<p>WS 1.3 Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues. MS 2c WS 1.3 WS 1.4 Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments. WS 1.1 Developments of microscopy techniques have enabled IVF treatments to develop. WS 1.3 Understand social and ethical issues associated with IVF treatments. WS 1.4 Evaluate from the perspective of patients and doctors the methods of treating infertility. S 1.2, MS 2c Interpret and explain simple diagrams of negative feedback control.</p> <p>Evidence for Darwin's theory is now available as it has been shown that characteristics are passed on to offspring in genes. There is</p>			

		<p>further evidence in the fossil record and the knowledge of how resistance to antibiotics evolves in bacteria.</p> <p>WS 1.1, 1.4 MS 2e MS 1c, 3a MS 2c, 4a MS 2e, WS 1.2</p> <p>WS 1.3 Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise.</p> <p>WS 1.2 Use the theory of evolution by natural selection in an explanation.</p> <p>WS 1.3, 1.4 Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues.</p> <p>(HT only) WS 1.4 Interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops.</p> <p>S 1.3 Data is now available to support the theory of evolution</p>			
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		MS 2c, 4a Extract and interpret information from charts, graphs and tables WS 1.3 Appreciate why the fossil record is incomplete. WS 1.1 Understand how scientific methods and theories develop over time. MS 2c, 4a WS 1.1 Understand how scientific methods and theories develop over time. WS 1.2 Interpret evolutionary trees.			
Autumn 2		Spring 2		Summer 2	
TOPIC: B10 WEEKS: 5		TOPIC: B15, B16, B17 WEEKS: 9		TOPIC: WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
B10 The Human Nervous System	B10 (EQ) MOCK EXAM 1 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	B15 Adaptations, Interdependence and Competition B16 Organising an Ecosystem B17 Biodiversity and Ecosystems	B15 (EQ) B16 (EQ) B17 (EQ) MOCK EXAM 2 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT		
SKILLS		SKILLS		SKILLS	
MS 2c MS 4a Required practical activity 6: plan and carry out an investigation into the effect of a factor on human reaction time. AT		WS 2.6 Recording first-hand observations of organisms. MS 2c, 4a Extract and interpret information from charts, graphs and tables.			

<p>skills covered by this practical activity: biology AT 1, 3 and 4</p>		<p>WS 1.2 MS 2b, 2f, 4a, 4c</p> <p>WS 1.2 Interpret graphs used to model predator-prey cycles MS 4a</p> <p>Required practical activity 7: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species. AT skills covered by this practical activity: biology AT 1, 3, 4 and 6.</p> <p>WS 1.2 Interpret and explain the processes in diagrams of the carbon cycle, the water cycle.</p> <p>WS 1.4 Explain how waste, deforestation and global warming have an impact on biodiversity.</p> <p>WS 1.4, 1.5 Understand the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions.</p> <p>WS 1.4 Evaluate the environmental implications of deforestation.</p> <p>S 1.6 Understand that the scientific consensus about global warming and climate change is based on</p>			
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		<p>systematic reviews of thousands of peer reviewed publications.</p> <p>WS 1.3 Explain why evidence is uncertain or incomplete in a complex context.</p> <p>WS 1.4, 1.5 Evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment. Explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information.</p>			
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Year 11: Combined Science (Trilogy) Chemistry

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: C7, C8 WEEKS: 10		TOPIC: C10, C11 WEEKS: 7		TOPIC WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C7 Energy Changes C8 Rates and Equilibrium	C7 (EQ) C8 (BA)	C10 Chemical Analysis C11 The Earth's Atmosphere	C10 (BA) C11 (EQ)		
SKILLS		SKILLS		SKILLS	

<p>AT 5 An opportunity to measure temperature changes when substances react or dissolve in water</p> <p>Required practical activity 4: investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6.</p> <p>MS 1a</p> <p>MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations. MS 4a Translate information between graphical and numeric form. MS 4b Drawing and interpreting appropriate graphs from data to determine rate of reaction. MS 4c Plot two variables from experimental or other data. MS 4d Determine the slope and intercept of a linear graph. MS 4e Draw and use the slope of a tangent to a curve as a measure of rate of change.</p> <p>Required practical activity 11: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas</p>		<p>WS 2.2, 4.1</p> <p>WS 1.4</p> <p>WS 2.2, 3.1, 2, 3 MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations.</p> <p>MS 2a</p> <p>Required practical activity 6: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate R_f values. AT skills covered by this practical activity: chemistry AT 1 and 4.</p> <p>MS 1c To use ratios, fractions and percentages.</p> <p>WS 1.1, 1.2, 1.3, 3.5, 3.6, 4.1</p> <p>WS 1.2 An opportunity to show that aquatic plants produce oxygen in daylight.</p> <p>WS 1.3, 1.4, 1.6</p>			
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<p>produced and a method involving a change in colour or turbidity. This should be an investigation involving developing a hypothesis. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6.</p> <p>WS 1.2 MS 5c MS 1c AT 5 An opportunity to investigate the catalytic effect of adding different metal salts to a reaction such as the decomposition of hydrogen peroxide.</p>					
Autumn 2		Spring 2		Summer 2	
TOPIC: C9 WEEKS: 5		TOPIC: C12 WEEKS: 9		TOPIC: WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C9 Crude Oil and Fuels	C9 (EQ)	C12 The Earth's Resources	C12 (EQ)		
SKILLS	MOCK EXAM 1 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	MOCK EXAM 2 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	
<p>WS 1.2 Make models of alkane molecules using the molecular modelling kits.</p> <p>WS 1.2, 4.1 Investigate the properties of different hydrocarbons.</p>		<p>WS 3.2 MS 2c, 4a MS 2h Translate information between graphical and numeric form.</p> <p>Required practical activity 8: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation. AT skills covered by this practical activity: chemistry AT 2, 3 and 4.</p>			

		<p>WS 1.3, 4, 5 LCAs should be done as a comparison of the impact on the environment of the stages in the life of a product, and only quantified where data is readily available for energy, water, resources and wastes. Interpret LCAs of materials or products given appropriate information. MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations. MS 2a Use an appropriate number of significant figures. MS 4a Translate information between graphical and numeric form</p>			
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Year 11: Combined Science (Trilogy) Physics

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: P5, P6, P7 WEEKS: 10		TOPIC: P9, P10, P11 WEEKS: 7		TOPIC WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
P5 Electricity in the Home	P5 (EQ)	P9 Motion	P9 (EQ)		

<p>P6 Molecules and Matter P7 Radioactivity</p>	<p>P6 (BA) P7 (EQ)</p>	<p>P10 Force and Motion P11 Wave Properties</p>	<p>P10 (BA) P11 (EQ)</p>		
<p>SKILLS</p>		<p>SKILLS</p>		<p>SKILLS</p>	
<p>MS 1c, 3b, 3c, 3d AT 7 WS 1.4 MS 1c, 3b, c, d WS 1.5 S 3b, c WS 4.5 Students should be able to recall and apply both equations for calculating power. WS 1.2 WS 1.4 Detailed knowledge of the structure of a transformer is not required.</p> <p>MS 1a, b, c, 3b, c Students should be able to recall and apply the density equation to changes where mass is conserved. WS 1.2 MS 1a, 3b, 3c, 3d Students should be able to apply the equation for specific heat capacity, which is given on the Physics equation sheet, to calculate the energy change involved when the temperature of a material changes. MS 1a, 3b, c, d Students should be able to apply the equation for specific latent heat, which is given on the Physics equation sheet, to calculate the energy change involved in a change of state.</p>		<p>MS 1a, c, 2f MS 3b, 3c Students should be able to recall and apply the equation for calculating speed MS 4a, b, c, d, f MS 1d, 3b, 3c Students should be able to recall and apply the equation for calculating acceleration. WS 3.3 MS 3b, 3c Students should be able to apply the equation for uniform acceleration which is given on the Physics equation sheet. MS 1, 3c Throughout this section (Forces and motion), students should be able to use ratios and proportional reasoning to convert units and to compute rates.</p> <p>MS 3b, c, 4a Students should be able to recall and apply the equation for calculating extension. WS 3.5 MS 3c Students should be able to apply the equation for elastic potential energy which is given on the Physics equation sheet.</p>			

<p>MS 4a AT 5 Perform an experiment to measure the latent heat of fusion of water.</p> <p>WS 3.5 MS 1b WS 4.4 Students should be able to recognise expressions given in standard form.</p> <p>WS 4.1</p> <p>WS 1.1, 1.6 This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time. WS 1.2</p> <p>WS 1.4, 1.5</p> <p>MS 4a</p> <p>(HT) MS 1c, 3d</p> <p>WS 1.6</p>		<p>Required practical activity 18: investigate the relationship between force and extension for a spring. AT skills covered by this practical activity: physics AT 1 and 2.</p> <p>MS 4a, b, c, d, f</p> <p>WS 3.3</p> <p>MS 3a Students should recognise and be able to use the symbol for proportionality, \propto</p> <p>Required practical activity 19: investigate the effect of varying the force on the acceleration of an object of constant mass, and the effect of varying the mass of an object on the acceleration produced by a constant force. AT skills covered by this practical activity: physics AT 1, 2 and 3.</p> <p>WS 3.5, 3.7</p> <p>WS 1.5, 2.2 MS 1a, c AT 1 Measure the effect of distractions on reaction time.</p> <p>MS 1c, 1d, 2c, 2d, 2f, 2h, 3b, 3c</p> <p>(HT) MS 1d</p> <p>(HT) S 1.2 MS 3b, c Students should be able to recall and apply the equation for momentum</p> <p>AT 1, 2, 3 Investigate collisions between laboratory trolleys using light gates, data loggers or ticker timers to measure and record data.</p>			
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		<p>WS 1.2, 2.2 S 1c, 3b, c Students should be able to apply the equation for calculating the Period of a wave which is given on the Physics equation sheet. S 1c, 3b, c Students should be able to apply the equation for calculating wave speed. AT 1, AT 4 WS 2.3, 2.4, 2.6, 2.7, 3.1, 3.5</p> <p>Required practical activity 20: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. AT skills covered by this practical activity: physics AT 4.</p>			
Autumn 2		Spring 2		Summer 2	
TOPIC: P8 WEEKS: 5		TOPIC: P12, P13 WEEKS: 9		TOPIC: WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
P8 Forces in Balance	<p>P8 (EQ)</p> <p>MOCK EXAM 1 WHOLE-SCHOOL</p>	<p>P12 Electromagnetic Waves P13 Electromagnetism</p>	<p>P12 (EQ) P13 (EQ)</p> <p>MOCK EXAM 2 WHOLE-SCHOOL</p>		
SKILLS		SKILLS		SKILLS	

<p>MS 3b, c Students should be able to recall and apply the equation for calculating weight</p> <p>MS 3a Students should recognise and be able to use the symbol for proportionality, \propto</p> <p>WS 1.2</p> <p>MS 4a, 5a, b</p> <p>S 3b, c Students should be able to recall and apply the equation for calculating work done</p>	<p>ASSESSMENT DATA COLLECTION POINT</p>	<p>WS 1.2</p> <p>Required practical activity 21: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.</p> <p>WS 1.54 (HT) WS 1.4</p> <p>WS 2.2</p> <p>MS 3b, c Students should be able to apply the equation for magnetic flux density which is given on the physics equation sheet.</p>	<p>ASSESSMENT DATA COLLECTION POINT</p>		
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Year 11: Separate Science (Triple) Biology					
Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
<p>TOPIC: B10, B11, B12</p> <p>WEEKS: 10</p>		<p>TOPIC: B14, B15, B18</p> <p>WEEKS: 7</p>		<p>TOPIC</p> <p>WEEKS: 6</p>	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
<p>B10 The Human Nervous System</p> <p>B11 Hormonal Coordination</p> <p>B12 Homeostasis in Action</p>	<p>B10 (BA)</p> <p>B11 (EQ)</p> <p>B12 (EQ)</p>	<p>B14 Variation and Evolution</p> <p>B15 Genetics and Evolution</p> <p>B18 Biodiversity and Ecosystems</p>	<p>B14 (EQ)</p> <p>B15 (EQ)</p> <p>B18 (BA)</p>		

SKILLS		SKILLS		SKILLS	
<p>MS 2c, 4a Required practical activity 7: plan and carry out an investigation into the effect of a factor on human reaction time. AT skills covered by this practical activity: AT 1, 3 and 4. (HT) WS 1.5 Evaluate the benefits and risks of procedures carried out on the brain and nervous system WS 1.2, 1.4</p> <p>Required practical activity 8: investigate the effect of light or gravity on the growth of newly germinated seedlings. Record results as both length measurements and as careful, labelled biological drawings to show the effects. AT skills covered by this practical activity: AT 1, 3, 4 and 7 (HT) S 1.3, 1.4 Understand how the everyday use of hormones as weed killers has an effect on biodiversity.</p> <p>MS 4a WS 1.4 Students should be able to describe how kidney dialysis works. WS 1.5 Evaluate the advantages and disadvantages of treating organ failure by mechanical device or transplant.</p>		<p>WS 1.2 Use the theory of evolution by natural selection in an explanation. WS 1.3, 1.4 Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues. (HT) WS 1.4 Interpret information about genetic engineering techniques and to make informed judgements about issues concerning cloning and genetic engineering, including GM crops. WS 1.3, 1.4 Explain the potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections</p> <p>WS 1.1, 1.3 Students should appreciate that the theory of evolution by natural selection developed over time and from information gathered by many scientists. WS 1.1 The theory of speciation has developed over time. WS 1.1 Our current understanding of genetics has developed over time. WS 1.3 Data is now available to support the theory of evolution.</p>			

		<p>MS 2c, 4a Extract and interpret information from charts, graphs and tables.</p> <p>WS 1.3 Appreciate why the fossil record is incomplete.</p> <p>WS 1.1 Understand how scientific methods and theories develop over time.</p> <p>MS 2c, 4a</p> <p>WS 1.2 Interpret evolutionary trees.</p> <p>WS 1.4 Explain how waste, deforestation and global warming have an impact on biodiversity.</p> <p>WS 1.4, 1.5 Understand the conflict between the need for cheap available compost to increase food production and the need to conserve peat bogs and peatlands as habitats for biodiversity and to reduce carbon dioxide emissions.</p> <p>WS 1.4 Evaluate the environmental implications of deforestation.</p> <p>WS 1.6 Understand that the scientific consensus about global warming and climate change is based on systematic reviews of thousands of peer reviewed publications. WS 1.3 Explain why evidence is uncertain or incomplete in a complex context.</p>			
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		<p>WS 1.4, 1.5 Evaluate given information about methods that can be used to tackle problems caused by human impacts on the environment. Explain and evaluate the conflicting pressures on maintaining biodiversity given appropriate information.</p> <p>WS 1.2</p> <p>WS 2c</p> <p>MS 1c Calculate the efficiency of biomass transfer between trophic levels.</p> <p>WS 1.4 Interpret population and food production statistics to evaluate food security.</p> <p>WS 1.3 Understand that some people have ethical objections to some modern intensive farming methods. WS 1.4 Evaluate the advantages and disadvantages of modern farming techniques.</p> <p>WS 1.4 Understand how application of different fishing techniques promotes recovery of fish stocks.</p>			
Autumn 2		Spring 2		Summer 2	
TOPIC: B13 WEEKS: 5		TOPIC: P13, P14 (to accommodate additional Physics support) WEEKS: 9		TOPIC: WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT

B13 Reproduction	B13 (EQ)	P13 Electromagnetic Waves P14 Light	P13 (EQ) P14 (EQ)		
SKILLS	MOCK EXAM 1 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	MOCK EXAM 2 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	
<p>WS 1.2 Modelling behaviour of chromosomes during meiosis.</p> <p>WS 1.1 Historical developments of our understanding of the causes and prevention of malaria.</p> <p>WS 1.2 Interpret a diagram of DNA structure but will not be required to reproduce it.</p> <p>(HT) WS 1.2 Modelling insertions and deletions in chromosomes to illustrate mutations.</p> <p>MS 2e</p> <p>MS 1c, 3a</p> <p>MS 2c, 4a</p> <p>MS 2e, WS 1.2</p> <p>WS 1.3 Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise.</p>		<p>WS 1.2</p> <p>Required practical activity 10: investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.</p> <p>WS 1.54</p> <p>(HT) WS 1.4</p> <p>Required practical activity 9 (physics only): investigate the reflection of light by different types of surface and the refraction of light by different substances. AT skills covered by this practical activity: AT 4 and 8.</p> <p>MS 5a, 5c WS 1.2</p> <p>MS 3b, c Students should be able to apply this equation which is given on the Physics equation sheet. AT 4, 8 Investigate the magnification produced by a range of convex lenses.</p> <p>WS 1.2</p>			

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: C7, C8 WEEKS: 10		TOPIC: C10, C11, C12 WEEKS: 7		TOPIC WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C7 Energy Changes C8 Rates and Equilibrium	C7 (EQ) C8 (BA)	C10 Organic Reactions C11 Polymers C12 Chemical Analysis	C10 (EQ) C11 (BA) C12 (EQ)		
SKILLS		SKILLS		SKILLS	
AT 5 An opportunity to measure temperature changes when substances react or dissolve in water Required practical activity 4: investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6. MS 1a MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations. MS 4a Translate information between graphical and		WS 1.2 Recognise substances that are alkenes from their names or from given formulae in these forms. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects. AT 2, 5, 6 Opportunities when investigating reactions of alcohols. AT 2, 5, 6 Opportunities within investigation of the reactions of carboxylic acids. WS 1.2 Use models to represent addition polymerisation. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects.			

<p>numeric form. MS 4b Drawing and interpreting appropriate graphs from data to determine rate of reaction. MS 4c Plot two variables from experimental or other data. MS 4d Determine the slope and intercept of a linear graph. MS 4e Draw and use the slope of a tangent to a curve as a measure of rate of change.</p> <p>Required practical activity 5: investigate how changes in concentration affect the rates of reactions by a method involving measuring the volume of a gas produced and a method involving a change in colour or turbidity. This should be an investigation involving developing a hypothesis. AT skills covered by this practical activity: chemistry AT 1, 3, 5 and 6.</p> <p>WS 1.2 MS 5c MS 1c AT 5 An opportunity to investigate the catalytic effect of adding different metal salts to a reaction such as the decomposition of hydrogen peroxide.</p>		<p>WS 1.2 Use models to represent condensation polymerisation. MS 5b Visualise and represent 2D and 3D forms including two-dimensional representations of 3D objects.</p> <p>WS 1.4, 2.2, 4.1 WS 2.2, 3.1, 2, 3 MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations.</p> <p>MS 2a Required practical 6: investigate how paper chromatography can be used to separate and tell the difference between coloured substances. Students should calculate R_f values. AT skills covered by this practical activity: 1 and 4. AT 8 An opportunity to investigate flame colours. AT 8 An opportunity to make precipitates of metal hydroxides Required practical 7: use of chemical tests to identify the ions in unknown single ionic compounds AT skills covered by this practical activity: 1 and 8.</p>			
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		AT 8 An opportunity to observe flame spectra using a handheld spectroscope. WS 3.6 MS 4a			
Autumn 2		Spring 2		Summer 2	
TOPIC: C9 WEEKS: 5		TOPIC: C13, C14, C15 WEEKS: 9		TOPIC: WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
C9 Crude Oil and Fuels	C9 (EQ) MOCK EXAM 1 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	C13 The Earth's Atmosphere C14 The Earth's Resources C15 Using Our Resources	C13 (EQ) C14 (EQ) C15 (EQ) MOCK EXAM 2 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT		
SKILLS		SKILLS		SKILLS	
WS 1.2 Make models of alkane molecules using the molecular modelling kits. WS 1.2, 4.1 Investigate the properties of different hydrocarbons.		MS 1c To use ratios, fractions and percentages. WS 1.1, 1.2, 1.3,1.4, 1.5. 1.6, 3.5, 3.6, 4.1 WS 1.2 An opportunity to show that aquatic plants produce oxygen in daylight WS 3.2 MS 2c, 4a MS 2h Translate information between graphical and numeric form. Required practical 8: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation. AT			

		<p>skills covered by this practical activity: 2, 3 and 4</p> <p>WS 1.3, 4, 5 LCAs should be done as a comparison of the impact on the environment of the stages in the life of a product, and only quantified where data is readily available for energy, water, resources and wastes. Interpret LCAs of materials or products given appropriate information. MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages. MS 1d Make estimates of the results of simple calculations. MS 2a Use an appropriate number of significant figures. MS 4a Translate information between graphical and numeric form.</p> <p>WS 2.2, 7, 3.5 Investigate the conditions for rusting. MS 1a Recognise and use expressions in decimal form. MS 1c Use ratios, fractions and percentages.</p> <p>WS 1.4, 3.5, 3.8 Compare the properties of thermosetting and thermosoftening polymers. MS 1a Recognise and use expressions in decimal form. MS 1c</p>			
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		Use ratios, fractions and percentages. WS 3.5, 3.8 AT 4 Prepare an ammonium salt.			
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Year 11: Separate Science (Triple) Physics

Autumn Term		Spring Term		Summer Term	
Autumn 1		Spring 1		Summer 1	
TOPIC: P5, P6, P7 WEEKS: 10		TOPIC: P9, P10, P11 WEEKS: 7		TOPIC WEEKS: 6	
KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
P5 Electricity in the Home P6 Molecules and Matter P7 Radioactivity	P5 (EQ) P6 (BA) P7 (EQ)	P9 Motion P10 Force and Motion P11 Force and Pressure	P9 (EQ) P10 (BA) P11 (EQ)		
SKILLS		SKILLS		SKILLS	
MS 1c, 3b, 3c, 3d AT 7 WS 1.4 MS 1c, 3b, c, d WS 1.5 S 3b, c WS 4.5 Students should be able to recall and apply both equations for calculating power. WS 1.2		MS 1a, c, 2f MS 3b, 3c Students should be able to recall and apply the equation for calculating speed MS 4a, b, c, d, f MS 1d, 3b, 3c Students should be able to recall and apply the equation for calculating acceleration. WS 3.3			

<p>WS 1.4 Detailed knowledge of the structure of a transformer is not required.</p> <p>MS 1a, b, c, 3b, c Students should be able to recall and apply the density equation to changes where mass is conserved.</p> <p>WS 1.2</p> <p>MS 1a, 3b, 3c, 3d Students should be able to apply the equation for specific heat capacity, which is given on the Physics equation sheet, to calculate the energy change involved when the temperature of a material changes.</p> <p>MS 1a, 3b, c, d Students should be able to apply the equation for specific latent heat, which is given on the Physics equation sheet, to calculate the energy change involved in a change of state.</p> <p>MS 4a AT 5 Perform an experiment to measure the latent heat of fusion of water.</p> <p>WS 3.5 MS 1b WS 4.4 Students should be able to recognise expressions given in standard form.</p> <p>WS 4.1</p> <p>WS 1.1, 1.6 This historical context provides an opportunity for students to show an understanding of why and describe how scientific methods and theories develop over time. WS 1.2</p>		<p>MS 3b, 3c Students should be able to apply the equation for uniform acceleration which is given on the Physics equation sheet.</p> <p>MS 1, 3c Throughout this section (Forces and motion), students should be able to use ratios and proportional reasoning to convert units and to compute rates.</p> <p>MS 3b, c, 4a Students should be able to recall and apply the equation for calculating extension.</p> <p>WS 3.5</p> <p>MS 3c Students should be able to apply the equation for elastic potential energy which is given on the Physics equation sheet.</p> <p>Required practical activity 6: investigate the relationship between force and extension for a spring. AT skills covered by this practical activity: physics AT 1 and 2.</p> <p>MS 4a, b, c, d, f</p> <p>WS 3.3</p> <p>MS 3a Students should recognise and be able to use the symbol for proportionality, \propto</p> <p>Required practical activity 7: investigate the effect of varying the force on the acceleration of an object of constant mass, and the</p>				
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<p>WS 1.4, 1.5 MS 4a (HT) MS 1c, 3d WS 1.6</p>		<p>effect of varying the mass of an object on the acceleration produced by a constant force. AT skills covered by this practical activity: physics AT 1, 2 and 3. WS 3.5, 3.7 WS 1.5, 2.2 MS 1a, c AT 1 Measure the effect of distractions on reaction time. MS 1c, 1d, 2c, 2d, 2f, 2h, 3b, 3c (HT) MS 1d (HT) S 1.2 MS 3b, c Students should be able to recall and apply the equation for momentum AT 1, 2, 3 Investigate collisions between laboratory trollies using light gates, data loggers or ticker timers to measure and record data.</p> <p>MS 1c, 3b, c WS 4.3, 4.4, 4.5, 4.6 Students should be able to recall and apply this equation</p> <p>WS 1.2</p>			
Autumn 2		Spring 2		Summer 2	
<p>TOPIC: P8 WEEKS: 5</p> <p>P8 Forces in Balance</p>		<p>TOPIC: P12, P15, P16 WEEKS: 9</p> <p>P12 Wave Properties P15 Electromagnetism P16 Space</p>		<p>TOPIC: WEEKS: 6</p>	

KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT	KNOWLEDGE	ASSESSMENT
	P8 (EQ)		P12 (EQ) P15 (EQ) P16 (EQ)		
SKILLS	MOCK EXAM 1 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	MOCK EXAM 2 WHOLE-SCHOOL ASSESSMENT DATA COLLECTION POINT	SKILLS	
<p>MS 3b, c Students should be able to recall and apply the equation for calculating weight</p> <p>MS 3a Students should recognise and be able to use the symbol for proportionality, \propto</p> <p>WS 1.2</p> <p>MS 4a, 5a, b</p> <p>S 3b, c Students should be able to recall and apply the equation for calculating work done</p> <p>MS 3c Students should be able to recall and apply the equation for calculating moments.</p>		<p>WS 1.2, 2.2</p> <p>S 1c, 3b, c Students should be able to apply the equation for calculating the Period of a wave which is given on the Physics equation sheet.</p> <p>S 1c, 3b, c Students should be able to apply the equation for calculating wave speed.</p> <p>AT 1, AT 4 WS 2.3, 2.4, 2.6, 2.7, 3.1, 3.5</p> <p>Required practical activity 8: make observations to identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid and take appropriate measurements. AT skills covered by this practical activity: physics AT 4</p> <p>WS 2.2</p> <p>WS 1.4</p> <p>MS 3b, c Students should be able to apply the equation for magnetic flux density which is given on the physics equation sheet S 3b, c Students should be able to apply</p>			

		<p>the equation for calculating voltage for step up and step-down transformers which is given on the Physics equation sheet.</p> <p>WS 1.2 WS 1.1, 1.3</p>			
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SCIENCE CURRICULUM SEQUENCING

The curriculum has been designed around the AQA Specification but has been appropriately sequenced to ensure the order of these units has coincided with the seasons so that students can experience their learning in the field where appropriate and it builds in demand over the 2-year course for the three disciplines.

EXAM INFORMATION FOR GSCE QUALIFICATIONS IN THIS SUBJECT AREA

Click each link below to view the full specification:

[AQA Trilogy Science Specification](#)

[AQA Biology Specification](#)

[AQA Chemistry Specification](#)

[AQA Physics Specification](#)

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